NEW CITY COURT

Environmental Statement Part 1 - Main Text

Waterman Infrastructure & Environment

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Glossary of Terms

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 UK Ordnance Survey maps show heights above Ordnance Datum in metres.
Accuracy	A measure of how well a set of data fits the true value.
Adverse	Having a negative / harmful effect on a receptor.
Air Quality Strategy Objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedences within a specific timescale (see also air quality standard).
Air Quality Standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Alluvium	Sediment laid down by a river. Can range from sands and gravels deposited by fast flowing water and clays that settle out of suspension during overbank flooding. Other deposits found on a valley floor are usually included in the term alluvium (e.g. peat).
Ambient	The totally encompassing sound in a given situation.
Amenity	An element of a location or neighbourhood that helps to make it attractive or enjoyable for residents and visitors.
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.
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, 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.
Air Quality Management Area	Area designated under the Local Air Quality Management regime for areas currently, or forecast, to exceed National Air Quality Strategy objectives. Areas declared if a local authority finds any places where the national air quality objectives are not likely to be achieved.
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.
Archaeological Priority Zone	Defined zones or areas where, according to existing information, there is significant known archaeological interest or particular potential for new discoveries. Set out within London boroughs' local plans, these areas inform the practical use of national and local planning policies for the recognition and conservation of archaeological interest.
Baseline	Existing environmental conditions present on, or near, a site against which future changes may be measured or predicted.
Built Heritage	Upstanding structure of historic interest.
Conservation	The preservation or enhancement of a species or building/structure.
Conservation Area	An area designated under Planning (Listed Buildings and Conservation Areas) Act 1990 as being of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance.
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	The total effects on a receptor when effects from all sources are considered, including in-combination effects and from other surrounding schemes.
Cut Feature	Archaeological feature such as a pit, ditch or well, which has been cut into the then-existing ground surface.
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.
Decibel (dB)	The ratio of sound pressures, which we can hear, is a ratio of 106 (one million: one). For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (Lp) and the associated measurement is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.
Dust	Fine particles of solid materials ranging in size from 1 to 75µm (micrometres or microns - millionths of a metre) 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 Development	Development that falls under the Schedule 1 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended 2015) for which EIA is mandatory; or a Schedule 2 development screened into EIA or a development for which a voluntary EIA has been submitted.
Emission	A material that is expelled or released to the environment. Usually applied to gaseous or odorous discharges to the atmosphere.
Emission Rate	The quantity of a pollutant released from a source over a given period.
Environmental Statement	Document that reports the findings of an Environmental Impact Assessment.
Evaluation (archaeological)	A limited programme of non–intrusive and/or intrusive fieldwork which determines the presence or absence, and significance of archaeological features, structures, deposits, artefacts or ecofacts within a specified area.
Excavation (archaeological)	A programme of controlled, intrusive fieldwork with defined research objectives which examines, records and interprets archaeological remains, retrieves artefacts, ecofacts and other remains within a specified area. The records made and objects gathered are studied and the results published in detail appropriate to the project design.
Exceedance	Where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard over a given period.
Grade I listed building	A listed building of exceptional interest.
Grade II listed building	Buildings of special architectural or historic interest.
Grade II* listed building	Particularly significant buildings of more than local interest.
Geotechnical	Ground investigation, typically in the form of boreholes and/or trial/test pits, carried out for engineering purposes to determine the nature of the subsurface deposits.
Groundwater	Water associated with soil or rocks below the ground surface but is usually taken to mean water in the saturated zone.
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.

Historic environment Assessment	A written document whose purpose is to determine, as far as is reasonably possible from existing records, the nature of the historic environment resource/heritage assets within a specified area.
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 (HER)	A source of information for planning, development-control work, and land management, a HER is an information service that provides access to resources relating to the archaeological and historic built environment of a defined geographic area. Information contained includes details on local archaeological sites and finds, historic buildings and landscapes.
Iron Age	600 BC–AD 43.
Lawson Comfort Criteria	Scale for assessing the wind suitability of the Development in the built environment.
Later Medieval	AD 1066 – 1500
L_{A10}	The noise level exceeded for 10% of the measurement period. It has been used in the UK for the assessment of road traffic noise.
L_{A90}	The noise level exceeded for 90% of the measurement period. It is generally used to quantify the background noise level, the underlying level of noise which is present even during the quieter parts of the measurement period.
$L_{Aeq, T}$	The A-weighted sound pressure level of the steady sound which contains the same acoustic energy as the noise being assessed over a specific time period, T.
L_{AMAX}	Maximum value that the A-weighted sound pressure level reaches during a measurement period. $L_{Amax\ F}$, or Fast, is averaged over 0.125 of a second and $L_{Amax\ S}$, or Slow, is averaged over 1 second. Maximum noise levels were all monitored using the Fast response.
Listed Building	A building included in a statutory list produced by the Secretary of State for Culture, Media and Sport. It comprises buildings and other structures that are of special architectural or historic interest and are protected under the terms of the Planning (Listed Buildings and Conservation Areas) Act 1990.
Locally Listed Building	A structure of architectural and/or historical interest. These are included on the Secretary of State's list, which affords statutory protection. These are subdivided into Grades I, II* and II (in descending importance).
Made Ground	Artificial deposit. An archaeologist would differentiate between modern made ground, containing identifiably modern inclusion such as concrete (but not brick or tile), and undated made ground, which may potentially contain deposits of archaeological interest.

Mitigation (measure)	The measures put forward to prevent, reduce and where possible, offset any adverse effects on the environment.
Model adjustment	Following model verification, the process by which modelled results are amended. This corrects for systematic error.
National Planning Policy Framework	The National Planning Policy Framework sets out the Government's planning policies for England and how these are expected to be applied. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.
National Planning Policy Statement	National Planning Policy Statement (PPS) 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.
Non-Technical Summary (NTS)	A summary of the Environmental Statement in non-technical language providing a concise, yet comprehensive summary of the likely effects of the project on the environment.
Ordinance Datum	A vertical datum used by Ordnance Survey as the basis for deriving altitudes on maps.
Post Medieval	AD 1500-Present
Particulate matter	Discrete particles in ambient air, sizes ranging between nanometres (nm, billionths of a metre) to tens of micrometres or microns.
Peak Particle Velocity (PPV)	Peak Particle Velocity is the parameter normally used to assess ground vibration measured in mm/s. Peak particle velocity refers to the maximum speed of a particular particle as it oscillates about a point of equilibrium.
Permanent	Long-lasting or non-fading.
Planning Policy Guidance	Statements of the Government's national policy and principles towards certain aspects of the town planning framework. These policy documents have been replaced by Planning Policy Statements (see below).
Planning Policy Statement	A document issued by central government to replace the existing Planning Policy Guidance notes under the provisions of the Planning and Compulsory Purchase Act 2004. They are statements of the British Government's national policy regarding aspects of the town planning framework. They apply only in England.
Preservation by record	Archaeological mitigation strategy where archaeological remains are fully excavated and recorded archaeologically and the results published. For remains of lesser significance, preservation by record might comprise an archaeological watching brief.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.

$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5 micrometres.
Public Transport Accessibility Level (PTAL)	A measure which rates locations by distance from frequent public transport services.
Qualitative	Pertaining to or concerned with quality or qualities.
Quantitative	Of or pertaining to the describing or measuring of quantity.
(Sensitive) Receptor	Receptors comprise anything that may be affected by an environmental effect, be this human beings, socio-economic activity, habitats, species, controlled waters, landscape or cultural heritage.
Residual	When used to describe archaeological artefacts, this means not in situ, i.e. Found outside the context in which it was originally deposited.
Residual effects	Environmental effects remaining after mitigation measures have been implemented.
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.
Roman	AD 43-410
Scheduled Monument	An ancient monument or archaeological deposits designated by the Secretary of State as a 'Scheduled Ancient Monument' and protected under the Ancient Monuments Act.
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 effects arising as a result of a development, and an assessment of what further studies are required to establish their significance.
Section 106 obligation	A mechanism which make a development proposal acceptable in planning terms, that would not otherwise be acceptable. They are focused on site specific mitigation of the impact of development.
SEMP	Site-specific Environmental Management Plan
Sensitivity	The capacity of an organ or organism to respond to stimulation.
Setting	The context in which a building or area can be appreciated.
Significant	Important; of consequence
Site code	Unique identifying code allocated to archaeological fieldwork sites, e.g. evaluation, excavation, or watching brief sites.
Source	Location from which contamination is, or was, derived.

Study area	Defined area surrounding a site in which archaeological data is collected and analysed in order to set a site into its archaeological and historical context.
Sustainable Development	Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.
Sustainable Drainage Systems	Blue roof system and permeable paving.
Temporary	Lasting existing, serving, or effective for a time only; not permanent.
Threshold	The minimum value that will produce a response or specified effect.
Truncate	Partially or wholly remove. In archaeological terms remains may have been truncated by previous construction activity.
Topography	The natural or artificial features, level and surface form of the ground surface.
Type 1 effect	The cumulative effect of at least two interacting aspects of a proposed scheme (e.g. the combined effect of adverse noise, air quality and water quality effects on a habitat).
Type 2 effect	The cumulative effect caused by the combination of a proposed scheme and other existing or future projects.
$\mu g/m^3$ micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of $1\mu g/m^3$ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
Use Class A1	Class of land use as formerly set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments. Use Class A1 (now superseded by Use Class E) related to shops, retail warehouses, hairdressers, undertakers, travel and ticket agencies, post offices, pet shops, sandwich bars, showrooms, domestic hire shops, dry cleaners, funeral directors and internet cafes.
Use Class A3	Class of land use as formerly set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments. Use Class A3 (now superseded by Use Class E) relates to the sale of food and drink for consumption on the premises - restaurants, snack bars and cafes.
Use Class B1	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments. Use Class B1 relates to offices (other than those that fall within A2), research and development of products and processes, light industry appropriate in a residential area.

Use Class D2	Class of land use as formerly set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments. Use Class D2 (now superseded by Use Class E) relates to assembly and leisure, such as Cinemas, music and concert halls, bingo and dance halls (but not night clubs), swimming baths, skating rinks, gymnasiums or area for indoor or outdoor sports and recreations.
Use Class E	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments. This Use Class was introduced on 1st September 2020 and covers the former use classes of A1 (shops), A2 (financial and professional), A3 (restaurants and cafes), B1 (Business), as well as parts of D1 (non-residential institutions) and D2 (assembly and leisure) and puts them all into one new use class.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements.
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.
Vibration	A to-and-fro motion; a motion which oscillates about a fixed equilibrium position.
Vibration Dose Value (VDV)	Vibration Dose Value is a measure of vibration exposure.
Watching Brief	Formal programme of observation and investigation conducted during any operational phase carried out for non-archaeological reasons. This will be within a specific area or site on land, inter-tidal zone or underwater, whether there is the possibility that archaeological deposits may be disturbed or destroyed.
The Works	The collective name for the demolition, deconstruction, refurbishment and construction works for the Development

Abbreviations

AADT	Annual Average Daily Traffic
AAWT	Annual Average Weekly Traffic
ADF	Average Daylight Factor
AHMM	Allford Hall Monaghan Morris
ANC	Association of Noise Consultants
AOD	Above Ordnance Datum
APSH	Annual Probable Sunlight Hours
ASHP	Air Source Heat Pump
APZ	Archaeological Priority Zone
AQAL	Air Quality Assessment Level
AQMA	Air Quality Management Area
AQS	Air Quality Standard
ATC	Automatic Traffic Count
AVRs	Accurate Visual Representations
BID	Business Improvement District
bgl	below ground level
BGS	British Geological Society
BMU	Building Maintenance Unit
BNG	Biodiversity Net Gain
BPM	Best Practicable Means
BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method
BS	British Standard
BSI	British Standards Institution
CA	Conservation Area
CABE	Commission for Architecture and the Built Environment
CCS	Considerate Constructors Scheme
CCTV	Closed-Circuit Television
CDM	Construction (Design and Management)
CFA	Continuous Flight Auger
CFD	Computational Fluid Dynamics

CIfA	Chartered Institute for Archaeologists
CIL	Community Infrastructure Levy
CLP	Construction and Logistics Plan
CMP	Construction Management Plan
COSHH	Control of Substances Hazardous to Health
CoL	City of London
CRTN	Calculation of Road Traffic Noise
DAS	Design Access Statement
dB	Decibel
DEFRA	Department for the Environmental Food and Rural Affairs
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DSWMP	Delivery Servicing and Waste Management Plan
EA	Environmental Agency
EFT	Emission Factor Toolkit
EH	English Heritage
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EPO	Environmental Protection Officer
EPUK	Environmental Protection UK
ES	Environmental Statement
EU	European Union
FFL	Finished Floor Level
FRA	Flood Risk Assessment
FTE	Full Time Equivalent
GEA	Gross External Area
GIA	Gross Internal Area
GiGL	Greenspace Information for Greater London
GLA	Greater London Authority
GLAAS	Greater London Archaeology Advisory Services
GLHER	Greater London Historic Environment Record
GLVIA	Guidelines for Landscape and Visual Impact Assessment
ha	Hectare(s)

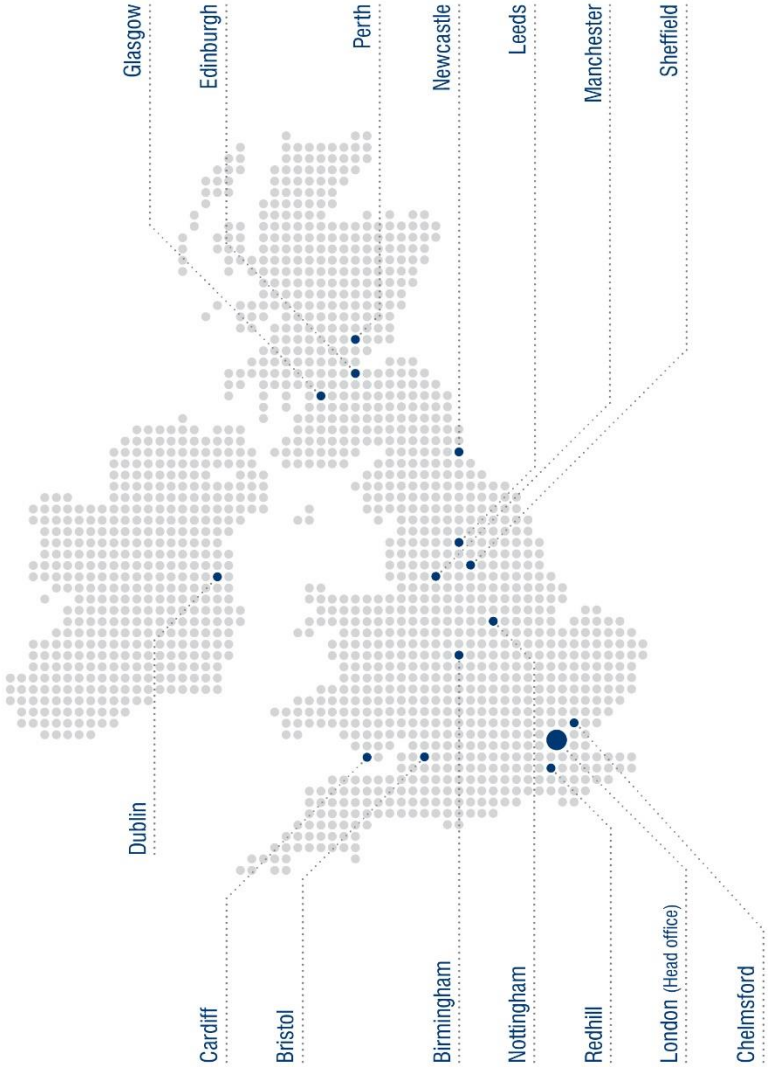
HCA	Home and Communities Agency
HDV	Heavy Duty Vehicle
HE	Historic England
HEA	Historic Environment Assessment
HGV	Heavy Goods Vehicle
HMSO	Her Majesty's Stationery Office
HSE	Health and Safety Executive
HTVIA	Heritage, Townscape and Visual Impact Assessment
HUDU	Health Urban Development Unit
IAQM	Institute of Air Quality Management
IEFs	Important Ecological Features
IEMA	Institute of Environmental Management and Assessment
ILP	Institute of Lighting Practitioners
IPPC	Integrated Pollution, Prevention and Controls
JNCC	Joint Nature Conservation Committee
KSI	Killed or Seriously Injured
l/s	Litres per second
LAARC	London Archaeological Archive and Research Centre
LAPPC	Local Authority Pollution, Prevention and Controls
LAQM	Local Air Quality Management
LBS	London Borough of Southwark
LDF	Local Development Framework
LPA	Local Planning Authority
LUL	London Underground Limited
LVMF	London View Management Framework
m	metre(s)
MCW	Management of Construction Work
MHCLG	Ministry of Housing, Communities & Local Government
NE	Natural England
NHLE	National Heritage List for England
NGR	National Grid Reference
NMR	National Monuments Record

NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
NPG	National Planning Guidance
NPPF	National Planning Policy Framework
NR	Network Rail
NSL	No Sky Line
NTS	Non-Technical Summary
OS	Ordnance Survey
PAN	Planning Advice Note
PCL	Pedestrian Comfort Levels
PEA	Preliminary Ecological Appraisal
PEP	Project Environmental Plan
PERA	Preliminary Environmental Risk Assessment
PERS	Pedestrian Environment Review System
PM_{10}	Particulate Matter 10 micrometers or less in diameter
$PM_{2.5}$	Particulate matter 2.5 micrometers or less in diameter
PPE	Personal Protective Equipment
PPG	Planning Policy Guidance
PPS	Planning Policy Statement
PTAL	Public Transport Accessibility Level
RC	Reinforced Concrete
SEMP	Site Environmental Management Plan
SFRA	Strategic Flood Risk Assessment
SI	Site Investigation
SMR	Sites and Monument Record
RODS	Rolling Origin and Destination Survey
SPG	Supplementary Planning Guidance
SPZ	Source Protection Zone
SR	Sensitive Receptor
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SWMP	Site Waste Management Plan

TA	Transport Assessment
TfL	Transport for London
TLRN	Transport for London Road Network
TMP	Traffic Management Plan
TP	Travel Plan
TPP	Transport Planning Professionals
TRICS	Trip Rate Information Computer System
TS	Transport Statement
TVIBHA	Townscape, Visual Impact and Built Heritage assessment
TWUL	Thames Water Utilities Limited
UK	United Kingdom
UKPN	UK Power Networks
ULR	Upward Light Ratio
VDV	Vibration Dose Value
VOA	Valuation Office Agency (VOA)
VSC	Vertical Sky Component
WHS	World Heritage Sites
WHO	World Health Organisation
WIE	Waterman Infrastructure & Environment
WRZ	Water Resource Zone
WSI	Written Scheme of Investigation
ZTV	Zone of Theoretical Visibility

waterman

UK and Ireland Office Locations



1. Introduction

1.1 GPE (St Thomas Street) Limited (hereafter referred to as the 'Applicant') is seeking to obtain full planning permission and listed building consent for the demolition of existing 1980s office buildings, part restoration and refurbishment of listed terrace, and redevelopment of Keats House with retention of existing façade, and construction of an office-led, mixed-use scheme (hereafter referred to as the 'Development'). The Development is proposed on a parcel of land on St. Thomas Street in the London Bridge area (hereafter referred to as the 'Site'). The Site covers an area of land of approximately 0.36 hectares (ha), is approximately centred on National Grid Reference (NGR) 532727 180155 and is located within the London Borough of Southwark (LBS). **Figure 1.1** and **Figure 1.2** illustrate the location of the Site and extent of the planning application boundary respectively.

1.2 The Development would comprise office and retail space within a new tower building of 26 storeys (106.90m AOD) in height, remodelled existing buildings and a double basement across part of the Site, together with publicly accessible rooftop garden, a new access to London Bridge Underground Station, new pedestrian routes and public realm at ground level. A detailed description of the Development is provided within **Chapter 5: The Development**.

1.3 An Environmental Impact Assessment (EIA) is a formal procedure that must be followed for certain types and scales of development, where the potential environmental effects of a development proposal are systematically assessed and reported, to assist in the determination of a planning application. The EIA process can also identify ways in which the Development can be modified, or adverse effects mitigated, so as to reduce or avoid potential adverse effects and to optimise beneficial effects. The likely significant environmental effects of the Development (during demolition, deconstruction, refurbishment and construction (hereafter referred to as the 'Works'), and once completed and operational) have been considered, alongside an analysis of the likely residual effects taking into account mitigation measures, together with relevant cumulative effects, and are presented within this Environmental Statement (ES).

Background Information

1.4 In December 2018 a planning application (Planning reference number 18/AP/4039) (hereafter referred to as the '2018 Application') was submitted for full planning permission for the Site comprising the demolition of the existing 1980s office buildings, part restoration and refurbishment of listed terrace, and redevelopment of Keats House with retention of existing façade, and construction of an office-led, mixed-use scheme.

1.5 An application for a listed building consent (planning reference number 18/AP/4039) was also submitted by the Applicant in December 2018, in relation to the proposed restoration works to the listed terrace. Together the applications are hereafter referred to as the 2018 Scheme.

1.6 The 2018 Scheme was described on the planning application form as follows:

'*Comprehensive redevelopment of the site to include demolition of existing 1980s office buildings and erection of a 37-storey building (including ground and mezzanine) of a maximum height of 144m (AOD), restoration and refurbishment of existing listed terrace, and redevelopment of Keats House with retention of existing façade to provide a total of 46,374 sqm of Class B1 office floorspace, 765 sqm of Class A1 retail floorspace, 1,139 sqm of Class A3 retail floorspace, 615*

sqm of leisure floorspace (Class D2), 719 sqm hub space (Class B1/D2) and a 825 sqm elevated public garden, associated public realm and highways improvements, new station entrance, cycling parking, car parking, servicing, refuse and plant areas, and all ancillary or associated works.'

1.7 Owing to the scale and nature of the Development and surrounding sensitive receptors, it was considered that the 2018 Scheme comprised 'EIA Development'. Correspondingly, an EIA was undertaken and the findings reported in an Environmental Statement (ES) (hereafter referred to as the 2018 ES), prepared by Waterman, which was submitted in support of the application.

1.8 The 2018 ES was prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017[1] (as amended) (hereafter referred to as the 'EIA Regulations and in line with the available best practice EIA guidance. An EIA Scoping Opinion was sought from LBS in relation to the Development in August 2018 to determine what topics should be examined under the ES. The scope of the EIA followed that set out in LBS's EIA Scoping Opinion received in October 2018, and subsequent correspondence with LBS (refer to the 'Legal Framework for the Environmental Statement' section below for further details).

1.9 Since submission of the 2018 ES, an ES Addendum (dated June 2020) was prepared and submitted to LBS to address clarifications requests on the 2018 ES, to review additional and substituted plans and whether these would result in any changes to the likely significant environmental effects presented in the 2018 ES. The 2018 Scheme, which is independent from the Application has not yet been determined by LBS.

Site Context

1.10 The Site is bound by St. Thomas Street to the north; shops on Borough High Street (A3) to the west; King's Head Yard to the south; and Guy's Hospital buildings to the east. It is currently almost entirely occupied by:

- Georgian terraced townhouses at Nos. 4, 6, 8, 12, 14 and 16 St. Thomas Street (No. 10 St. Thomas Street does not exist), referred to as the 'Georgian Terrace';
- New City Court office building at No. 20 St. Thomas Street; and
- Keats House at Nos. 24 to 26 St. Thomas Street.

1.11 In addition to the above, there is also a central courtyard at lower ground level, which adjoins the rear of the townhouses, and a service area off King's Head Yard. There is no public open space on the Site, although a non-public pedestrian route runs through the Site from St. Thomas Street to King's Head Yard.

Development Context

1.12 The Site falls within the London Bridge Borough and Bankside Opportunity Area, as designated by the London Plan[2], and the London Bridge Business Improvement District (BID), which provides additional or improved services to business within the BID, including extra safety, cleaning and environmental improvement measures.

1.13 The Development seeks to enhance the area of Southwark around London Bridge station, St. Thomas Street and Borough High Street by regenerating the underutilised historic yards to provide accessible new public spaces, improve pedestrian connections, and retain and restore

built heritage on Site. A clear set of objectives have developed through rigorous investigation over the course of seven years of study and extensive consultation.

1.14 These objectives can be summarised as follows:

- Retain and enhance the listed and historic buildings of merit on Site;
- Enhance transport links and reduce pedestrian congestion;
- Create new connections and desire lines;
- Create generous new public realm;
- Enhance the setting of adjacent buildings;
- Provide new retail space;
- Provide new workspace including an extensive affordable offer; and
- Create a public roof top amenity.

1.15 The Applicant aims to regenerate the Site including delivery of the following:

- Demolition of the existing 1980s buildings and alterations, sympathetic restoration of listed Georgian terrace buildings along St Thomas Street, and reconstruction of Keats House with retention of existing façade;
- Delivery of a highly sustainable 26-storey building (plus mezzanine and two basement levels) extending to 108.0 m AOD, providing 44,312 sqm (GIA) of high-quality office floorspace (Class E);
- Introduction of 340 sqm (GIA) of flexible office/retail floorspace (Class E) at ground floor level of proposed office building, activating the proposed public realm;
- Provision of 5,017 sqm (GIA) of affordable workspace (Class E) within the Georgian terrace buildings, Keats House and levels 1 and 2 of the proposed office building, representing 10% of the overall office provision;
- Delivery of publicly accessible rooftop garden with high-quality landscaping and a complementary café and restaurant providing 421 sqm food/drink floorspace (Class E);
- Delivery of high quality and fully accessible public realm, providing enhanced connectivity through new public routes and a new covered public arcade;
- Creation of a new entrance to London Bridge Underground Station; and
- Improved onsite servicing strategy to maximise servicing options and minimise impact on the local highway.

Legal Framework for the Environmental Statement

1.16 The EIA Regulations require that, before consent may be granted for certain types of development, an EIA must be undertaken. The EIA Regulations set out the types of development which must always be subject to an EIA (Schedule 1 development) and other developments which may require assessments based on certain thresholds and criteria, and therefore, are considered likely to give rise to significant environmental effects (Schedule 2 development), subject to the screening criteria set out in Schedule 3 of the Regulations.

1.17 The Development falls under Schedule 2, Category 10(b) of the EIA Regulations which relates to 'Urban development projects' where 'the development includes more than 1 ha of urban development which is not dwelling house development'; or 'includes more than 150 dwellings'; or the 'overall area of the development exceeds 5 ha'. The Site is less than 1 ha in area and the Development does not propose the provision of residential dwellings; however, due to the nature and scale (proposed uses, size and quantum) of the Development and surrounding environment (sensitive receptors), and the proposed provision of 'urban development which is not dwelling house development', the Applicant has decided to voluntarily undertake an EIA to identify and assess the likely significant environmental effects of the Development, to ensure that adverse effects are mitigated through design wherever possible. As such, a formal EIA Screening Opinion regarding whether the Development requires an EIA has not been sought from LBS. It is considered that by virtue of the 2018 Scheme being considered EIA Development the Development shall be considered EIA Development also owing to its similar nature and scale..

1.18 Waterman Infrastructure & Environment Limited (hereafter referred to as 'Waterman IE') has been appointed by the Applicant to coordinate the EIA process and to prepare this ES for the Development. This ES will be submitted in support of the full planning and listed building consent applications.

1.19 A key stage of the EIA process is 'EIA Scoping', which enables the identification of the likely significant effects to be addressed and the scope of the various technical studies to be undertaken as part of the full EIA process. On the basis of the existing knowledge of the Site obtained from the 2018 ES it was not considered necessary to request a formal Scoping Opinion, therefore, an informal EIA Scoping Letter was submitted to LBS on 19 February 2021 (**Appendix 2.1**), which was based on the EIA Scoping Report submitted for the 2018 Scheme (Annex 1 to **Appendix 2.1**). It is anticipated that this approach will enable any minor changes to the methodology as a result of the difference in the Development proposals to be identified with the relevant technical officers and stakeholders. An EIA Scoping Opinion was received on 4 October 2018 for the 2018 Scheme and this is presented in Annex 2 of **Appendix 2.1**. A response to the informal EIA Scoping Letter was received from LBS on 9 March 2021 (**Appendix 2.2**) which confirmed that covering the same topics and format as the 2018 ES seems appropriate given the similar scale of the Development. This EIA scoping process is described in further detail in **Chapter 2: EIA Methodology**.

1.20 As set out in the preceding paragraph, this EIA has been undertaken in line with the 2018 EIA Scoping Opinion and subsequent correspondence with LBS to determine the likely significance of environmental effects arising as a result of the Development, and the nature of any mitigation measures that may be required. The findings of the EIA are presented in this document, which forms an ES for the purposes of the EIA Regulations. The planning application will be determined by LBS, taking into account the environmental effects of the Development reported herein.

1.21 In accordance with the EIA Regulations, this ES considers the likely significant environmental effects of the Development during demolition, deconstruction, refurbishment and construction (hereafter referred to as 'the Works'), and once the Development is completed and operational. The cumulative effects of the Development together with cumulative schemes have also been considered. Where significant adverse effects on the environment are identified, the ES sets out measures that should be implemented to prevent, reduce and, where possible, offset these effects. These are known as mitigation measures. The ES also presents an assessment of the

likely residual effects of the Development which would occur following implementation of the mitigation measures.

Nature of the Planning Applications

1.22 The full planning and listed building applications for the Development have been submitted to LBS for determination. The Applicant is seeking permission for:

'Redevelopment to include demolition of the 1980s office buildings and erection of a 26-storey building (plus mezzanine and two basement levels), restoration and refurbishment of the listed terrace (nos. 4-16 St Thomas Street), and redevelopment of Keats House (nos. 24-26 St Thomas Street) with removal, relocation and reinstatement of the historic façade on a proposed building, to provide office floorspace, flexible office/retail floorspace, restaurant/café floorspace and a public rooftop garden, associated public realm and highways improvements, provision for a new access to the Borough High Street entrance to the Underground Station, cycling parking, car parking, service, refuse and plant areas, and all ancillary or associated works.'

1.23 The Development is defined by the drawings submitted as part of the application. These drawings, together with the description of the Development being provided in **Chapter 5: The Development** of this ES, form the basis of the EIA. A selection of drawings used to inform the EIA is presented in **Part 2: Figures** of this ES.

1.24 A description of the anticipated demolition and construction programme, together with the likely construction activities, is provided in **Chapter 6: Development Programme, Demolition, Deconstruction, Refurbishment and Construction** of this ES. Information set out in **Chapter 6** of this ES was used to inform the assessment of likely significant environmental effects associated with the Works.

Structure of the Environmental Statement

1.25 The ES comprises four separate parts:

- **Part 1**: Main Text (this document);
- **Part 2**: Figures;
- **Part 3**: Townscape, Visual Impact and Built Heritage Assessment; and
- **Part 4**: Appendices.

1.26 In addition, a Non-Technical Summary (NTS) of the ES has been prepared and is presented as a standalone document. All parts and the NTS should be read together since they present the full ES.

1.27 A summary of the content of each part of the ES is as follows:

Environmental Statement Part 1 – Main Text

1.28 This Part comprises 15 Chapters, including a description of the approach to the EIA (**Chapter 2: EIA Methodology**); the Site, existing land-use activities and surroundings (**Chapter 3: Existing Land Uses and Activities**); the main alternatives that were reasonably considered by the Applicant (**Chapter 4: Alternatives and Design Evolution**); the nature, extent and justification

for the Development (**Chapter 5: The Development**) and the Works (**Chapter 6: Development Programme, Demolition, Deconstruction, Refurbishment and Construction**). Chapters 7 to 14 present the findings of the EIA for the following disciplines: Transport; Noise and Vibration; Air Quality; Archaeology; Water Resources and Flood Risk; Wind Microclimate; Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare; and Cumulative Effects. **Chapter 15: Residual Effects and Monitoring** presents a summary of the residual effects and proposed monitoring identified in the ES.

1.29 Each technical Chapter of the ES is set out in accordance with Government guidance and best practice, and comprises: (i) an introduction; (ii) a methodology of assessment (iii) a description of baseline conditions; (iv) an assessment of the likely environmental effects of the Development; (v) a description of mitigation measures and discussion on residual effects and (vi) a summary of the key issues.

1.30 There is a summary of the residual effects and any monitoring of post-mitigation environmental effects in **Chapter 15: Residual Effects and Monitoring**.

1.31 Further detail on the structure of the technical chapters is provided in **Chapter 2: EIA Methodology**.

Environmental Statement Part 2 – Figures

1.32 Part 2 of the ES comprises a set of figures and illustrations that support the main text of the ES (**Part 1**). Therefore **Part 1: Main Text** and **Part 2: Figures** should be read in conjunction with one another.

Environmental Statement Part 3 – Townscape, Visual Impact and Built Heritage Assessment

1.33 Part 3 sets out the findings of the Townscape, Visual Impact and Built Heritage Assessment, including a series of Accurate Visual Representations (AVRs) of the Development. Although separate from **Part 1**, the assessment described in **Part 3: Townscape, Visual Impact and Built Heritage Assessment** forms an integral part of the EIA reported in this ES.

Environmental Statement Part 4 – Appendices

1.34 **Part 4** comprises appendices (such as data, reports and correspondence) that are relevant evidence bases to the assessments reported in **Part 1** of this ES. The appendices are supplied as a separate part of the ES to prevent the main text of the ES becoming excessively long.

Environmental Statement – Non-Technical Summary

1.35 This comprises a summary of the ES in ‘non-technical language’ as required under the EIA Regulations. Its objective is to provide a concise and balanced summary of the ES without excessive technical detail or scientific language, so as to be readily understood by stakeholders and members of the public that are not familiar with EIA terminology. The NTS is produced as a separate document that is freely available to facilitate wider public distribution.

Project Team

1.36 The EIA has been co-ordinated by Waterman IE. Waterman IE has prepared the ES in conjunction with a team of competent experts, as required by Regulation 18 of the EIA Regulations, which states:

"In order to ensure the completeness and quality of the environmental statement: (a) the developer must ensure that the environmental statement is prepared by competent experts; and (b) the environmental statement must be accompanied by a statement from the developer outlining the relevant expertise or qualifications of such experts".

1.37 **Table 1.1** sets out a summary of relevant qualifications and experience of the professional team who have prepared and contributed to this ES. It should also be noted that Waterman IE is a Registered Environmental Impact Assessor Member of the Institute of Environmental Management and Assessment (IEMA), providing independent recognition of the quality of Waterman's EIA work.

Table 1.1: Competent Experts' Qualifications and Experience

Name	Qualifications	Relevant Experience
Steve Brindle (EIA co-ordinator)	BSc (Hons), MSc MIEMA, CEnv	Over 20 years' experience undertaking, preparing, coordinating and directing EIA for a wide range of projects under the UK's EIA regimes.
Ellen Smith (EIA co-ordinator)	BSc (Hons) Geography. Msc Environmental Assessment and Management. Practitioner Member of the Institute of Environmental Management and Assessment (PIEMA).	Over 7 years' experience of co-ordinating EIAs and preparing ES' primarily for large, complex residential-led mixed-use projects.
Mark Maclagan (Noise and Vibration)	Corporate Member of the Institute of Acoustics (MIOA)	13 years' experience of preparing Noise and Vibration Environmental Statement Chapters and Planning Assessments under the Town & Country Planning Act EIA Regulations.
Andrew Fowler (Air Quality)	CEnv BSc (Hons) Member of the IAQM AIEMA (Associate Member of the Institute of Environmental Management and Assessment) Full Member of the Institution of Environmental Sciences (IES)	9 years' experience in the environmental sector with five years in the assessment of air quality and odour for a variety of projects including EIAs.
Patricia Pino (Wind Microclimate)	Meng Mechanical Engineering, CEng IMechE	Chartered Engineer with over 12 years combined experience in Computational Fluid Dynamics (CFD) analysis and the built environment. Developed methods for pedestrian comfort analysis, air dispersion and natural ventilation. Lead

Name	Qualifications	Relevant Experience
		on various architectural wind CFD projects within the City of London and across the UK.
Lotte Tobermann (Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare)	BA (Hons), MSc	Lotte Tobermann is the EIA Coordinator at GIA, with 3 years working in the built environment industry, responsible for the production of EIA works relation to daylight, sunlight, overshadowing and solar glare.
Peter Stewart (Townscape, Heritage Visual Impacts Assessment)	MA (Cantab) Dip Arch RIBA	Former Director of Design Review at the Commission for Architecture and the Built Environment (CABE). 15 years' experience of preparing townscape, visual impact, and built heritage assessments for major projects under the Town & Country Planning Act EIA Regulations.
Jonathan Freeman (Townscape, Heritage Visual Impacts Assessment)	BSc PGDip MSc MRTPI	6 years' experience of preparing townscape, visual impact, and built heritage assessments for major projects under the Town & Country Planning Act EIA Regulations.
Christina Holloway (Archaeology)	BA (Hons); Diploma in Field Archaeology	Christina has 20 years' experience in professional archaeology and has specialised in archaeological assessments and EIAs for 12 years.
Ashley Blair (Archaeology)	BA (Hons) Anthropology; MA Maritime Archaeology	Ashley has over 11 years' experience in professional archaeology and has specialised in archaeological assessments and EIAs for 4 years.

1.38 In addition to the competent experts as set out in **Table 1.1**, the assessments undertaken have been based on information provided by the professional team as set out in **Table 1.2**.

Table 1.2: Professional Design Team

Role	Organisation
Applicant	GPE (St Thomas Street) Limited (GPE)
Planning Consultant	DP9
Project Managers	Gardiner & Theobald (G&T)
EIA Project Managers and authors of technical assessments for: air quality, noise and vibration. Author of Water Resources and Flood Risk Chapter	Waterman IE
Planning Lawyers	Town Legal LLP

Role	Organisation
Architect	Allford Hall Monaghan Morris (AHMM)
Landscape Architect	MRG Studio
Transport Consultant	Transport Planning Practice (TPP)
Archaeology Consultant	Museum of London Archaeology (MOLA)
Wind Microclimate Consultant	Wirth Research
Daylight, Sunlight, Overshadowing and Solar Glare Consultant	Gordon Ingram Associates (GIA)
Townscape, Visual Impact and Built Heritage Consultant	Peter Stewart Consultancy and KM Heritage
Economics and Health Consultant	Volterra
Utilities, transport, flood risk and structural engineers	AKTII
Mechanical and Electrical Engineers	Chapman BDSP
Construction Advisors	Gardiner & Theobald

ES Availability and Comments

1.39 The ES is available for viewing by the public on the LBS website: https://www.southwark.gov.uk/. Copies of the ES are also available for viewing by the public at New City Court, between the hours of 9am and 5pm weekdays, by prior appointment only. Comments on the planning application should be made on LBS's website: https://www.southwark.gov.uk/planning-and-building-control

1.40 Additional copies of the ES can be purchased from Waterman IE on request (by emailing ie@watermangroup.com). A CD version of the ES can be purchased at a cost of £25. The Non-Technical Summary is available at no cost.

References

1 Her Majesty's Stationery Office, (2017); Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

2 Greater London Authority, (2021); London Plan: Chapter 2: Spatial Development Patterns, March 2021.

2. EIA Methodology

Introduction

2.1 This chapter sets out the general approach to, and methodology for undertaking, 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. In particular, this chapter details the process of identifying the environmental issues to be addressed in the EIA and the general method of assessing the likely significance of effects.

2.2 Specific assessment methodologies and significance criteria relating to each technical assessment scoped into the EIA are provided in the relevant technical chapters of this Environmental Statement (ES) (**Chapter 7** to **Chapter 14** inclusive) and in **Part 3: Townscape, Visual Impact and Built Heritage Assessment**.

General Approach

2.3 As outlined in **Chapter 1: Introduction**, this ES has been prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017[1] (hereafter referred to as the 'EIA Regulations'). Reference has also been made to currently available best practice guidance in EIA, including (but not limited to) the:

- Planning Practice Guidance[2]; and
- Institute of Environmental Management and Assessment's (IEMA's) Guidelines for Environmental Impact Assessment[3] and Quality Mark Review Criteria[4].

2.4 Topic specific guidance relevant to the technical chapters of this ES are referred to within **Chapters 7** to **Chapter 14** and in **Part 3: Townscape, Visual Impact and Built Heritage Assessment**.

2.5 Likely significant environmental effects were assessed based on environmental knowledge of the existing Site and surrounding land. The assessments have addressed both the potential beneficial and adverse significant effects of the Development during the Works, and once the Development is completed and operational. In line with legislative and best practice requirements, direct, indirect, cumulative, short-term, medium-term, long-term, permanent, temporary, beneficial and adverse effects have been addressed where applicable. The approach taken in the assessment of cumulative effects is set out later in this chapter and within **Chapter 14: Cumulative Effects**.

2.6 As outlined in **Chapter 1: Introduction**, the Applicant is seeking full planning permission for the Development. The description of the Development within this ES must be sufficient to enable the requirements of the EIA Regulations to be fulfilled and, in particular, to enable the determining authority, the London Borough of Southwark (LBS), to identify the likely significant effects of the Development.

2.7 The details of the demolition, deconstruction refurbishment and construction, and operation of the Development which are assessed and reported in this ES are set out in **Chapter 5: The Development** and **Chapter 6: Development Programme, Demolition, Deconstruction, Refurbishment and Construction**.

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

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

Location of Information Required by 2017 EIA Regulations within ES

2.10 Schedule 4 of the EIA Regulations sets out the type of information that is required to assess the environmental effects of a development. This information, and where it can be located within the ES, is presented in **Table 2.1**.

Table 2.1 Location of Information within the ES (as defined by Schedule 4 of the EIA Regulations)

Specified Information		Location in the ES
1.	A description of the development, including in particular:	
(a)	A description of the location of the development;	**Chapter 1**: Introduction **Chapter 3**: Existing Land Uses and Activities
(b)	A description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;	**Chapter 5**: The Development **Chapter 6**: Development Programme, Demolition, Deconstruction, Refurbishment and Construction
(c)	A description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;	**Chapter 5**: The Development **Chapter 6**: Development Programme, Demolition, Deconstruction, Refurbishment and Construction
(d)	An estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities) and types of waste produced during the construction and operation phases.	**Chapter 6**: Development Programme, Demolition, Deconstruction, Refurbishment and Construction **Chapter 8**: Noise and Vibration **Chapter 9**: Air Quality **Chapter 11:** Water Resources and Flood Risk:

Specified Information		Location in the ES
		Appendix 11.1: Flood Risk Assessment **Chapter 13**: Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare **Appendix 2.3:** Preliminary Environmental Risk Assessment (PERA)
2.	A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.	**Chapter 4**: Alternatives and Design Evolution
3.	A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.	**Chapter 3**: Existing Land Uses and Activities All technical Chapters (**Chapters 7-14**) Townscape, Visual Impact and Built Heritage Assessment (provided in **Part 3** of this ES)
4.	A description of the factors specified in regulation 4(2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape	All technical Chapters (**Chapters 7-14**) Townscape, Visual and Built Heritage Assessment (provided in **Part 3** of this ES)
5	A description of the likely significant effects of the development on the environment resulting from, inter alia:	
(a)	The construction and existence of the development, including, where relevant, demolition works;	**Chapter 6**: Development Programme, Demolition, Deconstruction, Refurbishment and Construction
(b)	The use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;	**Chapter 4**: Alternatives and Design Evolution **Chapter 5**: The Development

Specified Information		Location in the ES
		Chapter 11: Water Resources and Flood Risk **Appendix 11.1**: Flood Risk Assessment **Appendix 2.3:** PERA
(c)	The emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;	**Chapter 6**: Development Programme, Demolition, Deconstruction, Refurbishment and Construction **Chapter 8**: Noise and Vibration **Chapter 9**: Air Quality **Chapter 13**: Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare
(d)	The risks to human health, cultural heritage or the environment (for example due to accidents or disasters);	All technical Chapters (**Chapters 7-14**). Townscape, Visual Impact and Built Heritage Assessment (provided in **Part 3** of this ES)
(e)	The cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;	**Chapter 14:** Cumulative Effects
(f)	The impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;	**Chapter 5**: The Development **Chapter 9:** Air Quality
(g)	The technologies and the substances used	**Chapter 4**: Alternatives and Design Evolution **Chapter 5**: The Development All technical Chapters (**Chapters 7-14**) Townscape, Visual Impact and Built Heritage Assessment (provided in **Part 3** of this ES)
6.	A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	**Chapter 2**: EIA Methodology All technical Chapters (**Chapters 7-14**) and the Townscape, Visual Impact and Built Heritage Assessment (provided in **Part 3** of this ES), where appropriate.
7.	A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and,	All technical Chapters (**Chapters 7-14**)

Specified Information		Location in the ES
	where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	Townscape, Visual Impact and Heritage Assessment (provided in **Part 3** of this ES)
8.	A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies	**N/A -** Risk Assessment has been scoped out of the EIA (refer to **Appendix 2.1** given the proposed uses; the Site is not located near any hazardous facilities; flood risk is addressed in **Chapter 11**; and the Applicant is committed to implementing a Site-specific Environmental management Plan to manage environmental risks during the construction works (refer to **Chapter 6**).
9.	A non-technical summary of the information provided under paragraphs 1 to 8.	**Non-Technical Summary** (NTS) (a separate standalone document)
10.	A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.	All technical Chapters (**Chapters 7-14**) and the Townscape, Visual Impact and Built Heritage Assessment (provided in **Part 3** of this ES), where appropriate.

Requirements of the EIA Process

Scoping of the EIA

2.11 The ‘Scoping’ stage of the EIA process involves focussing the EIA on those issues of greatest likely significance throughout the design and construction, completion and operation of the Development, to ensure that appropriate mitigation options are considered and incorporated into the Development where possible.

2.12 The 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 a LPA is not mandatory. The Applicant commissioned Waterman Infrastructure & Environment Limited (Waterman IE) to prepare an informal EIA Scoping letter (**Appendix 2.1**), which was based on the EIA Scoping Report submitted for the 2018 Scheme (Annex 1 of **Appendix 2.1**). This was

submitted on 19 February 2021 to provide LBS with an opportunity to comment on the content of the EIA and the broad EIA methodology.

2.13 The key issues to be scoped into the EIA were identified through a review of the emerging Development design, the consideration of available baseline information, consultation with various statutory consultees as part of the 2018 Scheme process, and the application of professional judgement and relevant experience.

2.14 Following receipt of the 2018 EIA Scoping Report, LBS consulted with a number of statutory and non-statutory consultees before providing their formal EIA Scoping Opinion on the 2018 Scheme which was received on 4 October 2018 (Annex 2 of **Appendix 2.1**). The 2018 EIA Scoping Opinion broadly agreed with the scope proposed, and additionally requested the topic of Surface Water Drainage and Flood Risk to be scoped into the EIA. The EIA was undertaken, and the 2018 ES was prepared in accordance with the Scoping Opinion and subsequent correspondence with LBS. A response to the informal EIA Scoping Letter submitted on 19 February 2021 was received from LBS on 9 March 2021 (**Appendix 2.2**). This response confirmed that it was appropriate for the ES accompanying the Development application to cover the same topics and format as the 2018 ES, given the similar scale of the Development.

Potentially Significant Issues

2.15 Based on the EIA Scoping process, set out in the preceding paragraphs, 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 Part (and where relevant, Chapter) in which they are considered within this ES:

- Transportation and Access (ES Part 1, Chapter 7);
- Noise and Vibration (ES Part 1, Chapter 8);
- Air Quality (ES Part 1, Chapter 9);
- Archaeology (ES Part 1, Chapter 10);
- Water Resources and Flood Risk (ES Part 1, Chapter 11);
- Wind Microclimate (ES Part 1, Chapter 12);
- Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare (ES Part 1, Chapter 13);
- Cumulative Effects (ES Part 1, Chapter 14);
- Residual Effects and Monitoring (ES Part 1, Chapter 15); and
- Townscape, Visual Impact and Built Heritage Assessment (ES Part 3).

2.16 The methodology for the technical assessments in the EIA, as reported in the ES are broadly unchanged from those reported in the 2018 ES. This is on the basis that the proposed Development would provide similar uses and quantum of accommodation to the 2018 Scheme, albeit within a somewhat modified massing.

2.17 As part of the informal EIA Scoping letter (**Appendix 2.1**), the agreed 2018 ES scope of works were reviewed to identify any updates/changes in relation to the following:

- Updated legislation, guidance, industry best practice and policy context;

- Updated baseline information;
- Further and updated surveys undertaken since the 2018 ES Scope was agreed;
- Additional assessment and information, as is relevant, that was identified as being required within the detailed ES reviews undertaken by Land Use Consultants (LUC) on behalf of LBS of the 2018 ES;
- Current data availability and representativeness due to the COVID-19 restrictions; and
- Revised scheme proposals.

Insignificant Issues

2.18 As part of the 2018 EIA scoping process, it was agreed with LBS that the following themes and new topic areas (which were not included within the previous EIA Regulations[5]) would be unlikely to give rise to significant environmental effects as a result of the Development. An updated Preliminary Environmental Risk Assessment (PERA) and Preliminary Ecological Appraisal (PEA) has been provided for this application and appended to this Chapter as **Appendix 2.3** and **2.4** (previously appended to the EIA Scoping Report). Accordingly, the following environmental disciplines were considered as 'insignificant issues' and therefore are not considered further within this ES:

- Socio-economics;
- Human Health;
- Ground Conditions and Contamination (refer to **Appendix 2.3: Preliminary Environmental Risk Assessment** which identifies the overall risk rating for the Site as low to medium which becomes low once the remedial and mitigation measures recommended within the report are successfully implemented);
- Biodiversity (refer to **Appendix 2.4: Preliminary Ecological Appraisal** which concludes the Site is not considered to support any Important Ecological Features that would likely be significantly affected by the Development);
- Climate Change;
- Waste; and
- Risk of Major Accidents and Disasters.

2.19 In addition, it was agreed that effects on telecommunications and risk to aviation were not considered significant issues and are also engineering design issues rather than environmental effects. Further details on why topics were scoped out are included in Annex 1 of **Appendix 2.1** (2018 EIA Scoping Report) and Annex 2 of **Appendix 2.1** (2018 EIA Scoping Opinion).

Consultation

2.20 Extensive consultation has been undertaken throughout the EIA process for both the 2018 Scheme and for this Application. Since submission of the 2018 Scheme, the Applicant and their consultant team have provided a number of documents to support and clarify the contents of that application submission, as well as a number of additional and substitute plans. An ES Addendum to the 2018 ES was submitted in June 2020 to ensure that the ES presented the likely significant

environmental effects of the proposals as amended by the new and substituted plans and comments received. This ES, where appropriate, has reviewed the post-submission comments raised during the review of the 2018 ES, and addressed these issues as necessary

2.21 The following statutory and non-statutory organisations were consulted regarding the Development throughout the EIA process either directly by the EIA team or by LBS through the Scoping Opinion consultations and post-submission of the 2018 Scheme:

- LBS;
- Greater London Authority (GLA);
- Environment Agency;
- Natural England;
- Historic England;
- Greater London Archaeological Advisory Service (GLAAS);
- Transport for London (TfL);
- London Underground Limited (LUL);
- Network Rail (NR);
- Thames Water (TW); and
- Local community groups and residents.

2.22 All relevant comments received from the consultees relating to the EIA (whether made directly to the EIA consultant team, or through the Scoping Opinion), are addressed in the relevant technical Chapters (**Chapters 7** to **14** and **Part 3** of the ES).

2.23 Copies of consultation responses received directly by the EIA consultant team, in addition to those received by LBS as part of their consultation process, can be found in **Appendix 2.2**.

2.24 Consultation with Historic England, the GLA and other bodies including Historic Royal Palaces took place for the 2018 Scheme and this Application in relation to the townscape, visual impact and built heritage assessment. This consultation is reported in **Part 3: Townscape, Visual Impact and Built Heritage Assessment**.

2.25 Kanda Consulting LLP undertook comprehensive consultation with the local community for the 2018 Scheme through a survey in September 2017, meeting local stakeholder groups and public events in July 2017 and October 2018 on the Development proposals. In addition, the Applicant has provided regular updates on the proposals for the Development to the London Bridge Stakeholder Board Bi-annual meeting, a meeting organised by Southwark Council and Team London Bridge to facilitate discussion between Stakeholder Groups and major land owners in the area. The same programme of consultation was undertaken for this Application, mainly between January 2021 to April 2021.

Means of Assessment

2.26 Detailed methodologies for the assessment of each of the environmental topic areas scoped into the EIA are provided within each technical chapter of this ES (**Chapters 7 to 14** inclusive and **ES**

Part 3: Townscape, Visual Impact and Built Heritage Assessment). However, in general terms, the assessments have been based upon:

- A review of the current situation at and surrounding the Site for the environmental topic areas under consideration, via various sources of existing information, data and reports;
- Desk-top studies;
- Site surveys;
- Consideration of relevant legislation and planning policies (national, regional and local);
- Identification of potential environmental effects and an evaluation of their likely duration, magnitude and significance;
- Consideration of potentially sensitive receptors that could be affected by the Development;
- Expert opinion;
- The use of technical guidance and best practice; and
- Specific consultations with the appropriate organisations (e.g. Environment Agency and Thames Water).

Evaluation of Significance

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

2.28 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 technical Chapter.

2.29 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 negligible and whether the effects are considered to be adverse or beneficial.

2.30 Specific criteria for each environmental topic were 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.

2.31 In order to provide a consistent approach to expressing the outcomes of the various technical assessments undertaken as part of the EIA, the following terminology has been used throughout this ES to define residual effects:

- **Adverse** – detrimental or negative effects to an environmental resource or receptor;
- **Negligible** – Imperceptible effects to an environmental resource or receptor; or
- **Beneficial** – advantageous or positive effect to an environmental resource or receptor.

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

- **Minor** – slight, very short or highly localised effects of no significant consequence;
- **Moderate** – limited effect (by extent, duration or magnitude) which may be considered significant; and
- **Major** – considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards.

2.33 For the purposes of this ES, minor, moderate and major are all considered as 'significant' effects in accordance with the EIA Regulations. The exception to this is in the Townscape, Visual Impact and Built Heritage Assessment, where owing to topic-specific guidance (Guidelines for Landscape and Visual Impact Assessment (Third Edition)[6], minor or minor/moderate effects are considered to be not significant; moderate and major effects are considered as significant effects. This is clearly explained within **Part 3: Townscape, Visual Impact and Built Heritage Assessment**.

2.34 Each of the technical chapters within the ES will outline the criteria, including sources and justifications, for identifying 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.

2.35 Specific criteria for each environmental topic will give 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 where appropriate;
- Sensitivity of the receptor; and
- Compatibility with environmental policies.

2.36 In this ES, the following terminology will also be used to define the temporal and spatial scale of the effects:

- ‘Short’ to ‘medium-term’ effects are considered to be those associated with the demolition, deconstruction, refurbishment and construction of the Development;
- ‘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 administrative boundary of Southwark Council;
- ‘Regional’ effects are those affecting receptors within the Greater London area; and
- ‘National’ effects are those that affecting receptors within different parts of the country or England as a whole.

Establishing a Baseline

2.37 For the purposes of EIA, the baseline condition is the baseline against which the assessment of likely changes (i.e. environmental effects) arising from demolition, construction and operational use of a development is made. These are generally taken to be the environmental and built characteristics of a site (in terms of air quality, noise, ecology, geology) and its environs that exist at the time of undertaking the EIA.

2.38 To establish a robust baseline for the EIA, Site surveys and desk-based data collation was undertaken in respect of the existing conditions of the Site and immediate surroundings between 2017 and 2021. Where data is used before this time, this is considered in the relevant technical chapter. Baseline conditions, which are described in each of the technical chapters (**Chapter 7** to **Chapter 13**) of the ES, were established through a review of publicly available records, data, historical reports and surveys. Due to COVID-19 affecting travel patterns and data gathering, in some cases collation of new baseline data was not possible as the findings would not be considered representative of normal conditions. Therefore, the previous baseline data used for the 2018 Scheme has been re-used within this ES. This is clearly set out within the relevant technical chapters (**Chapter 7: Transportation and Access**, **Chapter 8: Noise and Vibration** and **Chapter 9: Air Quality** and **Part 3: Townscape, Visual Impact and Built Heritage Assessment**).

Cumulative Effects

2.39 In line with the EIA Regulations, an EIA must consider the cumulative effects or effect interactions of a development. Cumulative effects are those that result from incremental changes caused by other present or foreseeable activities or projects in the local area, in combination with the Development. Further details of the committed developments, including how they were identified and their location relative to the Site, are provided in **Chapter 14: Cumulative Effects**.

Reporting Structure of Part 1 Technical Chapters

2.40 Each key environmental topic considered in the EIA has been assigned a separate chapter in this ES (**Chapters 7 to Chapter 14** inclusive), with the exception of the Townscape, Visual Impact and Built Heritage Assessment which is presented as a separate part (**Part 3**) of the ES. Within each of the ES Part 1 technical chapters, the assessment is presented and reported in the following format:

Introduction

2.41 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

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

Baseline Conditions

2.43 The baseline conditions relevant to each environmental issue are set out in this section. 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

2.44 This section of each technical Chapter presents the assessment of the likely significant effects of the Development during both the Works, 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

2.45 One of the principal aims of the EIA is to prevent, reduce and where possible, offset significant adverse effects of a development, where necessary by identifying and assist in developing mitigation measures. 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 (inherent mitigation), thereby reducing the need for further mitigation. Mitigation measures can relate to design, the Works or the activities associated with the completed and operational Development. Inherent mitigation within the design of the Development is considered within the Likely Significant Effects sections as described above.

2.46 Where significant adverse environmental effects have been identified, the Applicant has committed to implement additional appropriate mitigation measures as set out in the relevant technical assessments, in order to further prevent, reduce and, where possible, offset any significant adverse effects of the Development. Where such measures are not incorporated in the approved parameters, a suitable planning condition or Section 106 obligation is proposed, and it is anticipated that LBS will attach such conditions or obligations to any approval.

2.47 This section also identifies the nature and significance of the likely residual effects of the Development, assuming the implementation of the proposed mitigation measures. The

significance of likely residual effects is identified in accordance with the significance criteria defined for the respective technical assessment.

Monitoring

2.48 In compliance with Schedule 4(7) of the EIA Regulations, the ES chapter where appropriate outlines monitoring arrangements post mitigation to cover both the construction and operational phases.

Reporting Structure of Part 1 Summary Chapter

2.49 In compliance with Schedule 4(7) of the EIA Regulations, Chapter 15 will demonstrate, where appropriate, post mitigation monitoring of environmental conditions is required. The chapter will also summarise the residual effects following mitigation.

Non-Technical Summary

2.50 The main findings of the ES have been set out in accessible, plain English, in a non-technical summary, to ensure that the findings can more readily be disseminated to the general public, and that the conclusions can be easily understood by non-experts as well as decision-makers.

Planning Documentation

2.51 Additional documentation that will be submitted to accompany the planning application includes, but is not limited to, the following:

- Application Document, Covering Letter and Application Forms;
- Planning Application figures and drawings (including a Site Location Plan, existing and proposed floor plans / sections / elevations, and Planning Application Drawing Schedule);
- Planning Statement / Community Infrastructure Levy (CIL) Form & Certificates;
- Design and Access Statement;
- Landscaping Strategy;
- Listed Building Consent Detailed Study;
- Listed Building Heritage Statement;
- Structural Statement;
- Ventilation and Extraction Statement;
- Television and Radio Reception Impact Assessment;
- Telecommunication Network Impact Assessment;
- Statement of Community Involvement;
- Whole Life-Cycle Carbon Statement;
- Circular Economy Statement;
- Urban Greening Factor Assessment;
- Energy Strategy;

- Sustainability Statement;
- Heritage Statement;
- Transport Assessment;
- Preliminary Ecological Appraisal;
- Delivery, Servicing and Waste Management Plan;
- Pedestrian Forecast and Landscape Assessment;
- Transport Assessment Report including Interim Travel Plan;
- Basement Impact Assessment;
- Drainage Strategy;
- Lighting Assessment; and
- Construction Management Plan.

Assumptions and Limitations

2.52 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 detailed planning application drawings, floorspace schedules, accommodation schedules, and landscape proposals submitted for approval;
- The assessment of likely significant effects associated with the Works is based upon the indicative demolition and construction programme which assumes works commence in quarter three 2022 and are completed in quarter one 2026, and methodologies as provided by the project team and agreed by the Applicant (refer to **Chapter 6: Development Programme, Demolition, Deconstruction, 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, demolition and construction, and completed and operational 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 Environmental Management Plan (SEMP) to control construction activities would be agreed with LBS after the planning application is determined. This SEMP would be enforced and monitored during all key stages of the Works: and
- Due to COVID-19 there has been a number of restrictions that have limited the ability to undertake updated surveys, due to restrictions on working and changes in activity that may lead to the result not being representative. Where relevant, this is explicitly stated within the technical Chapter. Best efforts have been made as relevant and in line with relevant best practice guidance on a topic by topic basis.

2.53 Where relevant, assumptions specifically relevant to each topic area included within the ES are noted in **Chapters 7 to 14** inclusive of this ES.

References

1 Her Majesty's Stationery Office, (2017); Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

2 Ministry of Housing, Communities & Local Government, (2020); Planning Practice Guidance (Environmental Impact Assessment).

3 Institute of Environmental Management and Assessment (IEMA), (2004); Guidelines for Environmental Impact Assessment 2004 (as amended 2006).

4 IEMA (on-line): EIA Quality Mark https://www.iema.net/corporate-programmes/eia-quality-mark

5 Her Majesty's Stationery Office, (2011); Town and Country Planning (Environmental Impact Assessment) Regulations 2011.

6 Ground scape Institute (2013); 'Guidelines for Landscape and Visual Impact Assessment (Third Edition)'.

3. Existing Land Uses and Activities

Introduction

3.1 This chapter presents a summary of the predominant existing land uses and activities currently within and around the Site. This chapter also identifies the key environmental characteristics of the Site and its adjacent areas, thereby identifying potentially sensitive receptors which may be affected by the Development.

3.2 For a full description of the baseline conditions relevant to each technical assessment, reference should be made the relevant technical chapter of this ES (**Chapters 7 to 14**) and **Part 3: Townscape, Visual Impact and Built Heritage Assessment**.

Site Location and Setting

3.3 As described within **Chapter 1: Introduction** and illustrated in **Figure 1.1**, the Site is located within the administrative boundary of London Borough of Southwark (LBS) and covers an area of approximately 0.36 hectares (ha) of land. The planning application boundary for the Site is shown in **Figure 1.2**.

3.4 The Site is centred on National Grid Reference (NGR) 532727 180155 and is bound by:

- St. Thomas Street to the north;
- Guy's Hospital buildings to the east;
- King's Head Yard to the south; and
- Shops on Borough High Street (A3) to the west.

Summary of Site History

3.5 In prehistoric times, the Site was located on a gravel 'island' and was historically low-lying and there is evidence of prehistoric activity in the area. Roman settlement south of the River Thames (the 'Thames') has also been recorded, opposite the Roman and medieval city on the north bank.

3.6 The later medieval period (11-14th centuries) saw the southern side of the Thames develop with many townhouses, churches and inns. The Site was adjacent to a busy road (what is now Borough High Street) extending from London Bridge, and was in the south-west corner of the walled precinct of St. Thomas' Hospital

3.7 Maps (included as Figures in **Appendix 10.1**) show that during the early part of the post-medieval period (AD 1485–the present), the Site was open land, but was progressively built up in the 17th and 18th century, although St Thomas' burial ground remained open land in the south-east part, persisting into the mid-20th century. The Site was occupied by a mix of terraced houses (which are the present Grade II listed buildings), office and light industrial buildings and gardens.

3.8 Except for the terrace of Grade II listed buildings and the facade of Keats House, the majority of the Site, including part of the post-medieval burial ground which lay within it, was cleared of buildings and structures for the construction of New City Court in 1982/3. This resulted in its current setting with no significant changes since.

Predominant Land Uses and Activities

3.9 The following sections should be read in conjunction with **Figure 3.1**, which illustrates predominant land uses currently existing within and immediately surrounding the Site. **Figure 3.1** also illustrates the potentially sensitive receptors and environmental constraints.

Within the Site

3.10 The Site is almost entirely occupied by buildings which include:

- 'New City Court' (20 St Thomas Street), a part four-, part five-storey building with rooftop access above the second, third and fourth floor and lower ground floor (basement) area with two plant rooms which occupies the majority of the Site;
- 'Keats House' (24-26 St. Thomas Street), a four-storey building with rooftop access above the third floor (via New City Court) and a lower ground floor (basement) plant room located in the east of the Site; and
- 'The Georgian Terrace', a series of four-storey terraced townhouses, each with a lower ground floor (basement) forming most of the northern boundary of the Site.

The lower ground floor is present beneath the majority of buildings on-Site, except beneath the south-eastern corner, which extends to approximately 3.5m below ground level. New City Court and the Georgian townhouses surround an outdoor central courtyard which is at lower ground floor level. A ground-level parking yard is present in the west. The existing Site layout is illustrated in **Figure 3.2**.

3.11 The Site currently provides approximately 12,763 sqm Gross Internal Area (GIA) of office floorspace and there are currently approximately 845 office Full-time Equivalent (FTE) jobs on the Site (equivalent to 900 people employed on the Site when accounting for part-time workers).

3.12 Vehicular and pedestrian access to the Site is currently from St. Thomas Street (A200) and King's Head Yard. There is no public open space on the Site; however, a non-public pedestrian route runs through the Site from St. Thomas Street to King's Head Yard.

Existing Land Uses Surrounding the Site

3.13 The Site is located within the largely commercial area surrounding London Bridge Station, the predominant land uses in proximity to the Site are set out as follows (refer to **Figure 3.1**):

- Commercial properties located to the north, south-east and west of the Site, including shops, restaurants, office, hotels, public houses (including The Old King's Head, Bunch of Grapes and The George Inn), banks and museums;
- Residential properties situated on St. Thomas Street, King's Head Yard, White Hart Yard and Borough High Street; and
- King's College University facilities, including Guy's Campus, which comprises the hospital, student centre and student accommodation, as well as a library, IT suite, and auditoriums to the south and east of the Site.

3.14 The Shard, located approximately 60m to the east of the Site, provides retail, offices, hotel, apartments, restaurants and a public viewing gallery for tourists.

3.15 In addition to the Shard there are numerous tourist attractions in the area which include Borough Market, Shakespeare's Globe theatre, the Tate Modern and Hay's Galleria. Southwark Cathedral is located to the west of the Site beyond Borough High Street. The Old Operating Theatre Museum and Herb Garret is located on the opposite side of St. Thomas Street to the Site.

3.16 Shard Place (formerly known as Fielden House), to the east of the Site, is a newly built part 26 storey and part 16 storey tower, which will provide 148 residential apartments along with flexible retail space.

Potentially Sensitive Receptors

3.17 Site visits and technical assessments have been undertaken to identify residential properties, buildings, people and environmental resources that should be considered as being sensitive to the Works and the completed and operational Development. Potential significant effects on these receptors have been considered as part of the EIA.

3.18 Specific sensitive receptors identified in the local area are set out in **Figure 3.1**. Further details on sensitive receptors and key environmental characteristics of the Site and surrounds are provided in the baseline conditions section of **Chapters 7 to 13** inclusive and **Part 3: Townscape, Visual Impact and Built Heritage Assessment** of this ES.

Table 3.1: Potentially Sensitive Receptors

Topic / Type of Receptor	Sensitive Receptor
Visitors / Commercial Occupants	Existing occupants of businesses operating on the Site and immediately surrounding the Site including St. Thomas Street, Borough High Street, King's Head Yard, White Hart Yard, Joiner Street, London Bridge Street and Southwark Street. Demolition and construction workers associated with the Development. Visitors and occupants of the Development once completed.
Residential	Existing residential properties in the vicinity of the Site, most notably these are understood to include: • Residents in the upper floors of the Bunch of Grapes Public House adjoining the western boundary of the Site, No. 2 St. Thomas Street. • Residents in the upper floors at No. 43 Borough High Street. • Residents in the flats in White Hart Yard. • Residents in the upper floors of The Old King's Head Public House, King's Head Yard, Nos. 45 - 49 Borough High Street, to the south of the Site. • Residents at Nos. 51, 53, 55, 57, 59, 61 and 63 Borough High Street to the south of the Site. • Residents at Isis Brook and Orchard Lisle House, comprising student accommodation for King's College approximately 50m to the south of the Site. • Residents at No. 6 London Bridge Street. • Patients at St. Thomas Hospital.

Topic / Type of Receptor	Sensitive Receptor
	• Residents in Shard Place.
Community / Amenity	The Old Operating Theatre Museum and Herb Garret, located north of the Site on the opposite side of St. Thomas Street at No. 9a. St. Thomas' Church, St. Thomas Street, approximately 20m north of the Site. London Bridge Hotel, London Bridge Street, approximately 50m north of the Site. Guy's Hospital including the Chapel, located immediately east of the Site. The Shard including bars, restaurant and viewing galleries, approximately 60m to the east of the Site. Ark Globe Academy approximately 1km to the south of the Site. King's College, Guy's Campus approximately 100m to the south of the Site. St Joseph's Catholic Primary School approximately 350m to the south-west of the Site. Borough Medical Centre approximately 800m to the south-west of the Site. Falmouth Road Group Practice, approximately 1km to the south-west of the Site. Bridge Dental Practice approximately 100m to the south-west of the Site. Southwark Police Station approximately 750m to the south-west of the Site. Chaucer House, London School of Commerce, including library, IT suite, teaching rooms and auditorium, immediately to the south-west of the Site. Borough Market 60m west of the Site. Southwark Cathedral 100m to the north-west of the Site.
Heritage Assets	Listed buildings within 250m of the Site, including (but not limited to): • Georgian Terrace at Nos. 4-8 and 12-16 St. Thomas Street (Grade II) (on Site). • Bunch of Grapes Public House (Grade II) immediately west of the Site. • Old Kings Head Public House (Grade II) on the southern side of Kings Head Yard. • Guy's Hospital Main building including the Chapel (Grade II*) immediately east of the Site. • The parish Church of St. Thomas, No. 9A St. Thomas Street (Grade II*) north of the Site. • No. 9 St. Thomas Street (Grade II*) north of the Site. • Hibernia Chambers (Grade II) north of the Site. • Nos. 6, 8 and 10 Borough High Street (Grade II) north of the Site. • An archway beneath southern end of London Bridge (Grade II) north of the Site. • Mary Sheridan House (Part), Nos. 11 & 13 St. Thomas Street (Grade II*) north of the Site.

Topic / Type of Receptor	Sensitive Receptor
	• Mary Sheridan House (Part), No. 15 St. Thomas Street (Grade II) north of the Site. • A telephone kiosk outside Nos. 17 & 19 St. Thomas Street (Grade II) north-east of the Site. • Post office, No. 19A Borough High Street (Grade II) north of the Site. • Nos. 53 & 53A Borough High Street (Grade II) west of the Site. • No. 55 Borough High Street (Grade II) west of the Site. • No. 67 Borough High Street (Grade II) south-west of the Site. • The Wheatsheaf Public House (Grade II) west of the Site. • George Inn within George Inn Yard (Grade I) west of the Site. • The Hop Exchange (Grade II) west of the Site. • Cathedral Church of St Saviour and St Mary Overie (Southwark Cathedral) (Grade I) north-west of the Site. Unlisted buildings of merit in the Conservation Area: • Keats House (Nos, 24-6 St. Thomas Street). Scheduled Monuments located within 250m of the Site including: • Roman Boat at New Guy's House, approximately 200m south-east of the Site. • Remains of Winchester Palace, Clink Street, approximately 230m north-west of the Site. • Romano-British bath house and Medieval remains at Nos. 11 – 15 Borough High Street 50m north of the Site.
Conservation Areas	The Site is located within Borough High Street Conservation Area (CA). Conservation Areas located within 250m of the Site including: • Tooley Street CA approximately 150m north-east of the Site. • Bermondsey Street CA approximately 250m south-east of the Site. • Thrale Street CA approximately 240m to the west of the Site.
Archaeology	Borough, Bermondsey and Rivers Archaeological Priority Zone (as defined by LBS) located across the entire Site.
Townscape Views	Viewing Corridors (including Primrose Hill to St Paul's Cathedral and Kenwood to St Paul's Cathedral). Long, medium and close non-statutorily protected views to the Site.
Transportation	Cyclists, pedestrians and vehicle users on the surrounding road network. Jubilee Line which runs under the Site's north-western boundary edge. Northern Line which runs close to the Site's north-western boundary edge.

Topic / Type of Receptor	Sensitive Receptor
	London Bridge London Underground and National Rail Station.
Controlled Waters	Groundwater beneath the Site. This includes the underlying Secondary A Aquifer with permeable layers capable of supporting water supplies at a local scale and Principal Aquifer capable of supporting water supplies at the strategic level. The River Thames located 200m north of the Site.
Infrastructure	Water mains and public sewers surrounding the Site.
Ecology	There are no statutorily designated sites for ecology or nature conservation within 2km of the Site. The Thames and tidal tributaries Site of Metropolitan Importance (SMI) and other non-statutory designated sites in the surrounding area.
Air Quality	Air Quality Management Area (AQMA) in the northern part of the Borough where the Site is located.

4. Alternatives and Design Evolution

Introduction

4.1. Under the Town and Country Planning (Environmental Impact Assessment) Regulations 2017[1](as amended) (hereafter referred to as the 'EIA Regulations'), an Environmental Statement (ES) is required to provide, as set out in Regulation 18(3)(d):

"*a description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment.*"

4.2. This chapter has been prepared by Waterman Infrastructure & Environment Limited (Waterman IE) in conjunction with the Applicant, the project Architects (AHMM) and Landscape Architects (MRG Studio). The chapter presents the environmental impacts of different design options that have been considered by the design team, and which have influenced the final design of the Development as described in **Chapter 5: The Development**.

4.3. The design evolution has been shaped through an extensive consultation process. This has included pre-application meetings with LBS, Commission for Architecture and the Built Environment (CABE) design reviews, as well as public consultation and one-to-ones with local businesses and stakeholder groups.

4.4. Reasons for the choice of the design alternatives taken forward are also summarised within the chapter.

Key Principles of the Development

4.5. As noted in **Chapter 1: Introduction**, the Site falls within the Central Activities Zone (CAZ) and Bankside, Borough and London Bridge Opportunity Area, as designated by the London Plan[2], and the London Bridge Business Improvement District (BID), which provides additional or improved services to business within the BID, including extra safety, cleaning and environmental improvement measures.

Site Opportunities

4.6. The starting point in 2014 was assessing the opportunities that the Site has and evaluating the potential for taller buildings on the Site. The team has undertaken extensive consultation with London Borough of Southwark (LBS), Historic England, London Underground Limited (LUL), Transport for London (TfL) and the Greater London Authority (GLA), as well as local groups such as Borough Market, Southwark Cathedral and neighbours including Guy's Hospital estate buildings. Key constraints and opportunities for the redevelopment of the Site are as follows:

- Delivering a solution to congested pavements of Borough High Street;
- Facilitating improved access to London Bridge Underground Station;
- Reduction in private car use;
- Avoiding the creation of a windy microclimate at ground level within this dense urbanised setting;

- Complementing the existing building heights of surrounding developments;
- Complementing the regeneration of London Bridge Station with its new southern entrance;
- Delivering an improved efficiency of the Site to provide enhanced public realm and increased more efficient accommodation;
- Provision of additional retail areas for surrounding residential development;
- Retention of key listed buildings and returning them closer to their original design;
- Consideration of the London View Management Framework requirements and ensure compliance;
- Respecting the location of the Site within the Borough High Street Conservation Area;
- Increasing active frontage along St. Thomas Street and King's Head Yard;
- Creation of high quality public realm off St. Thomas Street;
- Creation of commercial space for start-up businesses;
- Facilitation of regeneration of King's Head Yard and White Hart Yard; and
- Creation of publicly accessible significant garden area with views of Southwark Cathedral, St. Pauls and Tate Modern.

Alternatives to the Development

4.7. Under the EIA Regulations[3], an Environmental Statement (ES) is required to provide *"an outline of the main alternatives studied by the applicant ... and an indication of the main reasons for his choice, taking into account the environmental effects".*

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

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

4.9. The principal alternatives that were considered by the Applicant, taking into account potential environmental effects, were the 'Do Nothing' Scenario and 'Alternative Layout Design'.

4.10. No alternative development sites were considered by the Applicant because the Site is already identified as a brownfield site with capacity for development – such as housing or commercial use - and existing or potentially improved public transport access within the London Bridge, Borough and Bankside Opportunity Area designation. Although other sites within the London Bridge, Borough and Bankside Opportunity Area have also been identified as development sites, these are considered as additional sites for redevelopment by others rather than alternative sites for this Development.

The 'Do Nothing' Alternative

4.11. 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 'Do Nothing' Scenario. The 'Do Nothing'

scenario is based on leaving the Site in its current state. It is considered that under this scenario, the Site would remain underutilised and without redevelopment would lead to several missed opportunities for the Site and Southwark, including:

- Limited provision of office space beside London Bridge station;
- Loss of the potential to generate significant additional Business Rate receipts from the redevelopment of New City Court which would provide significant uplift in commercial and retail space;
- Loss of several million pound contribution towards the Mayor's Community Infrastructure Levy (MCIL2) fund and million pound contribution towards Southwark's Community Infrastructure Levy (CIL) from the development of additional floorspace;
- No connection between St. Thomas Street, King's Head Yard and Borough High Street along desired directions of travel;
- No opportunity to provide public realm to facilitate the opening up of an additional exit from London Bridge Underground Station avoiding the Borough High Street pavement;
- Loss of opportunity to increase flexible office floorspace;
- Loss of catalyst to bring forward other development opportunities around Guy's Hospital and St. Thomas Street;
- No creation of new public spaces and communal facilities;
- Lost opportunity to preserve and enhance existing heritage assets; and
- Limited opportunity for ecological succession and increase in biodiversity.

Evolution of Baseline Conditions

4.12. The EIA Regulations require the consideration of the likely evolution of the baseline conditions of the Site without implementation of the Development as a result of natural changes occurring. The existing conditions of the Site are reported in **Chapter 7** to **Chapter 14** of this ES and relate to conditions identified at the time the surveys and desk-based research were undertaken between 2016 and 2021. The baseline conditions without the Development are expected to evolve for a number of the environmental issues considered within this ES, as outlined in **Table 4.1**. Where no evolution of the baseline conditions as a result of natural changes occurring is anticipated, the baseline conditions would remain as reported in the technical chapters of this ES.

Table 4.1: Likely Evolution of Baseline Conditions without implementation of the Development

Issue	Evolution of Baseline
Transport	As outlined in the **ES Chapter 7 Transportation and Access** there would likely be a net increase in combined pedestrian and public transport users over the course of the day and an increase of cyclists due to the occupation of consented developments around the Site.
Noise and vibration	It is not anticipated that there would be a significant change to the background noise climate, as the predominant source of noise is traffic generated, and the levels of traffic are not predicted to be significantly changed.
Air Quality	Based on current guidance for air quality, it is expected that there would be a progressive reduction in vehicle emission rates and background concentrations due to newer vehicles with lower emissions replacing older vehicles and due to tighter emission standards for polluting industries. Therefore, future emissions to air are expected in the long term to be lower than concentrations currently experienced at and surrounding the Site.
Built Heritage, Townscape and Visual	The overall townscape character and visual amenity of the Site is expected to improve with the redevelopment of the surrounding areas.
Wind	As other schemes progress on neighbouring sites, it is expected that the wind microclimate may change around the Site boundary, however the microclimate within the Site would remain largely unchanged. It is possible that the wind conditions to the east of London Bridge Place would remain uncomfortable.
Daylight, Sunlight, Overshadowing and Solar Glare	As other schemes progress on neighbouring sites, levels of daylight and sunlight in the local area would generally reduce over time as these are built out and levels of overshadowing may increase. The buildings on Site do not currently cause any solar glare and this would remain the case in a no-development scenario.

4.13. Overall, it is considered that the negative effects of the do-nothing scenario outweigh the beneficial effects meaning that redevelopment is the preferred option.

'Alternative Uses'

4.14. The Applicant has not considered fundamentally different alternative land uses or mix of uses, for the Site than those proposed, which are in line with the possible uses set out in the Bankside, Borough and London Bridge Opportunity Area, as designated by the London Plan[4] and the types of town centre uses directed to the CAZ Additionally the use of the Site for commercial uses is protected within local planning policy, therefore, the Applicant chose to retain a commercial use and complement this by providing additional small office and retail space.

Alternative Layouts

4.15. The Georgian Terrace on the northern boundary of the Site is Listed. It has always been intended by the Applicant to retain, incorporate and improve the Georgian Terrace. Alterations were made to the Georgian Terrace in the 1980s which detract from their appearance and historic interest, additionally past repairs and renovations have not always been undertaken to the highest standards. Keats House façade is an important historic feature contributing to the Borough High Street Conservation Area. It has always been intended to incorporate the Keats House façade

within the Development, however, the proposals would see it relocated approximately 6m to the west of its present location to create a servicing route to the east for the whole Development.

4.16. It is proposed to create a thoroughfare between St. Thomas Street and Borough High Street, incorporating the Georgian Terrace which, in addition to the new entrance to London Bridge Underground Station, is a key benefit of the Development. Consequently, to achieve this aim it was concluded that the most suitable location for the main element of the Development would be at the south of the Site, due to the location of the Georgian Terrace, Keats House and the potential location for a connection to the London Bridge Underground Station.

Footprint and Building Orientation

4.17. Studies were undertaken by the architect early on in the design process to ascertain the appropriate floor print size and orientation of the buildings, considering the Site's area and appearance from different viewpoints.

4.18. The connection with London Bridge Underground Station and surrounding roads has influenced the location of the public realm and building position. The elongated shape of the Site east-west has meant that the buildings on Site can only sensibly be orientated east-west.

4.19. The footprint of the Tower (the main proposed building) has been designed to be minimised in order to facilitate the provision of new high quality pedestrian connections through the Site, including the integration of the historic yards and Georgian Terrace, and providing a safe access route to an off street servicing area.

4.20. Due to the constrained nature of the Site, it is not considered that there are practicable alternative footprints that would meet the Applicant's aspirations for the Site or realise the key benefits of redeveloping the Site. However, numerous studies were undertaken to refine the basic footprint, with the aim of optimising the design.

Height and Massing Options

4.21. The height of the Tower above ground level has been the primary focus during the design process. The Development is surrounded by existing and proposed developments of significant height above ground level, for example The Shard (310m), Shard Place (100m), Guy's Hospital Tower (150m) and the new application for The Quill / Capital House (138m). The Development has been considered in this context, to form part of the 'foothills of The Shard', and is with the range of 100 to 150 m in height that is considered appropriate. Therefore, whilst other building heights within this range would likely be equally suitable no significant consideration was given to an alternative scheme within this height range.

4.22. The principal strategy in the Development's architectural design has been to deliver a building that delivers an appropriate quantum of accommodation, respectfully integrating within the wider setting of the Site and minimising the appearance of bulk of the Tower. Since the design of the Development commenced in 2014, the proposals have evolved, with over one hundred different conceptual designs considered.

4.23. Once the basic form and height of the Tower was selected, the design was refined to maximise the efficiencies of the Site, and ensure the Tower is articulated in such a way to minimise its visual bulk. Through numerous studies a flattening of the Tower (to form a parallelogram) with the

reduction of massing at the corners was identified of the Tower to make the tall building appear more slim and slender.

4.24. High resolution Computational Fluid Dynamics (CFD) analysis conducted by wind consultants Wirth Research was used during the early stages of the design process. This enabled wind speeds at sensitive locations around the Tower (such as entrances, terraces and balconies) to be reviewed, to enable changes to the location of these features, as well as changes to the shape and articulation of the Tower to be incorporated into the design, minimising the need for engineered mitigation to be incorporated into the design.

4.25. Studies were undertaken to review how to minimise the wind effects of a tall building channelling wind into the existing narrow King's Head Yard and prevent significant wind effects through the yard's entrance archway. A four-storey tall podium was created on the south eastern edge of the Tower to follow the footprint of King's Head Yard and to protect the ground level from channelled winds. Additionally, the CFD wind microclimate study undertaken highlighted areas of higher wind speeds at the Tower's corners, on terraces and areas in the ground level public realm. Therefore, the pedestrian entrances would all be located away from building corners, and terrace and roof areas would have enhanced screens and landscaping introduced to protect them from potentially unfavourable wind conditions.

4.26. Development of the scale proposed for the Site has the potential to be visible in a number of strategic views, as defined in the Mayor of London's London View Management Framework Supplementary Planning Guidance' (LVMF), as well as in several views of borough-wide importance, as identified by LBS and London Borough of Islington (LBI). A number of these views are focussed on London landmarks, most notably St. Paul's Cathedral.

4.27. The relevant policy documents were consulted to establish which views were of particular relevance to the Development. With regards to the LVMF, it was clear from inspection that the Development would have an effect on 11 views set out within the LVMF.

4.28. A Zone of Theoretical Visibility exercise was also carried out at an early stage to understand the potential visibility of the Development in local and medium range views, including borough views defined by LBS and LBI. This exercise informed design development, including refinement in the form and massing of the Development's tall building.

Façade

4.29. For the Tower, initially the design when massing was the primary focus was a smooth glazed façade to maximise daylight as well provide internal views across the London skyline. However, the aesthetic did not fit with the townscape of the yards and the character of Southwark and solid horizontal elements were introduced to the Tower façade to distinguish the building from the surrounding buildings.

4.30. Extensive studies examined the most appropriate townscape scale for the façade grid, to provide linkage with its surroundings, and provide an elegant solution. After detailed consideration inspiration was taken from the burgage plots, and the repeating module of the Georgian Terrace, with a 6m bay, continuing the rhythm of Borough High Street and St Thomas Street.

Amenity and Landscape

4.31. The ground floor amenity areas' design has not changed much, however, the designs have evolved to maximise the public realm and ensure a suitable environment in the space, including in relation to wind and daylight and sunlight.

4.32. The planned seating in King's Head Yard was relocated from lining the central area to the edge to areas of highest comfort level as identified by the CFD wind model. The location of the trees within the ground level public realm reduces the effect of wind even further at ground level, and these also serve to waymark key routes through the Site.

4.33. The introduction of the biodiverse habitat at level 24 realises the aim of providing larger areas of high quality publicly accessible space. At concept design it was soon recognised that there was insufficient space at ground level to achieve this aim, without compromising the Development and enhanced pedestrian access through the Site. By placing this area within the Tower it would provide additional space, an opportunity to significantly enhance the net biodiversity of the Site, as well provide views over the surrounding rooftops to local landmarks.

4.34. As part of the design evolution consultation exercises were held about the design and valuable feedback was received. Through this process it was recognised that the gardens could be an educational resource offering additional social benefit, and accordingly the design incorporates teaching space.

Access

4.35. The demolition of the 1980s building on St. Thomas Street as part of the Development was always planned to open up the Site. Early on in the design process it became clear that the project offered an opportunity to create new public routes through the Site between St. Thomas Street and Borough High Street and King's Head Yard, easing pedestrian congestion on the junction of St Thomas Street and Borough High Street. The change in massing from the existing New City Court building to a smaller footprint has enabled new pedestrian realm and access routes through the Site. All routes will be provided step free, and fully accessible.

4.36. A study of pedestrian routes in the area surrounding the Site was undertaken to inform the design, this showed that the key route would be from St. Thomas Street to Borough High Street, and providing access to a new entrance to London Bridge Underground Station. It was therefore determined that there would be a clear benefit in providing these new routes through the Site to the yards, which in addition to providing a new traffic free route, would significant ease pedestrian congestion and safety issues away from the Site, resulting in a benefit to the wider area.

Servicing

4.37. The existing access for the service yard on Kings Head Yard / on street loading bay servicing was partly across hospital land. Detailed consideration was given to enabling improved servicing arrangements that would meet the needs of the Development, but provide safer access routes, that work with potential future changes to the highways network and do not compromise new pedestrian routes across the Site.

4.38. As part of the design process, a number of options for servicing the Development were initially considered, including providing a servicing yard at different levels within the Development, alternative connection points to the highway network and on-highway servicing.

4.39. In order to inform the design, the needs of the Development were reviewed, to determine what vehicle types and frequencies would be generated. This review highlighted that rather than compromising the design of the Development and the important public realm, an alternative servicing strategy utilising offsite consolidation could be utilised. This approach was incorporated into the design, resulting in reduced space requirements for vehicles, fewer trips and smaller vehicles visiting the Site. Initial designs requiring access for three Light Goods Vehicles (LGV) loading bays and one Heavy Goods Vehicle (HGV) loading bay, were reduced down to two LGV loading bays and one HGV loading bay (for waste and recyclable collection only) along with ancillary parking for motorcycle couriers at ground floor level.

Basement Layout and Design

4.40. Three key considerations informed the layout and sizing of the basement. Firstly, a desire to maximise active frontages, retail and public space at ground (i.e. move service functions below ground). Secondly the requirements of the London Plan for high levels of cycle parking, and ancillary uses, such as showers or changing areas. In order to accommodate these requirements, cycle parking needs to occupy half the Site's footprint and hence could not be provided at ground level to meet this aspiration. This meant with Basement Level B1 predominantly occupied by cycle parking, showers and lockers, that the servicing yard and plant was displaced down to Basement Level B2.

Alternative Technology

4.41. Significant consideration has been given to the building systems to provide heating and cooling as the design has evolved. Since the inception of the project in 2014 there has been a significant shift in policy and good practice with respect to energy systems in particular. The growing awareness of the health impact from poor air quality, due to vehicle emissions and combustion plant, combined with both LBS and the Mayor of London declaring a 'Climate Emergency', in May 2019 and December 2018 respectively, indicated that consideration of net zero carbon technologies with zero point of use emissions would be required.

4.42. The project MEP engineers, Chapman BSDP, undertook a study of the Development and the potential solutions, in line with the energy hierarchy, and aligned with the policy requirements of the, then emerging, London Plan. This determined that more traditional systems, such as gas fired boilers or CHP systems would not achieve net zero carbon. Instead, it was proposed to utilise Air Source Heat Pumps (ASHPs) coupled with thermal stores and supplemented by Photovoltaic panels. The early identification of the technology to be incorporated has enabled both the systems to the building to be optimised to incorporate the ASHPs in a manner that is efficient, both with regard to energy and space.

Mitigation by Design

4.43. As outlined above the EIA studies have significantly influenced the design evolution but additionally some design measures have inherent environmental mitigation built into them and these are outlined below.

4.44. The provision of alternative pedestrian routes avoiding the pavement of Borough High Street would improve pedestrian safety especially at junctions around the underground station entrance.

4.45. The fixed building plant should achieve the proposed noise limits set out in **Table 8.15** in **Chapter 8 Noise and Vibration** and, therefore, the noise effects of building services plant on human and biodiversity receptors would be negligible.

4.46. The selection of an all electric building services strategy, including ASHPs ensures that there will be no emissions to air from combustion plant. The introduction of additional vegetation would improve the air quality, as well as provide significant biodiversity net gains.

4.47. The refurbishment of the Georgian Terrace, the reinstatement of Keats House as a detached building and the removal of the 1980's New City Court Building on St. Thomas Street would all serve to improve the heritage value of the buildings.

4.48. The removal of the made ground as part of basement excavations over almost the whole Site would remove any contaminated soils in these areas, and the risk of exposure to Site users.

4.49. As outlined in **Chapter 15: Wind**, landscape measures that improve wind conditions include screens on terraces and roof areas and soft landscape planting on the terrace.

4.50. The incorporation of SuDS drainage techniques to achieve greenfield runoff rates serve to reduce the volume and frequency of surface water ponding that currently occurs in King's Head Yard. The detailed design of drainage would include silt and hydrocarbon interceptors as required by Document H3 of the Building Regulations[5].

4.51. The final scheme is the one presented in ES **Chapter 5: The Development**.

References

1 HMSO (2017). The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (S.I. 571) HMSO, London.

2 Greater London Authority, (2021); New London Plan, March 2021.

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

4 Greater London Authority, (2021); London Plan: Chapter 2: Spatial Development Patterns, March 2021.

5 HMSO (2015), Part H of Schedule 1 to the Building Regulations 2010: 2015 Edition.

5. The Development

Introduction

5.1. This chapter provides a description of the Development, upon which the EIA is based. As discussed in **Chapter 1: Introduction**, a full planning application and listing building consent is being submitted for the demolition of existing 1980s office buildings, part restoration and refurbishment of listed terrace, and redevelopment of Keats House with retention of existing façade, and construction of an office-led, mixed-use scheme (the 'Development'). The description has been compiled with reference to both the full planning application and the listed building consent description, and the documents that are submitted in support of these applications (refer to **Chapter 2: EIA Methodology** on the planning documentation). Details of the anticipated Site preparation and construction activities, and programme of works, are outlined separately in **Chapter 6: Development Programme, Demolition, Deconstruction, Refurbishment and Construction**.

5.2. This chapter has been written by Waterman Infrastructure & Environment Ltd (Waterman IE) with input from the Applicant's architect, AHMM Architects and landscape architect, MRG Studio.

Overview of the Development

5.3. The Development as described in the planning application form is as follows:

'*Redevelopment to include demolition of the 1980s office buildings and erection of a 26-storey building (plus mezzanine and two basement levels), restoration and refurbishment of the listed terrace (nos. 4-16 St Thomas Street), and redevelopment of Keats House (nos. 24-26 St Thomas Street) with removal, relocation and reinstatement of the historic façade on a proposed building, to provide office floorspace, flexible office/retail floorspace, restaurant/café floorspace and a public rooftop garden, associated public realm and highways improvements, provision for a new access to the Borough High Street entrance to the Underground Station, cycling parking, car parking, service, refuse and plant areas, and all ancillary or associated works.*'

5.4. The total amount of floor space proposed by the Development is set out within **Table 5.1**.

Table 5.1: Proposed Floorspace of the Development

Land Use and Class	Floorspace Area (sqm)	
	Gross External Area (GEA)	Gross Internal Area (GIA)
Office (Class E)	-	44,312
Affordable Workspace (Class E)		5,017
Flexible Office / Retail (Class E)	-	340
Food and Drink (Class E)	-	421
Shared Rooftop Garden Access*	-	208
Shared Facilities and Plant*	-	5,243
TOTAL	**58,253**	**55,541**

* Shared areas to be prorated between uses, where required.

Application Drawings

5.5. A series of drawings have been submitted to London Borough of Southwark (LBS) for approval. These drawings have informed the basis of the EIA.

5.6. The Environmental Statement (ES) makes reference to, and reproduces, the following key planning drawings that have been submitted to support the applications, as set out in **Table 5.2**. All the supporting planning documents are available to view on LBS's planning applications website (https://planning.southwark.gov.uk/online-applications/).

Table 5.2: Planning Application Drawings and Figures Included in this ES

Planning Application Drawings / Figure Reference	Title
20065_X_(00)_ 118	GA Plan – Level B2
20065_X_(00)_119	GA Plan – Level B1
20065_X_(00)_120	GA Plan – Level 00 Ground
20065_X_(00)_121	GA Plan – Level 01
20065_X_(00)_123	GA Plan – Level 03
20065_X_(00)_136	GA Plan – Level 16 – Typical Upper Floors (L16-22)
20065_X_(00)_144	GA Plan - Level 24 Terrace
20065_X_(00)_145	GA Plan - Level 25 Upper Plant
20065_X_(00)_146	GA Plan - Level 26 Roof
20065_X_(00)_201	North Elevation Proposed
20065_X_(00)_ 301	Section AA Proposed
20065_X_(00)_ 302	Section BB Proposed
166-NCC2-GA01	General Arrangement - Ground Floor Landscape Plan
166-NCC2-GA02	General Arrangement – Level 03 Terrace & Balconies Landscape Plan
166-NCC2-GA03	General Arrangement – Level 24 Terrace Landscape Plan
166-NCC-GA04	General Arrangement – Level 26 Terrace Landscape Plan
Figure 5.1	Ground Floor Public Space Provision

Development Arrangement

5.7. **Planning Application Drawing 20065_X_(00)_120** shows the ground floor layout and footprint of the Development. The Development would comprise three elements:

- The Tower, occupying the majority of the Site area, would replace the existing 1980s New City Court buildings with a 26-storey building (with mezzanine and two basement levels);

- Keats House located in the north-east of the Site is a four-storey building with retained 19th Century façade to be redeveloped with relocation of the façade; and
- The Georgian Terrace located in the north of the Site is a row of early 19th Century Grade II listed buildings which are to be retained, restored and refurbished.

Building Massing and Form

5.8. The design of the Tower building, particularly with respect of height and massing, has responded to Site constraints, planning guidance and consultation with statutory and non-statutory consultees (refer to **Chapter 4: Alternatives and Design Evolution**). The proposed height of the Tower (including the top of the balustrade on the level 26 terrace) would not exceed 108.0 m AOD (the height of the Tower above ground is 103m).

5.9. Keats House would remain at four storeys (20.9m AOD) but the façade would be relocated and the building reconstructed approximately 6m to the west to facilitate ground level servicing access onto St. Thomas Street. The Georgian Terrace would remain at 20.15m AOD.

Basement Levels

5.10. The existing lower ground floor below the Georgian Terrace would be refurbished and used for affordable workspace, as shown on **Planning Application Drawing 20065_X_(00)_119**. The existing basement within the Site below the current location of Keats House and the proposed Tower would be extended to a two-storey basement (9.65m below ground level), with the lower level basement B2 set at -4.65m AOD. as shown in **Planning Application Drawing 20065_X_(00)_ 302**. The lower level basement B2 would comprise plant, storage tanks and a refuse and recycling holding area with spare storage space and tenant plant for the retail use under Keats House as shown on **Planning Application Drawing 20065_X_(00)_118**.

5.11. Basement level B1 at -0.050m AOD would comprise cycle parking and changing facilities. Keats House basement level B1 would be dedicated to building management and staff mess room, as shown on **Planning Application Drawing 20065_X_(00)_119**.

Substructure

5.12. Details of the substructure are provided within **Chapter 6: Chapter 6: Development Programme, Demolition, Deconstruction, Refurbishment and Construction**.

Land Uses

5.13. As set out within **Table 5.1,** the Development would provide a mix of uses within Use Class E, the quantity and composition of which is described as follows.

Commercial Land Uses

5.14. The Tower would provide a total of 44,312sqm GIA of office space. A total of 340 sqm GIA of flexible office and retail space would be provided within a unit at ground level in the south western corner of the proposed tower (refer to **Planning Application Drawing 20065_X_(00)_120**). A total of 421 sqm of food and drink floorspace would be provided at the Terrace Level (levels 24

and 25) as part of the publicly accessible rooftop garden (refer to **Planning Application Drawings 20065_X_(00)_144** and **20065_X_(00)_145**).

5.15. A total of 5,017 sqm GIA of affordable workspace would be provided. The Georgian Terrace would provide a total of 1,258 sqm GIA of affordable workspace split into seven units from lower ground up to second level, with access to each unit from St. Thomas Street at the ground level. Keats House would provide a total of 381 sqm GIA of affordable workspace from ground level to second level, with access also from St. Thomas Street. A further 3,378 sqm GIA of affordable workspace would be provided on levels 1 to 2 of the proposed tower. This is shown on **Planning Application Drawings 20065_X_(00)_119** to **20065_X_(00)_121**.

Station Entrance

5.16. It is proposed to open up the rear of the London Bridge Underground Station building at ground level, to provide a new exit directly onto the Site's public realm. Transport for London and London Underground Limited (LUL) support the proposals, and it is proposed that the Applicant is to enter into a developer agreement with LUL to undertake the works.

Ancillary Land Use

5.17. Levels 25 and 26 of the Tower (as **Planning Application Drawings 20065_X_(00)_145** and **20065_X_(00)_146**) would be dedicated to plant and photovoltaic cells. The photovoltaic panels would be in an east to west orientation, to achieve a higher energy output than a conventional south facing array. The basements are also mostly in ancillary use, as described above.

5.18. The existing UK Power Networks (UKPN) substation, located within the Site, would be replaced with a temporary substation on the site during the construction works, which will in turn be replaced by a new substation within the development at a location to be agreed with UKPN. The. The UKPN substation would remain accessible at all times.

Publicly Accessible and Amenity Space

Publicly Accessible Space

5.19. There is proposed to be a total of 2,343 sqm of public space within the Development.
The proposed 1,542 sqm public space on ground level, outside the Tower, is intended to be fully accessible and used by both the office tenants and the wider general public. The publicly accessible landscape at ground level (refer to **Planning Application Drawing 166-NCC2-GA01** and **Figure 5.1**) would comprise the King's Head Courtyard, the new Gallery, the passage through the Georgian Terrace and the entrance at St Thomas Street (St. Thomas Square). A service entrance shares a threshold to the street with the pedestrian east passageway connecting St Thomas Street to Beak Alley.

5.20. A separate public entrance on ground level would provide direct access via the dedicated pair of lifts to the public roof terrace at level 24 (refer to **Planning Application Drawing 20065_X_(00)_144)** The public roof terrace at level 24 would provide 801 sqm of public space. The level 24 public roof terrace would circulate around the edge of the building, with the main terrace area located on the western side comprising a fully accessible woodland area, and a wildlife refuge area along the eastern boundary. Primary circulation is around the west and north

west of the main public terrace area, with a secondary path circulating around the south and east along the wildlife terrace area and past the restaurant area which would be located within the centre of the level.

Private Amenity Space

5.21. On level 3 of the proposed tower, there would be a south facing external private amenity space 192 sqm in area for the office tenants at that floor (refer to **Planning Application Drawing 20065_X_(00)_123**). This garden terrace would provide seating, raised planters, decorative wind screens and views to King's Head Yard. Access to the level 3 terrace would be direct from office workspaces with the primary entrance door on the south west corner and secondary circulation to the south east door. Balconies with planting would be provided on the northern façade of the building, repeating from levels 3 to 23 to create a green connection between the ground floor design and landscaping at level 24.

5.22. A terrace at level 26 providing 280 sqm of private amenity space is reserved for the top floor office tenants (refer to **Planning Application Drawing 20065_X_(00)_146**). This area would comprise fixed and moveable planters and seating, which could also be used as an events space (refer to **Planning Application Drawing 166-NCC-GA04**). The fixed planting would be strategically placed to mitigate wind effects (refer to **Chapter 12: Wind Microclimate**). Access to the level 26 terrace would be via a set of stairs in the east side of the terrace coming directly and only from office workspaces.

Materials, Façade Treatment, and Finishes

5.23. The design of the Tower's façade is based on a 6m wide grid with the extent of glazing increasing further up the Tower. This would be achieved by minimising the width of the vertical solid piers on the building elevations, with pier widths maximised at the ground level to mimic the solidity of the Georgian Terrace to the north and the Guy's Hospital buildings to the east. This grid is split off-centre of the Tower on the northern elevation where the balconies provide a vertical green connection from ground floor to level 26, which is further described in the Landscaping Design section later in this Chapter (paragraph 5.43).

5.24. As outlined earlier in this Chapter, the front elevation of Keats House would be retained and re-located approximately 6m to the west.

5.25. The works to the Georgian Terrace would remove the 1980s intervention from the south façade, restore the rear elevation and reinstate windows to create a new active retail environment to the rear. In addition, the Works would include refurbishment of the north façade on St. Thomas Street, by re-opening or re-instating the original front doors and reactivating disused entrances/ passages. On the roofs, the existing asbestos synthetic slates would be replaced with natural UK sourced slates and the chimney pots would be re-instated as active habitats for native bird species.

Vehicular and Pedestrian Access, Circulation and Parking

Vehicular Servicing Access

5.26. The vehicular service area is located on the south eastern part of the Tower and would be accessed from St Thomas Street (refer to **Planning Application Drawing 20065_X_(00)_120**).

5.27. The overall servicing strategy takes into consideration refuse collection, UKPN access and building management, as well as goods deliveries to both retail and office tenants. The movement of Keats House to the west allows the creation of a new controlled service route to the east which would be regulated by CCTV and intercom.

5.28. Servicing and goods deliveries, utilising Light Goods Vehicles only, would arrive from St. Thomas Street and park in the designated loading bay. Couriers would then report to the building management office in Keats House. Further details on the proposed servicing strategy for each part of the Development (the Georgian Terrace, Keats House and the Tower) are set out in **Chapter 7: Transportation and Access** of this ES and within the Transport Assessment, submitted in support of the Application. It is anticipated that a Delivery and Servicing Strategy would be agreed with LBS, pursuant to a planning condition or planning obligation pursuant to a S.106 agreement.

5.29. The loading bay would be accessible at all times as required by UKPN, to ensure access to the UKPN assets on the basement. Vehicles would be able to turn and reverse into an accessible parking bay to allow the operative to unload any equipment / replacement units in the loading bay. Operatives would then be able to access the UKPN rooms located in the basement via the good lifts on the ground level. Final arrangements are to be agreed with UKPN.

5.30. Refuse trucks would access the Site from St. Thomas Street and park within the loading bay at ground level in the eastern part of the Site.

Pedestrian and Cycle Access and Circulation

5.31. The main pedestrian and cycle access points to the Development would be from St. Thomas Street and Borough High Street. It is expected that a significant footfall through the Site would be from pedestrians travelling through the Site to access London Bridge Mainline Station; the new London Bridge Underground Station entrance; King's Head Yard; and to go south on Borough High Street.

5.32. The public realm has been designed to ensure mobility impaired user access is maintained throughout the Site. The ground floor level of the Tower has been set at AOD +5.00m to provide the potential for level access into the rear of the Georgian Terrace and ensure step free access to the new London Bridge Underground Station entrance. Lift access is provided to all office floor levels within the Tower, with a dedicated dual lift to the level 24 public terrace which would have tiered levels all accessible via shallow gradients.

5.33. As noted above, access to the Georgian Terrace and Keats House would be provided directly from St. Thomas. Entrances to the ground floor retail unit, reception area and public garden of the Tower would be accessed from the Gallery and King's Head Yard (refer to **Planning Application Drawing 20065_X_(00)_120** and **Figure 5.1**).

5.34. The original passageway through the midpoint of the Georgian Terrace from St. Thomas Street to the yards behind would be reopened.

Car Parking

5.35. With the exception of two disabled parking spaces, located in the loading bay area at ground level, the Development would be car free.

Cycle Parking Facilities

5.36. The Development would provide a total of 1,322 cycle spaces (1,103 long stay spaces and 219 short stay spaces) in compliance with the London Plan[1] and LBS Local Plan and Draft New Southwark Plan (2020)[2].

5.37. Cycle parking spaces, 79 associated shower and 515 lockers would be provided across ground level and Level B1. Short stay cycle parking would be provided at ground level and in basement level B1 using a mixture of double stacking racks, Sheffield stands and folding bike lockers. Long stay cycle parking would be provided using a mixture of double stacking racks, Sheffield stands and folding bike lockers at Level B1, within secure access zones. Access to level B1 for cyclists would be provided via a combined cycle stair ramp, assisted by a conveyor system. A dedicated lift would also be incorporated to provide access for cyclists up to the reception.

Waste Management

5.38. The proposed arrangement is for waste to be stored at Level B2, under the Tower, which would contain 16 x 1,280l Eurobins to service the whole Development. Separate containers would be provided for general and recyclable waste. Additionally, a cardboard baler would be provided in the basement refuse store given that cardboard / paper is expected to make up a large proportion of waste being generated.

5.39. A waste holding area would be provided within the service area to allow easy loading into the refuse vehicle. The relevant set of bins would be brought to the ground level waste store from the basement via a goods lift by the site management.

5.40. It is proposed that waste would be collected from the service area accessed from St Thomas Street. Once emptied, the bins would be transported back to the basement by the site management. Waste would be collected daily for general and recyclable waste.

Landscaping and Ecological Enhancements

Landscaping Design

5.41. The proposals would provide new, high quality, publicly accessible spaces, linking the Development with existing pedestrian and cycle routes, and providing new connections through the Site away from busy streets. Eight medium and tall trees would be planted at ground level to aid way-finding and to indicate the main entrance points. The planting scheme would include, in addition to the native trees, climbers and ornamental non-native species. Typically, rainwater attenuation would be integrated into soil and an attenuation layer under permeable paving.

5.42. The pavement along Borough High Street and St Thomas Street would use the LBS recommended Yorkstone paving. Feature paving is proposed for the gallery and King's Head Courtyard. The cobblestones may be extended from King's Head Yard to the east passage and the service yard. The steps to the south would provide a clear break between the feature paving and the cobblestone from the yard. The materials would be robust and with durable finishes for ease of maintenance. Where practicable permeable paving systems to attenuate rainwaters would be included.

5.43. The private terraces on both level 3 and 26 would have a simple landscape design. The level 3 terrace would contain raised planters to provide sufficient soil depth for trees. Three pockets of seating would be provided under the tree canopies on the southern part where it is sunniest, with the eastern side of the terrace clear for façade maintenance. The landscaping installed on the roof terrace at level 26 would comprise fixed planters and seating along the south side to screen the building maintenance and plant rooms, with the other planters temporary and moveable to create different spaces for events. The balconies on the northern façade of the Tower would contain planters that would provide a green connection from ground level to the level 24 woodland habitat.

5.44. The terrace at level 24 would provide an inclusive, publicly accessible, immersive experience with tiered planting creating a biodiverse habitat. Seating would be provided for relaxation and enjoyment of the views. Different soil types and depths would be specified to meet the needs of different plants. The woodland area would comprise a diverse mix of native and non-native species, incorporating a range of specimens from young to mature trees alongside mixed shrubs and perennials to create a biodiverse micro-woodland. A circular pavilion for educational purposes (referred to as the 'Jar') would be situated within the woodland area and would have the ability to accommodate a school class of up to 30 children. The Jar would be encouraged to be used as an education resource for children and adult visitors about the whole woodland ecosystem, from tree top and down into the soil.

Ecological Enhancements and Management

5.45. The landscaping includes native trees and plants which would be of local provenance where practicable. This planting would be of benefit to biodiversity by providing food and shelter to a range of bird and invertebrate species. Trees would be planted in extensive soil volumes, which provide root space and infiltration/attenuation benefits.

5.46. The woodland area on level 24 would create a biodiverse micro-woodland which would be lightly managed using successional processes topped with seedlings and saplings as needed:

- Largest trees felled every 15-20 years to mimic natural cycle;
- Multistem trees and large shrubs coppiced every 5/7 years;
- Mixed field layer rich in species; and
- Wood piles made from felled and coppiced trees and shrubs.

5.47. The wildlife area on the southern aspect would appear unmanaged with flowering species for foraging bees and other insects, and evergreen and deciduous species to provide year round interest.

5.48. Bird boxes will be integrated or mounted on the walls of the new buildings at least 3m above ground level to prevent vandalism and face east or west.

Utilities and Services

5.49. Modification and / or relocation of selected existing utilities would be required to implement the Development. Accordingly, where appropriate, the existing infrastructure networks would be diverted, remodelled and reinforced to suit the demands of the Development.

5.50. As previously described, the existing UKPN substation within the Site would be would be replaced with a temporary substation on the Site during the construction works, which would in turn be replaced by a new substation within the Development at a location to be agreed with UKPN.

5.51. There is an existing 300mm diameter sewer that currently runs south to north beneath the basement of Keats House, which would be diverted from manhole 39 (upstream manhole) to run closer to Conybeare House to the east of the Site, along the party wall and then would be reconnected to the existing manhole located in the lightwell. A formal S185 application for the sewer diversion under Keats House has been submitted to Thames Water by AKT II.

5.52. It is proposed that a new 80mm diameter incoming potable water supply is routed from King's Head Yard into the Site. This would have a current design load of 159 m^3 daily and 4.1 l/s peak.

Flood Protection

5.53. The Environment Agency's "Flood Map for Planning"[3], shows that the Site lies in Zone 3a (an area with a high probability of flooding from rivers and sea). A Flood Risk Assessment (**Appendix 11.1**) has been undertaken by AKT II and concluded that the Development would not increase the food risk to other properties. Due to the presence of the Thames Flood Barrier, the Development has an acceptable flood risk within the terms and requirements of the National Planning Policy Framework. In the event of breach, as there are no habitable areas at ground and basement levels the occupants can evacuate to first floor level and safely remain inside if evacuation is not possible. The Applicant would register for the Environment Agency's Flood Warning Service as a precaution. Temporary flood barriers would be used along St Thomas Street in the event of a breach of the flood defences.

5.54. There is also a risk of surface water flooding from King's Head Yard which would be mitigated with the use of permanent flood resistant doors within the design of the building entrances to prevent flood water entering the property.

Drainage Strategy

5.55. As outlined in the Drainage Strategy the proposed solution is to limit the flows from the Site where practicable and connect to existing public sewers. Following consultation with Thames Water it has been identified that a greenfield runoff rate (3.49 litres per second (l/s)) should be achieved. To facilitate this some 190m^3 of storage volume has been provided on Site through the incorporation of Sustainable Drainage Systems (SuDs) via incorporation of a tanked permeable surface at ground level (on a podium deck) and a blue roof system on the Tower's roof.

5.56. The existing foul flow from New City Court and Keats House is 8.5 litres per second (l/s) which passes underneath Keats House and into the main combined sewer in St. Thomas Street. A pre-development enquiry has been submitted to Thames Water in March 2021 to confirm the proposed foul water rates.

5.57. It is anticipated that any foul water drainage from ground floor level and above would be drained by gravity. Foul water from below the basement level would be pumped to facilitate discharge by gravity to the public sewer.

5.58. Subject to the findings of the CCTV survey, it is proposed that the existing drainage connection(s) would be reused if possible. The existing combined sewer connections from the Georgian Terrace would be retained and used.

5.59. A silt / hydrocarbon interceptor would be provided for the service yard area. The interceptor would have visual and audible warning when the level of oil reaches 90% of the oil storage volume under static liquid level conditions.

5.60. A rainwater harvesting system is proposed to be installed where roof water could be collected for toilet flushing or irrigation. This would be further developed at the detailed design stage to determine its suitability in terms of plant space requirements, the need for a secondary water distribution network, and available yield and demands.

Lighting Design

5.61. The external lighting would be designed in compliance with the guidance in the Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 2020[4], BS 5489-1:2020[5] and other relevant good practice lighting design guidance. Lighting would be designed so that it is directed to where it is needed and to minimise as far as is practicable light spill into neighbouring residential properties or affect wildlife. It is proposed that all external lighting specified, except for safety and security lighting, would include appropriate controls to ensure they can be automatically switched off between 11pm and 7am. Where specified, illuminated advertisements would be designed in compliance with ILP Technical Report 5 – 'The Brightness of Illuminated Advertisements[6]'. An external lighting strategy would be secured as a planning condition.

Security Design Strategy

5.62. The Applicant has appointed Toren Consulting Ltd (Toren) as Security Design Consultant. Following a review of relevant policy including the London Plan[7] and LBS Local Plan Policy 3.14 – Designing Out Crime[8], the team anticipates providing significant improvements to the existing condition with regard to the design solutions described in Policy 3.14. The Development would be designed cognisant of security design and risk management best practice, as described in:

- Operational Requirements (2018), CPNI;
- Crowded Places Guidance, NaCTSO and Counter Terrorism Policing;
- Protecting Crowded Places: Design and Technical Issues, Home Office / CPNI / NaCTSO;
- SABRE New Facilities, Building Research Establishment; and

- Commercial 2015 V2, Secured by Design.

5.63. The security measures are to be developed at the detailed design stage as outlined in the DAS.

Energy and Sustainability Energy Strategy

5.64. An Energy Strategy has been developed by Chapman BDSP and is submitted in support of the application. In line with the London Plan, the Development has adopted a net zero carbon strategy. To meet the net zero-carbon target, an on-site reduction of at least 35% beyond the baseline of Part L of the current Building Regulations[9] is required.

5.65. The Development seeks to reduce both embodied carbon and operational energy. A lean and simple construction approach has been adopted by minimising basement sizes and material waste. Post Tensioned concrete flat slabs would be used to minimise the quantum of materials with the added benefit of embedded cooling pipes to provide the majority of the office cooling. This solution uses less energy than conventional office systems and significantly reduces the embodied carbon of the on-floor solutions. The inclusion of exposed thermal massing can be pre-charged with cooling overnight when external temperatures are lower providing energy savings. This also allows for openable windows reducing the need for mechanical ventilation, further reducing energy demand.

5.66. The Development would employ Air Source Heat Pumps (ASHPs) with chillers for cooling on the upper levels. The use of Air Source Heat Pumps combined with discrete thermal storage solutions enable significant reductions in total greenhouse gas emissions (the ASHPs would reduce carbon emissions by 16.5% alone which works out at 97.8 tonnes of CO_2 per annum).

5.67. The Development would also provide two emergency generators – one for life safety and the other a tenant fit option situated at roof level. The life safety generator would be tested for a maximum of 16 hours annually and would otherwise not be used, other than its intended use.

5.68. It is anticipated that emissions from any future generator installed as part of the tenant fit out would be controlled by a suitably worded planning condition.

5.69. Renewable energy would also be incorporated as part of the Development. An area of 197.2 sqm on level 26 on the Tower is dedicated to photovoltaics (assumed to accommodate 116 units). The photovoltaic array achieves carbon savings of 6 tonnes of CO_2 per annum.

5.70. The Energy Strategy indicates that the overall predicted reduction in CO_2 emissions beyond Part L 2013 (2016 amendments) of the Building Regulations, as a result of the above measures, is approximately 47% which represents an annual saving of approximately 279.7 tonnes of CO_2.

Sustainability

5.71. A Sustainability Statement has been developed by Chapman BDSP and is submitted in support of the planning application. The Sustainability Statement sets out how the features of the Development would accord with the relevant policies of the London Plan and the LBS Local Plan (including the Draft New LBS Local Plan). In particular, the Development is targeting a BREEAM New Construction Shell and Core 2018 (offices) rating of 'Excellent' for the new retail and offices in the Tower and new offices in Keats House. For the Georgian Terrace, the Development is

targeting a ‘Very Good’ BREEAM Non Domestic Refurbishment and Fit-out 2014 (office and retail) ‘Very Good’ for the refurbishment rating for the proposed office use.

References

1 Greater London Authority (2021); London Plan, March 2021.

2 Southwark Council (2020): New Southwark Plan, August 2020.

3 EA website Flood map for planning - GOV.UK (https://flood-map-for-planning.service.gov.uk/) Accessed 31/03/21.

4 Institute of Lighting Professionals (2011), Guidance Notes for the Reduction of Obtrusive Light GN01:2020.

5 British Standard Institute (2020): BS 5489-1:2020 Design of road lighting. Lighting of roads and public amenity areas. Code of practice. Published May 2020.

6 Institute of Lighting Professionals Lighting (2015), PLG05 The Brightness of Illuminated Advertisements.

7 Mayor of London (2021), The London Plan, The Spatial Development Strategy for Greater London.

8 Southwark Council (2020): New Southwark Plan, August 2020.

9 Department for Communities and Local Government (2016), 'Conservation of fuel and power: Approved Document L: 2013 edition incorporating 2016 amendments'. Available from: https://www.gov.uk/government/publications/conservation-of-fuel-and-power-approved-document-l

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

Introduction

6.1. This chapter, which has been prepared by Waterman Infrastructure & Environment (Waterman IE) with input from the Applicant's construction advisors Gardiner & Theobald, sets out the proposed programme of the demolition, deconstruction, refurbishment and construction works for the Development (hereafter referred to as 'the Works'), together with the key activities that would be undertaken on the Site during the construction period. This chapter also contains a summary of the proposed mitigation measures expected to be implemented by the construction contractor.

6.2. An outline Construction Management Plan ('CMP') has been submitted as part of the planning application, which identifies the proposed phasing and construction methodology. The CMP seeks to highlight and address any potential issues during construction that the Main Contractor, who has overall responsibility for planning, coordinating and supervising the work of specialists and labourers working on Site, should consider when developing their Site-specific Environmental Management Plan ('SEMP') and Construction Logistics Plan. The SEMP would include details of relevant environmental management controls necessary for environmental protection during the Works, as detailed later in this chapter. This would be discussed and agreed with the relevant planning officers from London Borough of Southwark (LBS), pursuant to a discharge of condition application, following the approval of the planning application.

6.3. The detailed assessments of the likely significant environmental effects resulting from the proposed Works, together with mitigation measures, are presented in technical **Chapters 7** to **14** inclusive of this Environmental Statement (ES) and in **Part 3: Townscape, Visual Impact and Built Heritage Assessment** of this ES.

Existing Structures

6.4. The existing New City Court building (see **Figure 3.2**) is part four storeys and part five storeys high. A single storey basement is present beneath the majority of the buildings on-Site except beneath the south eastern corner of the Site and is set at 1.5 metres (m) Above Ordnance Datum (AOD) and 3.5m below ground floor level. The existing foundation consists of 450mm diameter reinforced concrete piles, with 10m deep pile caps located below the 250mm thick reinforced concrete basement slab.

6.5. Keats House is a four-storey building with a retained 19th Century façade (the façade would also be retained as part of the Development). There are six vaults located in front of Keats House. The two larger vaults have been bricked up and are currently inaccessible with the remaining four filled with concrete, which is likely to be have been left there from the 1980s refurbishment works. The foundations of Keats House main superstructure are approximately 450mm diameter piles as part of the existing development. The façade foundations appear to have been underpinned in order to provide additional strength.

6.6. The four-storey Georgian Terrace comprises a row of listed buildings along St Thomas Street which are to be retained, restored and refurbished. The existing foundations are corbelled brickwork strip footings. The rear footings were underpinned using various combinations of

brickwork and mass concrete, during the 1980s conversion. The vaults beneath the Georgian Terrace are constructed of brick and extend beneath the pavement, some 1.6m at No. 4 St. Thomas Street and 2.6m in front of numbers 6-16.

Programme of Works

6.7. The programme of Works is necessarily broad at this stage, and may be subject to modification. Specific demolition, deconstruction, refurbishment and construction activities may vary in frequency, depending upon the particular stage of works. However, it is considered that sufficient planning has taken place at this stage to enable the likely significant environmental effects relating to the Works to be identified and assessed.

6.8. It is anticipated that the Works would be carried out over a period of approximately three years and 8 months (44 months). The Works would include**:**

- Site set up and enabling works;
- Demolition and Site clearance to ground level of identified units;
- Piling;
- Basement construction;
- Construction of the superstructures;
- Service installation and fit-out; and
- Landscaping and external works.

6.9. The estimated start date for the Site clearance and demolition is quarter three 2022. The anticipated duration of each task within the Works is set out in **Table 6.1**. Although the exact weeks (including the start and finish dates) may vary, based on a best estimate within this early stage of design, the approximate duration of the works means the works are anticipated to finish in quarter one or two 2026. A Gannt chart setting out the indicative programme is provided as **Appendix 6.1** to visually represent **Table 6.1**.

Table 6.1: Indicative Programme of the Works

Activities	Anticipated Start Date	Anticipated Completion Date	Approximate Duration (Weeks)
Site set up and enabling works	Week 1	Week 37	**38**
Demolition and Site clearance	Week 1	Week 31	**32**
Piling	Week 30	Week 50	**21**
Basement construction	Week 49	Week 77	**29**
Construction of the superstructures	Week 65	Week 167	**103**
Service installation and fit-out	Week 80	Week 176	**97**
Testing and commissioning	Week 138	Week 189	**52**
Keats House	Week 134	Week 179	**46**
Landscaping and external works	Week 93	Week 181	**89**

Description of the Works

Site Set Up and Enabling Works

6.10. Secure hoarding would be erected around the perimeter of the Site prior to the commencement of demolition works. The design of the hoarding would be in accordance with LBS's Technical Guidance – Demolition and Construction[1] (hereafter referred to as the 'Code'). The Main Contractor would be required to maintain the hoarding to provide full security and safety for the general public and to minimise adverse visual and noise effects. The Site would be secure at all times to prevent unauthorised access and a traffic management plan / site logistics strategy would be provided pursuant to the Code, separating vehicular and pedestrian access.

6.11. The enabling works would include:

- Set up of the Site welfare offices in the existing Georgian Terrace on St. Thomas Street;
- Erecting the tower crane;
- Carrying out a Site-wide asbestos survey;
- Moving the UKPN substation to a temporary gantry on St. Thomas Street; and
- Carrying out investigation works to the existing structure.

6.12. It is anticipated that the Site would be serviced from St. Thomas Street. All Works vehicles during site preparation and enabling works would be held on Druid Street, as shown on **Figure 6.1**.

Archaeological Evaluation

6.13. As reported in **Chapter 10: Archaeology** evaluation trial pits or trenches would be excavated once the basement slab is removed. If the results of these investigations indicate that it is necessary, mitigation would comprise of targeted excavation and recording, and / or a watching brief during the groundworks under a planning condition to secure preservation by record.

Demolition, Deconstruction and Site Clearance

6.14. The existing New City Court building would be soft stripped and demolished to ground level. Keats House façade would be relocated approximately 6m to the west along St Thomas Street to allow creation of a new ground level servicing access onto St. Thomas Street. The remains of Keats House would be demolished to the existing basement level B1. The Georgian Terrace would be soft stripped of material during this stage.

6.15. The demolition of the buildings would be preceded by a period of Site investigation and would be carried out according to the following sequence:

- Hazardous material identification and removal works;
- Internal soft strip out of the identified buildings;
- Removal of all mechanical plant and equipment; and
- Deconstruction of the buildings on a floor-by-floor basis.

6.16. Special provisions would apply for any asbestos-containing materials. A safety method statement would outline the control measures necessary to reduce the risks to an acceptable level, and all

statutory notices would be placed with the HSE. Any asbestos would be removed by a licensed contractor in accordance with the Control of Asbestos Regulations and the appropriate HSE guidance.

6.17. The following main principles would be followed:

- The main New City Court building would be demolished (see **Figure 6.2**) starting from the roof and working down to the ground floor slab;
- The demolition works would be subject to the detailed method statement from the demolition contractor;
- The New City Court building lift would be removed early in the programme, and the shaft would be used to drop debris to ground floor;
- Suitable demolition material would be retained on Site to provide a piling platform for the operations; and
- An external scaffold would be deployed around the existing buildings to ensure the safety of the workers.

6.18. Once the buildings are removed, the existing sewer under Keats House would be relocated to the east, beneath the service access between Conybeare House and the relocated Keats House (see **Figure 6.3**).

6.19. It is expected that 1,200 tonnes of material would be created from the soft strip, much of which would be re-used or recycled. The demolition of the reinforced concrete structure would create about 7,200 tonnes of concrete and bricks and 800 tonnes of ferrous and non-ferrous metal. Where it is not possible to reduce or re-use materials on Site, opportunities to recycle the materials off-Site would be explored, where feasible. It is expected that over 98% of the above materials will be re-used, recycled, or recovered in line with the London Plan policy (refer to Section 7 of the Sustainability Statement submitted in support of the planning application for further details on the anticipated construction material processes).

6.20. An approximate total of 23,014m^3 of excavated material is expected to be removed from the Site, during the groundworks phase. The material will be separated into material for disposal and material for recycling.

6.21. The impact of the demolition works on the adjacent buildings is to be assessed and approvals secured via party wall awards where required. Further ground movement analysis would be undertaken via halfspace modelling to ascertain the mitigation required (see Appendix 4 of the Basement Impact Assessment (standalone document) for details).

Substructures and Piling

6.22. After the demolition of the existing structures (New City Court and Keats House), the ground floor slabs would be broken down on-site to allow excavation of the basement (see **Figure 6.3**). The proposed two story basement would be confined by secant pile retaining walls. The levels of the first and second basement floors are approximately -0.050 AOD and -4.650 AOD with the level of the ground at 5.0m AOD.

6.23. Piling rigs would then be used to construct the new foundations and new drainage would be installed (see **Figure 6.4**). The diameter of the secant piles would generally be 600mm, however

along the north side of the proposed building adjacent to the Georgian Terrace, the diameter has been increased to 900mm due to the increase in loadings. The piles would be 'sleeved' as they pass through the existing basement void.

6.24. There are two zones (beside the off-site buildings: Conybeare House on the north-east side; and Iris Brook House on the south-east side) where the diameter of the secant piles would be reduced to 450mm. In this location the piles would be constructed using a restricted access pilling rig, to allow the piles to be installed closer to the party walls.

6.25. In all cases, the secant piles wall would be constructed by drilling with a Contiguous Flight Auger ('CFA'). Secant piles would be installed from either existing basement B1 or ground floor level and are anticipated to be progressed up to a depth of 12-16m, except for the north elevation of the Tower (main proposed building) - opposite to the Georgian Terrace – where they are anticipated to be progressed up to a depth of circa 28m from basement level B1. The final depth of the secant piles would be confirmed on the base of the findings of the geotechnical investigations.

6.26. Bearing piles would be installed from basement level B1 and would be installed using a CFA piling method, with 900mm diameter. The bearing piles would be extended up to a depth of circa 28m from basement level B1. The piling depth of the bearing piles would be confirmed upon completion of the geotechnical investigation.

6.27. Piling would commence at basement level B1 with one rig working from the south west corner working north and the second rig starting central north and working east. The piling line would be set such that adequate clearance to the adjacent structures is maintained from the centre line of the pile to the adjacent high-level obstruction (as required by the contractor). The vibration induced by piling and the movements arising from piling and excavation would be assessed against national standards and specified limits through implementation of a SEMP and agreed with LBS through planning conditions as required.

6.28. Generally, the piling of the retaining wall is proposed to be done from the existing basement level B1. The wall is set out 1.2m inside the existing masonry walls. Along the south and the east faces, the piling would be carried out from ground floor level to avoid restriction from the existing basement walls. Utilising mainly demolition rubble, a berm would be formed against the existing retaining wall, thus allowing for the piling rig to be positioned on top.

6.29. Once the entire ground floor slab is removed, a logistic slab would be constructed, which will be necessary due to limited areas for storage and laid down areas adjacent to St. Thomas Street. The logistics slab would be supported on plunge columns and designed by a qualified temporary works engineer. A plunge column is a structural steel or concrete section embedded in freshly poured concrete pile. This is done to allow simultaneous superstructure construction and basement excavations.

6.30. The piles for the Tower would support a 1,350mm deep pile cap which occupies the entire footprint of the building. Therefore, the formation level of the basement is -6.0m AOD under the footprint of the Tower and -5.0m AOD under the public realm and Keats House with exception of the pile caps and the lift pits, which would be deeper.

6.31. The bearing piles for the public realm and Keats House would be 900mm deep. The pile caps underneath the columns and the core of Keats House are 1,350mm deep.

6.32. The excavation would begin from the existing basement level B1 to proposed basement B2 formation level (see **Figure 6.5**). Next the core of plunge columns would be constructed. The slabs at both B1 and B2 levels would be a 350mm thick reinforced concrete suspended slab.

6.33. The underpinning work on the Georgian Terrace undertaken in the 1980s would be strengthened as part of this work by piling from proposed basement level B1.

Construction of the Superstructures

6.34. The building superstructure would be constructed around a concrete core, with pre-cast concrete columns and post tensioned in situ concrete slabs (see **Figure 6.6**). The core would house the lifts, stairs and primary landlord service risers. Traditional reinforced concrete slabs would be utilised at ground floor level and below. The priority would be to build the main core as quickly as possible and considering the building height and potential weather impacts, a "jumpform" self-climbing formwork system for the cores has been adopted. Jump form is a method (formwork) the structure is cast in a series of vertical sections called "lifts". After the concrete has gained sufficient strength the framework is moved back and then 'jumped' to the next level above. The mould/formwork structure elevates itself with the help of mechanic leverage equipment (usually hydraulic). To do this, it is usually fixed to sacrificial cones or rails emplaced in the previously cast concrete.

6.35. The structural frame construction is due to commence once the core is sufficiently installed to allow full access to install the embedment plates.

6.36. The Superstructure floor slabs will generally be post tensioned in situ reinforced concrete flat plates, formed on table formwork. Starter bars are to be left in the core to pick up the floor slabs. The frame would span from the external elevation to the core. Once cured sufficiently the table formwork would be removed and back propping installed until full strength on the concrete is achieved.

6.37. It is expected that the construction would use the following amounts of material:

- Reinforced concrete (superstructure) = 4,800m^3
- Reinforced concrete (substructure) = 2,153m^3
- Reinforced concrete (piling) = 6,264m^3
- Pre-cast concrete columns (superstructure) = circa 5,400 pieces
- Façade panels = 4,200no.

6.38. The façade construction would commence once the superstructure reaches level 6 of the Tower. This should ensure the façade construction works never clash with the structure construction works.

6.39. During certain works, such as the façades of Keats House, the external scaffold would be progressively erected to provide protection for the façade operations**.**

Fit Out

6.40. The office areas will be fitted out to a shell and core level (e.g. raised floors and suspended ceilings, basic mechanical and electrical services installed), prior to handover to tenants. The cores and landlord areas would be fully fitted out.

6.41. Work to the risers start on completion of the frame to level 6 of the Tower. The main mechanical and electrical carcasses to the floors would be installed and followed by the progressive fit-out of the offices, cores and lobbies.

6.42. Temporary waterproofing is essential to allow early services installation and the first stage fit-out works to commence. This is to consist of two levels of protection (such as bundling) at levels 5 and 15 of the Tower to prevent water ingress to risers from floor plates.

6.43. Lift Installation to the cores would commence once the frame structure is complete. The lifts would be installed as early in the programme as possible to allow for early beneficial use to facilitate logistics, during the final stages of construction.

External Landscaping

6.44. The landscaping works would commence half way through the Works programme, and shall form part of the final stage of works for the completed Development.

6.45. The external works would comprise the construction of the courtyards, plus all of the public realm, including the soft landscaping, hard landscaping and seating areas.

Employment

6.46. The Main Contractor would be required to work with LBS to promote the employment of local people during the demolition and construction works and the patronage of local businesses. This would be secured through a s106 agreement.

Plant and Equipment

6.47. Consideration has been given to the types of plant that would likely be used during the Works. The anticipated plant and equipment likely to be used is set out in **Table 6.2** below. As indicated below, the Applicant's construction advisors have stated the peak daily number of Heavy Goods Vehicles (HGVs) movements would peak at 62 in July 2023 during the piling and excavation works.

Table 6.2: Anticipated Demolition, Deconstruction, Refurbishment, and Construction Plant

Plant and Equipment	Demolition	Excavation /Piling	Substructure	Superstructure and Envelope	Fitting out
1.5 tonne Skid Steer Loader Shovels	3				
Luffing jib tower crane	1		2	2	
30 tonne excavator with hydraulic muncher attachment	1				
30 tonne excavator with muncher attachment	1				
30 tonne excavator with bucket attachment	1				
5 tonne minis with hydraulic pulveriser/impact hammer attachments	3				
Brokk – Demolition Robot		2			
Excavator		2	4		
Concrete Pump		2	2	2	
Piling Rig		2			
Crawler crane		2			
Temporary Substation		1	1	1	
Mobile access Platforms			5	4	8
Single hoist			1	1	
Twin hoist				2	2
Common Tower				1	1
Scaffolding					✓
Concrete lorry (6m^3)*					
Muck away lorry (standard 16 tonne)*					
Articulated lorry*					
Low Loader*	Peak 36	Peak 62	Peak 60	Peak 40	Peak 28
Lorry*					

* all of these peak numbers are two-way movements e.g. Peak 62 is 31 vehicles into the Site and 31 vehicles out of the Site.

Hours of Work

6.48. It is anticipated that the normal core working hours for the Works would be:

- 08:00 - 18:00 hours Monday to Friday;

- 08:00 - 14:00 hours Saturday; and
- No working on Sundays or Bank Holidays.

6.49. The hours of working would be confirmed via a planning condition and agreed with LBS prior to the commencement of the Works. It is conceivable that certain works such as the delivery or maintenance of large plant and equipment may have to be undertaken outside these periods.

6.50. Any Works outside these hours would only happen with prior approval from Southwark Public Protection Services. The hours would be discussed further with local residents and businesses.

Materials Distribution

6.51. Materials would be loaded and unloaded utilising two luffing jib tower cranes. The location of these cranes would need to avoid any potential over-sailing issues and also to ensure that it does not impede the progress of the Works. The proposal is for the crane to be situated to the north of the office block and the second one to be on the top of the core. A number of mobile crane lifts would be required throughout the project, which would mean a partial road closure of the St. Thomas Street carriageway. Any road closures would be agreed with LBS.

Environmental Issues

6.52. Demolition 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 effects, recommended mitigation measures and likely residual effects resulting from the Works of the Development are described within the technical chapters of this ES (**Chapters 7: Transportation and Access** to **Chapter 14: Cumulative Effects** and **Part 3: Townscape, Visual Impact and Built Heritage Assessment**).

Environmental Management and Mitigation

6.53. Below are the Site environmental protection measures and Site practices already proposed by the Applicant.

Site Environmental Management Plan

6.54. The nature, extent and magnitude of potential adverse effects associated with the Works are largely dependent on the implementation of effective management controls, e.g. the employment of dust suppression methods and the use of properly maintained plant.

6.55. The Main Contractor would be required to prepare and implement a SEMP in accordance with LBS's Code. The implementation of a SEMP is an established method for managing potentially adverse environmental effects resulting from demolition and construction works and is consistent with methods generally adopted for major schemes in urban areas. Amongst other relevant documents, the SEMP will be issued to all demolition or construction contractors, to provide an operational manual for carrying out environmental controls and monitoring during works in line with best practice.

6.56. The content of the SEMP would be discussed and agreed with LBS prior to the commencement of the Works and could be secured through an appropriately worded planning condition.

6.57. It is envisaged that the SEMP would include:

a. Procedures implemented in line with ISO14001 including: environmental Site inspections, constant monitoring of subcontractors, environmental training, signage, waste management, COSHH storage;

b. Available details of the sequencing of the works;

c. Details of the demolition, deconstruction, refurbishment and construction activities to be undertaken, highlighting any operations likely to result in adverse environmental effects, with an indication of the specific detailed mitigation measures to be employed;

d. Prohibited or restricted operations;

e. A framework for compliance with relevant legislation and guidance;

f. Details of plant to be used;

g. Details of proposed routes for Heavy Goods Vehicles (HGVs) travelling to and from the Site;

h. Roles and responsibilities of key staff including training of staff, liaison with stakeholders and management of enquiries and complaints;

i. Details of emergency procedures which would be implemented on the Site;

j. Requirement for spill kits and drip trays;

k. Details of general Site management practices, including working hours, hoarding, access, lighting, Site facilities, energy and water use, waste, materials procurement and storage;

l. Details of environmental management and control procedures, covering traffic and access, noise and vibration, dust, archaeology, contamination, hazardous materials and waste management, drainage and pollution control;

m. Details of all works involving interference with a public highway, including temporary road / footpath closures, realignment and diversions, and temporary car parks;

n. Requirements for auditing, monitoring and record-keeping;

o. Mechanisms for third parties to register complaints and the procedures for responding to complaints;

p. Provisions for reporting, public liaison and prior notification, especially where dispensations would be required; and

q. Measures implemented to ensure procurement of certified, sustainably sourced materials in order to comply with BREEAM requirements.

6.58. The preparation and implementation of a SEMP would place stringent contractual and procedural performance obligations upon trade contractors.

Management of Contractors

6.59. Individual trade contracts would incorporate appropriate requirements in respect of environmental control, based largely on the standard of ‘good working practice’ outlined in the SEMP, the Code and the Considerate Constructors Scheme. Contractors would be required to demonstrate how they would achieve the provisions of the SEMP, how targets would be met and how potential adverse effects would be minimised.

Management of Construction Works

6.60. The Applicant anticipates that construction of the Development would be managed on their behalf by a Main Contractor and that the Main Contractor would participate in the Considerate Constructors Scheme, which sets stringent targets for environmental performance, neighbourhood liaison and workers welfare facilities.

6.61. The Main Contractor would demonstrate in the SEMP how management, monitoring, auditing and training procedures are in place to ensure compliance with the Code. The SEMP would also set out the specific roles and responsibilities of the contractors' personnel in managing, monitoring and controlling all sub-contractors.

Communications with Neighbours

6.62. The Main Contractor would have a Site based project team who would manage every aspect of the construction process. Their Senior Construction Manager's responsibilities include ensuring that the Site team are doing everything practically possible to minimise disruption to the neighbours and other local residents. They would have regular liaison meetings and distribute newsletters on progress and plans of upcoming work.

Public Safety, Emergencies and Accidents

6.63. The Main Contractor would be required to liaise fully with LBS, the police (where necessary) and other relevant parties with regard to maintaining and contributing to a safe environment around the Site.

6.64. A clear and secure demarcation between operational activities and other areas would be maintained to ensure public safety. Particular attention would be given to crossing points on surrounding roads, routes for the Works, access gates and security arrangements. A 'clean site' policy would be maintained through careful management, designated storage locations of materials and waste, clearing away loose cables and equipment.

6.65. The Code states the Main Contractor should follow a 'good housekeeping' policy that would ensure that the Site is, amongst other things, left clean and tidy, and has high safety standards on the Site, and is fully compliant with current health and safety legislation.

6.66. Emergency procedures would be developed in consultation with the emergency services to ensure plans would be in place to deal with any spillages and / or pollution incidents. Any notifiable pollution incidents would be reported immediately to the regulatory bodies.

6.67. To assist the programme of works, it is anticipated that the footpath adjacent to the Site would be closed from pedestrians, and a new crossing may be sited at either end of the Site to allow safe access to the opposite side.

6.68. All construction entering and leaving the loading bays would be closely managed by the Applicant's traffic management team / traffic marshals.

Traffic and Access Management

6.69. From the outline Site logistic proposals, it is anticipated that delivery points on St. Thomas Street would be suitable for receiving deliveries from HGVs. To ensure that St. Thomas Street is not congested during the Works, all deliveries would comply with a booking system coordinated by the Main Contractor's logistics manager and the project team. This would ensure that materials are pre-booked in a timely manner on a "just in time" basis. An off-site consolidation centre will also be considered as this would assist in ensuring that the scheduled deliveries arrive and depart from the Site on time.

6.70. Full time banksmen / traffic marshals would be stationed within the proposed loading bay area within St. Thomas Street and would be responsible for managing safe access and egress of all vehicular traffic. St. Thomas Street, being a main thoroughfare into London, has very high usage in the morning and evening and therefore all deliveries would be restricted to be outside these core times

6.71. No parking on Site would be permitted, with exception to the delivery vehicles loading and unloading within the loading bay.

6.72. As previously mentioned, designated construction routes to and from the Site have been developed (**Figure 6.1**).

Control of Noise and Vibration

6.73. To minimise potential noise and vibration effects during the Works, site-specific code of practice measures would be implemented and adhered to. Such measures set out in the SEMP would be in accordance with the Code and suitable plant / working methods would be agreed with LBS prior to the commencement of any works. Noise and / or vibration monitoring on the Site and in adjacent buildings would also be undertaken, where necessary, which would assist in establishing noise and vibration levels. Works would be limited to the specified hours outlined above and would be subject to agreement with LBS. Control measures to minimise noise are outlined in **Chapter 8 Noise and Vibration.**

Control of Dust

6.74. To minimise the release of dust and air pollution during the Works, in accordance with the Code, the GLA SPG on The Control of Dust and Emissions during Construction and Demolition[2] and guidance from the Institute of Air Quality Management[3], a number of measures would be implemented. These are detailed in **Chapter 9: Air Quality**, and within the Construction Management Plan (CMP), which has been submitted to support the application and commits the Main Contractor to dust mitigation measures.

Ground Contamination

6.75. A desk-based ground conditions assessment was undertaken (**Appendix 2.3: Preliminary Environmental Risk Assessment** of this ES) and concluded that whilst there is potential for contamination to be present, existing underground structures - the basement - are likely to have removed much of the potential sources of contamination. However, piling and other intrusive sub-

structure works may create a risk of disturbance and a potential contamination pathway to aquifers underlying the London Clay Formation.

6.76. As such, the following measures have been committed to by the Applicant to mitigate the risk of ground contamination:

- Undertaking a Site investigation in line with best practice following the demolition element of the Works, to provide information for both geotechnical and contamination purposes. This would include testing samples of soil and groundwater and taking readings of levels of ground gas and vapour;
- Based on the findings of the Site investigation, preparation and implementation of a remediation strategy during the works to ensure identified contamination receptor linkages are broken as part of the development; and
- Removal of the buried diesel tank in the east plant room at New City Court (lower ground level) along with associated pipework and infrastructure in accordance with best practice measures. It would be drained, cleaned and appropriately decommissioned prior to removal from the Site.

6.77. In addition, the Works would be undertaken in accordance with the SEMP to negate adverse risks to the health of construction workers, Site residents, Site visitors, Site neighbours, ecological receptors and the environment. Good practice measures to be incorporated into the SEMP include, but are not limited to:

- Dust monitoring within the Site hoarding and also public areas surrounding the Site and taking preventive measures to control dust, such as use of a fine water spray at the working face and loading areas (refer to **Chapter 9: Air Quality**);
- Handling and storage of any potential hazardous liquids/materials in accordance with relevant legislation and Environment Agency (EA) pollution prevention guidance. Above ground tank storage of oil would be undertaken in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001[4]. This would include the use of appropriately tanked and bunded storage areas for fuels, oils and other chemicals in designated areas located away from surface water drains;
- Procedures for the management of materials, spillage and spill clean-up, use of best practice construction methods and monitoring;
- Surface drainage would pass via settlement and oil interception facilities, where required, and discharge arrangements would be agreed with the EA and Thames Water Utilities Limited (TWUL);
- The provision of adequate drainage to manage surface water run-off and minimise contaminated water reaching the groundwater; and
- The stockpiling of contaminated materials would be avoided, wherever possible. Stockpiles would be located on areas of hard standing or on plastic sheeting to prevent mobile contaminants infiltrating into the underlying ground and covered with suitable materials at the end of each working day.

Waste Management and Minimisation

6.78. Waste would be generated during all stages of the Works from a number of sources, including:

- Spoil - including concrete, brick rubble, steel, aluminium, plastics, glass, wood;
- Soils (including potentially contaminated soils);
- Packaging - including plastics, carboard, pallets, expanded foams; and
- Waste materials generated from the construction process as well as inaccurate ordering, poor usage, badly stored materials, poor handling and spillage.

6.79. The Main Contractor would ensure that construction waste is appropriately segregated to maximise recycling rates. The SEMP would detail the process that the Main Contactor and their trade contractors would be required to follow to maintain a tidy Site and, where practicable, to operate 'just-in-time' and lean ordering policies for the delivery and supply of materials for the Works.

6.80. The destination of all waste or other materials removed from the Site would be notified by the Construction Site Manager for approval in accordance with the CMP. Loads would only be deposited at authorised waste treatment and disposal sites. All wastes removed from the Site would be recorded appropriately, including final destination and percentage diverted from landfill, in accordance with legal requirements, good practice and the requirements of BREEAM.

6.81. Disposal of all Site generated wastes would be in accordance with the requirements of the EA, the Control of Pollution Act 1974[5], Part IIA of the Environmental Protection Act 1990[6], Clean Neighbourhoods and Environment Act 2005[7], Hazardous Waste Regulations 2005[8] and the Environmental Protection (Duty of Care) Regulations 2003[9].

Protection of Archaeological Resources

6.82. There is an area in the south east corner of the Site where no basement currently exists, and this area may have been a former burial ground. As reported in **Chapter 10: Archaeology**, development affecting any former burial ground is regulated by statute, principally the Burial Act 1857[10], the Disused Burial Grounds Act 1884[11] and 1981[12], and the Mission and Pastoral Measure 2011[13]. The exhumation of any human remains requires approval from either the Secretary of State or the Church of England, depending on whether the land is subject to the Church of England's jurisdiction. Under the Town and Country Planning (Churches, Places of Religious Worship and Burial Grounds) Regulations 1950[14], the removal and re-interment of human remains would be in accordance with the direction of the local Environmental Health Officer.

Protection of Ecological Resources

6.83. A Preliminary Ecological Appraisal report (refer to **Appendix 2.4** of this ES) identified that the Site consists of habitats assessed to be of between low and negligible value. It has been assessed that the Site does not have potential to support notable or legally protected species, however, it is considered that it may support common species of bird and invertebrates.

6.84. As set out in the Preliminary Ecological Appraisal, removal of any habitats supporting nesting birds would be undertaken outside of the breeding bird season (March to August inclusive) where possible. However, if the Works cannot be undertaken outside the breeding bird season an ecologist would inspect any vegetation / building to be removed immediately prior to the

clearance. If an occupied nest is recorded, an appropriate buffer zone would be created around the nest, and clearance of this area delayed until the young have fledged.

6.85. The Works would be carried out according to the British Standards Institute (BSI) and Best Practice Guidelines with regard to ecology, including guidelines produced by the EA[15]. The Code includes measures to prevent disturbance from noise, light, vibration, surface water run-off and dust deposition. Protection of ecological resources would already be covered by the measures within the SEMP.

References

1 Southwark Council (2016); Technical Guidance – Demolition and Construction [Online].. Available from: http://www.southwark.gov.uk/assets/attach/1477/Technical%20Guidance%20for%20Construction%20-%202016.pdf

2 Greater London Authority (2014); SPG The Control of Dust and Emissions during Construction and Demolition. 2014. Available from: https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/london-plan-guidance-and-spgs/control-dust-and

3 Institute of Air Quality Management, (2014); Guidance on the Assessment of dust from demolition and construction. Available from: https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf

4 Statutory Instrument No. 2954, 'Control of Pollution (Oil Storage) (England) Regulations 2001

5 HMSO (1974); Control of Pollution Act 1974

6 HMSO (1990); Environmental Protection Act 1990

7 HMSO (2005); Clean Neighbourhoods and Environment Act 2005

8 HMSO (2005); The Hazardous Waste (England and Wales) Regulations 2005

9 HMSO (2003); The Environmental Protection (Duty of Care) Regulations 2003

10 HMSO (1857); Burial Act 1857

11 HMSO (1884); Disused Burial Grounds Act 1884

12 HMSO (1981); Disused Burial Grounds (Amendment) Act 1981

13 HMSO (2011); Mission and Pastoral Measure 2011

14 HMSO (1950); The Town and Country Planning (Churches, Places of Religious Worship and Burial Grounds) Regulations 1950

15 EA; Pollution Prevention Advice and Guidance. Available from: http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx

7. Transportation and Access

Introduction

7.1 This chapter, which was prepared by Transport Planning Practice (TPP), presents an assessment of the likely transport and access effects of the Development. Information on traffic flows and routes during the Works has been provided by Gardiner & Theobald.

7.2 This chapter provides a description of the assessment methodology; a description of the relevant baseline conditions of the Site and surrounding area; and an assessment of the likely significant effects of the Development, that could arise during demolition, deconstruction, refurbishment and construction, and once the Development is completed and operational. Where appropriate, mitigation measures are identified to avoid, reduce or offset adverse effects and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described

7.3 This chapter refers to the Transport Assessment and Travel Plan submitted to support the applications.

Assessment Methodology and Significance Criteria

Assessment Methodology

Consultation

7.4 Consultation has taken place with London Borough of Southwark (LBS) Highways by means of pre-application meetings. A formal pre-application meeting with Transport for London (TfL) took place on 9th February 2021.

7.5 Relevant comments raised within the 2018 EIA Scoping Opinion, in connection with the previous planning application for the Site. have been summarised in **Table 7.1** below, along with an indication of where within this ES Chapter each issue is addressed.

Table 7.1: Consultation Feedback

Consultee	Comment	Where in the Chapter this is addressed
LBS	In respect of the changes which will result from the new areas of public realm to be created at ground level within the Site along with a potential new access to London Bridge Underground Station, a description should be provided of the reasonable alternatives for ground level pedestrian routes studied by the developer. The alternative route options considered should be noted and the main reasons for selecting the chosen option should be set out together with the reasons for other route options being discounted so that the transport effects can be properly weighed.	The alternatives for ground level pedestrian routes are considered in **Chapter 4: Alternatives and Design Evolution**. A description of the new public realm created at ground level is included in **Chapter 5: The Development**. An assessment of the effects on pedestrians of the Development is included within this Chapter.
LBS	Any mitigation measures proposed for inclusion in the outline Travel Plan, including any contingency measures identified, should be properly assessed and any effects and their significance identified.	The Travel Plan is included in **Appendix 7.2** and a summary of the measures have been set out within the mitigation section of this ES chapter.
TfL	It is noted that TfL has stated that it would like to see details of alternative servicing arrangements that have	The servicing arrangement is set out within this Chapter and the

Consultee	Comment	Where in the Chapter this is addressed
	been considered. The rationale for selecting the chosen option and the reasons for other arrangements being discounted should accordingly be provided.	servicing proposals have been amended to take place from an on-site service yard accessed from St Thomas Street – which is TfL's preferred option.

7.6 An EIA Informal Scoping Report was submitted to LBS in February 2021. As set out in Chapter 2 the LBS response requested the scope of the EIA be amended as follows:

- Updated legislation, guidance, industry best practice and policy context;
- Updated baseline information;
- Further and updated surveys undertaken since the 2018 ES Scope was agreed;
- Additional assessment and information, as is relevant, that was identified as being required within the detailed ES reviews undertaken by LUC on behalf of LBS of the 2018 ES;
- Current data availability and representativeness due to the COVID-19 restrictions; and
- Revised scheme proposals.

7.7 The amended scope as set out above has been taken into account in this Chapter.

Establishing Baseline Conditions

7.8 The baseline conditions have been identified using a combination of site observations, desktop studies, traffic surveys and reviews of available information such as the 2011 Census data.

7.9 In particular, information on the following transport modes has been obtained:

- Public transport services by review of service routes and frequencies;
- Review of pedestrian routes from the Site to local public transport nodes (bus stops, London Bridge Underground and National Rail stations) undertaken during a site visit;
- Undertaking of a Pedestrian Environment Review System (PERS) audit in order to assess the level of provision and quality of the local pedestrian environment;
- Undertaking of a Pedestrian Level of Comfort assessment in order to assess whether the existing footway provision can accommodate existing and future pedestrian demands;
- Accident data for the most recent three-year period, from 2017 to 2020, for roads surrounding the Site;
- Information on the 2011 travel to work modal split data for the local area which is the most recent Census information available;
- Information on the 2011 Census Special Workplace Statistics (SWS) data looking at the modes of travel that employees use to travel into LBS based on where they live; this allows to determine the direction of travel and selection of the most appropriate Underground Line for the purposes of trip distribution. This is the most recent Census data available.
- Review of the London Borough of Southwark (LBS) and TfL car and cycle parking standards;
- The most up-to-date Rolling Origin and Destination Survey (RODS) data has been obtained for the Jubilee Line and the Northern Line from TfL;
- Review of the frequencies of the river taxi services from the London Bridge City Pier;

- Automatic Traffic Count (ATC) surveys were undertaken in 2018 on Borough roads in the vicinity of the Site i.e. White Hart Yard, Marshalsea Road and Southwark Street to provide baseline flows for the original ES and the subsequent update.

7.10 Traffic data has been obtained from TfL for roads forming part of the Transport for London Road Network (TLRN) for 2017 in the vicinity of the Site i.e. London Bridge, Borough High Street, Southwark Bridge Road, St. Thomas Street and Tooley Street. These flows were adjusted in the 2018 ES and 2020 ES Addendum, based on the review of the Department for Transport (DfT) traffic trends over the last 10 years, to provide suitable baseline flows (referred to as the 2018 baseline flows) for the 2018 ES and 2020 ES Addendum. New surveys have not been undertaken for this ES, as any data collected during the COVID-19 pandemic is likely to have resulted in lower levels of traffic than those used in the previous submission. However, the 2018 baseline flows have been increased by adding the predicted vehicle movements from those committed developments that have since been constructed and operational. This therefore provides a robust and suitable baseline for this ES as it does not take into account any potential long-term reduction in travel as a consequence of COVID-19. Similarly, new pedestrian counts have not been undertaken for the same reasons.

7.11 In terms of the Underground, bus, rail and river taxi services frequencies, these have been reviewed for the period prior to the COVID-19 pandemic, therefore, these data do not take into account any potential changes to the operation of the services. This is in line with the overall approach to the trip generation and the assessment of effects in the Chapter which makes no discount to the proposed trips to account for any potential reduction in travel of employees to and from the proposed Development.

Assessment Approach and COVID-19 Pandemic

7.12 Whilst the effects of COVID-19 on the working environment have yet to be fully understood it is acknowledged that there might be a reduction in staff trips in the short term as more people continue to work from home. Additionally, there might be peak hour spread as commuters chose to arrive slightly earlier or later than they previously used to.

7.13 This assessment assumes that employees are based at the site rather than work remotely and no discount has been made to the proposed number of employees that would be expected at the proposed Development and the associated number of trips. This provides a worse case assessment in terms of the additional trips that would be generated by the proposed Development.

7.14 As a result of the COVID-19, there could also be changes to the modal split of the final leg of a journey with more people walking or cycling to the workplace having arrived at the mainline rail station. However, the Census data reports the main mode of travel (the longest mode by distance) which would be largely unaffected, therefore, the Census data can be relied upon.

Assessment Area

7.15 The assessment area has been established based on the likely areas of influence on the various travel modes available and where these are likely to give rise to significant effects as follows:

- Travel by foot - the focus is on access to amenities and facilities within 10 - 15 minutes' walk;
- Travel by cycle - the focus is on access to amenities and facilities within 10 - 15 minutes' cycle;
- Travel by public transport - the focus is on access to stops within the range of travel by foot and those destinations which can be reached within 40 minutes on public transport; and

- Traffic flows – the broad rules set out by the Institute of Environmental Management and Assessment (IEMA)[1] guidance have been followed to define the geographical extent of the assessment of traffic flows:
  - Rule 1 – Include highway links where traffic flows will increase more than 30% (or the number of heavy goods vehicles will increase by more than 30%); and
  - Rule 2 – Include any other specifically sensitive areas where traffic flows have increased by 10% or more.

Assessment Scenarios

7.16 The following scenarios have been considered within the assessment:

- Existing Baseline: This scenario comprises the Baseline 2018 flows and the traffic flows of schemes that have since been constructed and are now operational. These include:
  - Tower Bridge Magistrates Court and Police Station (15/AP/3303);
  - 175-179 Long Lane (15/AP/4072);
  - 25-29 Harper Road (15/AP/3886); and
  - Isis House, 67-69 Southwark Street.
- Future Baseline 2026: This scenario comprises the Existing Baseline + committed developments. The agreed list of committed developments is set out below:
  - 1 Bank End (20/AP/2333);
  - Fielden House (Shard Place) (17/AP/4008);
  - 2-4 Melior Place (18/AP/3229);
  - Capital House (18/AP/0900);
  - Colechurch House (20/AP/3031);
  - Fielden House (Shard Place) 28-42 St Thomas Street;
  - 153-159 Borough High Street;
  - Lavington House, 25 Lavington Street;
  - 19-23 Harper Street, 325 Borough High Street and 1-5 and 7-11 Newington Causeway;
  - 133 Park Street;
  - 40-44 Bermondsey Street, Vinegar Yard (19/AP/0404);
  - Southwark Fire Station, 94 Southwark Bridge Road;
  - 1-5 Paris Garden and 16-19 Hatfields;
  - Sampson House, 64 Hopton Street;
  - 185 Park Street (17/AP/1944);
  - 151-157 Tower Bridge Road (16/AP/3222);
  - Guinness Court, Snowfields Street (16/AP/3819);
  - King William Street (14/00178/FULEIA);
  - Kings College London (19/AP/0405);
  - Land bounded by St Thomas Street (18/AP/4171);
  - Landmark Court (19/AP/0830);
  - Royal Mint Court (PA/16/00479/A1); and

- Seal House, 1 Swan Lane (18/01178/FULMAJ).

- Future Baseline 2026 + Development; and Existing Baseline + Proposed Development + Committed developments – This scenario assesses the effects of the Proposed Development in combination with the Committed Developments (refer to **Chapter 14 Cumulative Effects**).

7.17 As mentioned earlier in the Chapter, new surveys have not been undertaken as they would have likely resulted in lower levels of traffic flows being recorded, due to the current pandemic. However, the flows have been increased to take account of traffic from previous committed developments that have since been operational and are therefore now baseline.

Assessment of Likely Significant Transport and Access Effects

7.18 This section outlines the methodologies applied to identify and assess the range of potential transport and access effects that may result from the Development. The assessment has been undertaken in line with TfL's Transport Assessment Best Practice guidelines[2] and IEMA Guidelines.

The Works

7.19 An assessment of the potential effects of demolition, deconstruction, refurbishment and construction (referred to as the 'Works') traffic from the Development has been undertaken based upon professional judgement and experience of such analysis at other comparable schemes within London and Southwark. Detailed consideration of the demolition and construction activities for the Development is set out within **Chapter 6: Development Programme, Demolition, Deconstruction, Refurbishment and Construction**. For the purposes of providing a robust, worst case assessment of the Works, the peak construction period has been used, and traffic control measures that would be developed post planning secured through a Construction Logistics Plan (CLP) and Site Environmental Management Plan (SEMP) have not been included within the main assessment (pre-mitigation).

7.20 Based on the review of the Works programme, the most intensive period for construction vehicle activity is predicted to be during piling, substructure works. The peak figure from these periods has been used in the assessment of effects of Works traffic.

Completed and Operational Development

7.21 A detailed multi-modal trip generation for the Development is set out in the Transport Assessment (TA) and summarised later in Table 7.15 and Table 7.16.

Employee and visitors travel

7.22 The morning and evening peak hour trip generation assessment has been undertaken based on an agreed methodology with LBS and TfL. For both the existing and proposed office space (Class E use) at the Site, the total person trips during the AM and PM peak hour have been established based on a first principles assessment taking into consideration the expected occupancy levels in terms of the number of employees, supplemented by the Trip Rate Information Computer System (TRICS) database. This assessment has shown that the Development morning peak would be expected to occur between 08:30 – 09:30 which is typical for employment uses in Central London. The evening peak is predicted to occur between 17:00 – 18:00.

7.23 The mode distribution of the trips has been derived from the 2011 Census method of travel to work data with adjustments made to take account of the limited car parking provision around the Site and the lack of parking at the Development (other than two disabled bays). On the basis of

the above, a net change in trips on all modes of transport has been calculated which forms the basis of the assessment of potential effects.

7.24 With regard to the proposed commercial, business and service use (Class E) uses, the trips are expected to be pass-by or linked trips and would not generate additional movements on the transport infrastructure. This is with the exception of staff travel and servicing trips which are considered later in the chapter. Staff travel is expected to be arranged in shift work arriving and leaving outside of the peak hours. It is noted that some customers might be arriving/departing using a taxi and an assessment of the likely taxi movements for the Class E uses A1/A3 uses has been undertaken.

Servicing vehicle generation

7.25 Following discussions with LBS and TfL during pre-application discussions the expected number of servicing trips has been taken from a specialist consolidation report, produced for the Applicant that was commissioned for the Development based on the individual land uses. A copy of the consolidation report is included as an appendix within the Transport Assessment.

Significance Criteria

7.26 Guidance provided by the Institute of Environmental Management and Assessment (IEMA)[1] and DfT[3] has been consulted in order to identify significance criteria applicable to the assessment of walking, cycling, public transport and vehicle trips associated with the Development.

7.27 For a number of effects there are no readily available thresholds of significance, in which case interpretation and judgement has been applied based on knowledge of the Site or quantitative data where available.

Characterisation of Effects

7.28 All effects have been characterised as being either:

- **Beneficial**: meaning that the changes produce positive benefits in terms of transportation and access (such as reduction of traffic, travel time or patronage, or provision of a new service, access or facility);
- **Negligible**: meaning that their bearing is too small to measure meaningfully (e.g. less than 10% change); or
- **Adverse**: meaning that changes produce negative effects in terms of transportation and access (such as increase of traffic, travel time, patronage or loss of service or facility).

7.29 Effects have been further characterised as:

- **Minor**: slight, very short or highly localised effect (where the data is available/applicable, 10% to 30% change);
- **Moderate**: limited effect (by extent, duration or magnitude) which may be considered significant, (where the data is available/applicable, 30% to 60% change); or
- **Major**: considerable effect (by extent, duration or magnitude) of more than local significance or breach of recognised acceptability, legislation, policy or standards (where the data is available/applicable greater than 60% change).

7.30 The significance criteria apply to all assessments within this chapter are summarised in **Table 7.2**:

Table 7.2: Significance Criteria

	Effect	Negligible	Minor	Moderate	Major
Highway Network	Change in traffic flow on highway network	Increase or decrease in flows of less than 10%	Increase or decrease in flows of 10-30%	Increase or decrease in flows of 30-60%	Increase or decrease in flows of more than 60%
Bus Network	Change in passenger numbers leading to a change in journey experience	Less than 10% change in passenger numbers leading to no change in journey experience	10%-30% change in passengers leading to a change in journey experience	30%-60% change in passenger numbers leading to a change in journey experience	More than 60% change in passenger numbers leading to a change in journey experience
Underground and Rail Network	Change in passenger numbers leading to a change in journey experience	Less than 10% change in passenger numbers leading to no change in journey experience	10%-30% change in passengers leading to a change in journey experience	30%-60% change in passenger numbers leading to a change in journey experience	More than 60% change in passenger numbers leading to a change in journey experience
Walk and Cycle Network: Severance	Change in perceived divisions within a community separated by a traffic route	Increase in traffic flows of less than 10%	Increase in traffic flows of 10-30%	Increase in traffic flows of 30-60%	Increase in traffic flows of more than 60%
Pedestrian Delay	A judgement based on the routes with two way traffic flow exceeding 1,400 vehicles per hour in context of their individual characteristics				
Pedestrian Amenity	Change in perceived pleasantness of the journey/walking route	Change in total traffic or HGV flows < 100% No change to pedestrian comfort level rating or a change that does not alter the description of the rating as per TfL's criteria.		Change in total traffic or HGV flows > 100% A change in Pedestrian Comfort Level which alters the description of the rating criteria as per TfL's criteria.	
Pedestrian Fear and Intimidation	Increase in traffic flows, HGV composition and narrow footways	Increases in traffic flow, HGV composition and narrow footways		As set out in Table 7.4.	
Accidents and Safety	A judgement based on change in collision numbers over a route under consideration				
Dust and Dirt on the road	A judgement taking into account baseline construction management processes				

Assessing Significance of Changes in Traffic Flows

Receptor Sensitivity

7.31 In order to help define the value and sensitivity of receptors, the following guidance has been obtained from the IEMA Guidelines as shown in **Table 7.3**.

Table 7.3: Guidelines for the Assessment of Receptor Value and Sensitivity

Receptor Type	Receptor Sensitivity	Sensitive Receptor
Receptors of greatest sensitivity to traffic flow: schools, colleges, playgrounds, accident clusters, retirement homes, roads without footways that are used by pedestrians.	High	Pedestrians and cyclists along White Hart Yard and King's Head Yard.
Traffic flow sensitive receptors: congested junctions/links, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, recreation facilities.	Medium	Guy's Hospital patients
Receptors with some sensitivity to traffic flow: places of worship, public open space, tourist attractions and residential areas with adequate footway provision.	Low	Future and existing surrounding residential occupants to the west, north and east of the Development including Bunch of Grapes Public House, 43 Borough High Street, Shard Place and 6 London Bridge Street. Future and existing surrounding residential occupants to the south of the Development including Nos. 51-55 Borough High Street, 22 Southwark Street. Residential students at Iris Brook House and Orchard Lisle House

7.32 From a transport and accessibility perspective, receptors comprise pedestrians, cyclists, public transport users and drivers which could be affected by changes in traffic flows, public transport trips, and changes to the pedestrian and cycling trips and environment as a result of the Proposed Development.

7.33 The Site is located in a busy central London setting with roads that carry high traffic flows, but also with adequate footway and crossing provisions, and these would be classed as having low sensitivity based on the guidance set out in **Table 7.3**. The only links that have been assessed as being sensitive receptors for pedestrians and cyclists are White Hart Yard and King's Head Yard as these roads are shared between vehicles and pedestrians with limited footway provision.

Assessing Significance of Changes on Pedestrians, Cyclists and Public Transport Users

Pedestrian Severance

7.34 Pedestrian severance can be described as the perceived divisions that can occur within a community when it becomes separated by a traffic route. Thresholds for assessing severance are based on changes in traffic flows as set out in the Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3, Part 8[4]. This document suggests changes in traffic flow of 30%, 60% and 90% are considered equivalent to 'minor', 'moderate' and 'major' changes in severance respectively.

Pedestrian Delay

7.35 Increases in traffic flows can lead to increases in delay to pedestrians seeking to cross roads. IEMA guidance suggests a range of pedestrian crossing times of 10 seconds (lower threshold) to 40 seconds (higher threshold) which equate to a link with no crossing facilities and a two-way flow

of approximately 1,400 vehicles per hour. . However, the guidance also recommends that assessments should be based on judgement rather than specific thresholds to determine whether or not there is significant pedestrian delay.

Pedestrian Amenity

7.36 The IEMA Guidelines describe pedestrian amenity as the relative pleasantness of a journey. It is affected by traffic flow, traffic composition, footway width and separation from traffic. The Guidelines suggest that the threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow is doubled. Significance of such an increase beyond that would be based on professional judgement. Additionally, the effect on pedestrian amenity has been assessed based on the changes in pedestrian comfort level on footways surrounding the Site with reference to the TfL's Pedestrian Comfort Level Guidance document (2010).[5]

Accidents and Safety

7.37 The significance of the change to accidents and safety likely to be introduced by the Development was assessed by means of professional judgement based on the projected changes to daily vehicle flows and Development trips.

Dust and Dirt on the Road

7.38 The significance of the change to dust and dirt likely to be introduced during the construction activities for the Development was assessed by means of professional judgement.

Pedestrian Footway Movement and Capacity

7.39 The significance of the change to pedestrian footway movement and capacity likely to be introduced by the Development was assessed by means of professional judgement.

Pedestrian Fear and Intimidation

7.40 Pedestrian fear and intimidation is caused by a number of factors, including a combination of volume of traffic, its Heavy Goods Vehicle (HGV) composition, its proximity to people and the lack of protection caused by such factors as narrow footway widths. The criteria for assessing fear and intimidation in the IEMA Guidelines are presented in **Table 7.4**. The significance is determined from the change of the classification of the degree of hazard for a particular road.

Table 7.4: IEMA Thresholds for Pedestrian Fear and Intimidation

Degree of Hazard	Average Traffic Flow over 18 Hour Day (vehicles/hour)	Total 18 Hour Goods Vehicle Flow	Average Speed over 18 Hour Day (miles/hour)
Extreme	1,800+	3,000+	20+
Great	1,200 – 1,800	2,000 – 3,000	15 – 20
Moderate	600 – 1,200	1,000 – 2,000	10 – 15

Public transport

7.41 The effects on the public transport users have been assessed based on the increase in trips in relation to the capacity of the services and the significance criteria.

Walking and cycling

7.42 In addition to the effects of traffic flows on pedestrians, the effects of the Development, including increase in walking and cycling trips and provision of pedestrian and cycle facilities, have also been assessed by means of professional judgement, using the significance criteria.

Limitations and Assumptions

7.43 The modal split of the trips undertaken by the existing and future staff have been derived from the 2011 Census Method of Travel to Work – Workday Population dataset for Southwark 002 Middle Layer Super Output Area, with adjustments made to reflect the limited car parking provision at the existing Site and the car-free nature of the Development (other than two disabled bays).

7.44 The Development lies within this area and therefore it is reasonable to assume that the travel characteristics of people travelling into this area would be representative of those which would be generated by the existing and the Development.

7.45 In order to determine the likely direction the employees would be travelling to and from the Development, the 2011 Census data: Special Workplace Statistics (SWS) has been used.

Baseline Conditions

7.46 In order to assess the potential effects of the Development, it is necessary to determine the environmental conditions, resources and sensitive receptors that currently exist on the Site and in the surrounding area.

Existing Land Uses

7.47 The Site comprises the offices of New City Court occupying the majority of ground level on the Site behind the buildings on St. Thomas Street and Borough High Street. The Site also includes the Georgian Terrace and Keats House which form most of the northern boundary of the Site fronting onto St. Thomas Street.

7.48 Vehicular and pedestrian access to the Site is currently from St. Thomas Street (A200) and King's Head Yard. King's Head Yard provides access to the Site's car parking/servicing area. Servicing to the existing buildings has also been observed to take place from St. Thomas Street.

7.49 There is currently no public open space or a route through the Site.

Pedestrian Network and Facilities

7.50 The Site is located in an area with an established network of footways and pedestrian facilities. Due to its central London location, numerous public transport services and amenities can be accessed on foot. Details of the existing pedestrian infrastructure on each of the roads surrounding the site are provided below.

St. Thomas Street

7.51 St Thomas Street provides footways on both sides of its carriageway. The width of the footways varies between 2m (near the junction with Borough High Street) to 5m (in the vicinity of London Bridge Station and Weston Street).

7.52 A signalised pedestrian crossing facility is located on St Thomas Street, near the junction with London Bridge Street and Bedale Street. The crossing is provided with tactile paving on the footways on both sides of the carriageway and zig-zag road markings.

7.53 Signalised pedestrian crossings are also located at the junction with Borough High Street and outside the entrance to London Bridge Underground Station. Both crossings are provided with tactile paving on the footways on both sides of the carriageway. The footways of St Thomas Street are well lit as they are provided with light columns at regular intervals.

Borough High Street

7.54 Borough High Street provides footways on both sides of the carriageway. The footways are generally wide and provide a minimum width of approximately 3m.

7.55 Signalised pedestrian crossings are located on each arm at the four-arm junction between Borough High Street, St Thomas Street and Bedale Street. Signalised crossings are also provided at the junction between Borough High Street and Southwark Street, at the junction between Borough High Street and London Bridge Street and at the junction between Borough High Street and Duke Street Hill.

7.56 The footways of Borough High Street are well lit as they are provided with light columns at regular intervals.

King's Head Yard and White Hart Yard

7.57 King's Head Yard is accessible from the south-eastern side of Borough High Street and provides narrow footways (approximately 1m-1.5m wide) on both sides of the carriageway.

7.58 White Hart Yard is also accessible from the south-eastern side of Borough High Street and offers very limited footway provision. The road is very lightly trafficked and is effectively used as a shared surface with pedestrians utilising the whole width of the yard and having priority over vehicles.

PERS Audit

7.59 A PERS audit has been undertaken of the existing pedestrian network surrounding the Site including area immediately south of London Bridge and around London Bridge Station.

7.60 It is noted that the local pedestrian environment would be undergoing changes as a result of the proposed Development's public realm and also TfL's proposals for St. Thomas Street. Therefore, the pedestrian environment in the vicinity of the Site by the time the Development is completed and operational would be different to the one currently in place. Notwithstanding this, the PERS audit was requested by TfL and LBS during pre-application discussions. The audit has been undertaken by Transport Research Laboratory (TRL) and is included in Appendix A of the Transport Assessment.

7.61 PERS uses a red, amber, green (RAG) scoring system. Crossing points were also assessed and all were given a good or acceptable score (green or amber) with the exception of the diagonal crossing on Borough High Street which was given a red rating (poor). The crossing scored low on various parameters as the crossing has no tactile paving provision or dropped kerbs.

7.62 The audit shows that at present, a number of links achieved a red rating which indicates poor level of provision. These include on the southern side of St. Thomas Street, on the southern side of Borough High Street outside of the Site, on White Hart Yard and on King's Head Yard. The links have scored based on several parameters with worst scoring parameters being poor maintenance, user conflict, colour contract, tactile information and permeability. It is noted that this is the existing situation and the Development includes proposals which would improve the existing situation. These are described in the Proposed Development section.

Pedestrian Survey

7.63 Pedestrian counts have been undertaken in 2016 by Space Syntax to inform the baseline conditions at key locations surrounding the Site. These are summarised below in **Table 7.5**.

Table 7.5: Existing baseline pedestrian flows (two-way, no. of people)

Link	AM Peak	Lunch-time Peak	PM Peak
St Thomas Street north side	312	717	522
St Thomas Street south side	906	1,896	1,617
Borough High Street east side	2,562	3,357	3,444
Borough High Street west side	1,440	2,406	2,220
King's Head Yard	207	645	423
White Hart Yard	81	372	234

Pedestrian Level of Comfort Assessment

7.64 The results of the Pedestrian Comfort Level (PCL) assessment for the existing situation and for the future baseline situation are set out in **Table 7.6**.

Table 7.6: PCL Assessment

Link Ref	Existing PCL	
	Average	AM Peak
1a	B+	A-
1b	F	F
1c	B+	A-
2a	F	F
2b	B-	B+
3a	F	F
3b	B	B+
4a	B-	B-
4b	B-	C+
5a	B-	C+
5b	C	C-
5c	B-	B-
6	A+	A+
7	A+	A+

7.65 **Figure 7.1** shows how the ratings correspond to the different levels of comfort for an office / retail area type which is the most suitable area choice for footways in the vicinity of the Site. The footways around the Site vary in width due to the presence of obstructions, such as street furniture, and this has been taken into account with the assessment undertaken at various locations.

7.66 The assessment shows that the footways around the Site generally provide comfortable to acceptable level of pedestrian comfort. However, it is noted that on St Thomas Street, there are three localised areas of the footway width being less than 1.5m as a result of street furniture. Accordingly, this results in localised pinch points providing areas that are less comfortable, but with the majority of the footway providing acceptable level of comfort. The three footway locations of less than 1.5m width are illustrated on **Figure 7.1**.

Cycle Network and Facilities

7.67 The Site is located in close proximity to established cycle routes which provide access within the Borough and the wider area. **Figure 7.2** shows the available network for cyclists and cycle facilities in the vicinity of the Site include Cycle Superhighway 7 (CS7) and National Cycle Network Route 4.

7.68 Additionally, Weston Street and Bermondsey Street are located to the east of the Site and are identified by TfL on their cycle maps as routes 'signed or marked for use by cyclists on a mixture of quiet or busier roads'. Tooley Street (north of the Site) has been labelled in the same way.

7.69 Newcomen Street, Snowsfields and Crosby Row are local roads located to the west of the Site which feature on the TfL cycle map as 'quieter roads recommended by other cyclists'.

7.70 Cycle parking facilities are provided throughout St Thomas Street in the form of Sheffield Stands. A cycle hire docking station is located on Tooley Street, approximately 400m (4-5 minute walk) to the north of the Site. The docking station provides access to 20 bicycles.

7.71 Southwark Bridge Road is located to the west of the Site and is part of Cycle Superhighway 7. The superhighway extends by approximately 13.7km (an approximate 45 minute cycle) and connects the City, Southwark, Lambeth, Wandsworth and Merton.

7.72 Tooley Street forms part of the National Cycle Network Route 4, a long distance route between London and Fishguard via Reading, Bath, Bristol, Newport, Swansea, Carmarthen, Tenby, Haverfordwest and St Davids.

7.73 Given the above, it can be seen that the Site is well located to the local cycle network.

7.74 A Cycling Level of Service (CLoS) assessment was undertaken for the cycle routes near the Site in 2017 as part of the planning application submission for Capital House (planning reference: 18/AP/0900) which is available from LBS's planning portal. Capital House is located on St Thomas Street near its junction with Weston Street, approximately 300m from the proposed development. Given the proximity, the CLoS assessment for Capital House covers all cycle routes relevant to the proposed Development. The assessment shows that the existing routes between the Site and CS7 / CS3 are considered to be suitable for cyclists, indicating that the Site has good connections to the wider cycle network and is therefore in a favourable location to encourage cycling.

7.75 The existing cycle flows for links surrounding the Site are set out in **Table 7.7**.

Table 7.7: Existing baseline cycle flows (no. of cyclists two-way)

Link	AM Peak	PM Peak
Borough High Street between St Thomas Street and King's Head Yard	1,008	750
St Thomas Street	138	132
White Hart Yard	6	3
King's Head Yard	6	3
Southwark Bridge Road	369	273

Public Transport Accessibility Level (PTAL)

7.76 The TfL Planning Information Database[6] identifies the Site as having a PTAL of 6b, ('excellent') the highest obtainable.

Bus Network and Services

7.77 The local area is served by several bus routes. London Bridge Bus Station is located within a 200m walking distance (2-3 minute walk) to the north of the Site and provides access to bus stops 'B', 'C' and 'D'. Bus stop 'B' provides access to routes 521 and N343. Bus stop 'C' provides access to routes 43 and 141. Bus stop 'D' provides access to routes 149, N21 and N343.

7.78 Bus stops 'S' and 'R' are located on Duke Street Hill within a 300m walking distance (3-4 minute walk) to the north of the Site. Both bus stops are served by routes 47, 343, 381, N381 and RV1. Bus stop R is also served by route N199.

7.79 Bus stops 'M' and 'Y' are located on Borough high Street within a 320m walking distance (3-4 minute walk) to the north of the Site. Bus stop 'M' is served by routes 17, 21, 35, 40, 43, 47, 48, 133, 141, 149, 344 and N21. Bus stop 'Y' is served by routes 17, 21, 35, 40, 47, 48, 133, N21, N133 and N199.

7.80 There are two bus stops located outside of The Hop Exchange on Southwark Street within a 250m walking distance (2-3 minute walk) to the west of the Site. These bus stops are served by routes 344, 381, N343, N381 and RV1.

7.81 Bus Stop 'Southwark Street' is located on Borough High Street within a 280m walking distance (2-3 minute walk) to the south-west of the Site. The bus stop provides access to routes 21, 35, 40, 133, 343, N21, N133, and N343. Bus stop 'G' is located on Borough High Street within a 400m walking distance (4-5 minute walk) to the south-west of the Site and is served by the same bus routes as bus stop 'Southwark Street'.

7.82 Bus stop 'BD' is located on Southwark Bridge Road within a 580m walking distance (5-7 minute walk) to the west of the Site. The bus stop is served by route 344.

7.83 **Table 7.8** presents the bus services which are accessible from the Site.

Table 7.8: Summary of Local Bus Services

Bus Route	Stop Location	Destination	Monday - Friday		Saturday	Sunday
			AM Peak	PM Peak		
48	Y	London Bridge	6	6	6	5
	M	Walthamstow Bus Station	6	6	6	5
343	S / Southwark Street	New Cross / Jerningham Road	7	7	8	6
	R / G	City Hall	8	8	8	6
21	Y / Southwark Street	Molesworth Street	9	9	8	5
	M / G	Newington Green	9	9	8	5
17	Y	London Bridge	7	7	6	4
	M	Archway Station	8	8	6	4
40	M / G	Duke's Place	8	8	6	4
	Y / Southwark Street	Dulwich Library	7	7	6	4
35	M / G	Shoreditch	6	6	6	4
	Y / Southwark Street	Clapham Junction Station / Falcon Road	6	6	6	4
381	S / The Hop Exchange	County Hall	6	6	6	5
	R / The Hop Exchange	Peckham Bus Station	6	6	6	5
344	M / The Hop Exchange	Appold Street	8	8	6	7
	BD	Clapham Junction Station	8	8	7	7
RV1	R / The Hop Exchange	Tower Gateway Station	4	3	3	3
	S / The Hop Exchange	Covent Garden / Catherine Street	4	3	3	3
521	B	London Bridge Station	20	20	-	-
	B	Waterloo Station / Mepham Street	21	23	-	-
141	C	London Bridge Station	8	8	8	5
	C / M	Tottenhall Road	8	8	7	6
149	London Bridge Station	London Bridge Station	11	9	8	7
	A / M	Edmonton Green Bus Station	11	9	7	7
43	C	London Bridge Station	11	11	9	7
	C / M	Halliwick Park or Archway Station	11	11	7	6
47	S / M	Shoreditch	6	6	5	3
	R / Y	Catford Garage	5	5	5	3
133	M / G	Great Winchester Street	11	11	7	4
	Y / Southwark Street	Streatham Station	11	11	8	4
Total			**257**	**253**	**182**	**138**

7.84 Table 7.8 shows that during the AM peak there are approximately 128 bus services per direction and 257 bus services in both directions. Based on an average bus operational capacity of 63 persons and a weekday AM Peak frequency of 128 buses in each direction, the planning bus capacity has been calculated as 8,064 passengers per direction per hour.

7.85 In the PM peak, the planning bus capacity is approximately 8,001 passengers per direction per hour based on there being approximately 127 buses per direction and thus 253 bus services in total.

Underground Services

7.86 Access to London Bridge Underground Station can be taken from St. Thomas Street, Borough High Street and Tooley Street. The station is served by the Jubilee Line, which provides services towards Stratford and Stanmore, and the Bank branch of the Northern Line, which provides services towards High Barnet, Mill Hill East, Edgware and Morden. **Table 7.9** shows the peak hour frequencies at London Bridge Underground Station.

Table 7.9: Services & Frequencies from London Bridge Underground Station

Service	Direction	Monday – Friday		Saturday	Sunday
		0800-0900	1700-1800		
Jubilee Line	Westbound	30	30	24	24
	Eastbound	30	30	24	24
Northern Line	Northbound	25	23	20	20
	Southbound	23	23	20	20

7.87 **Table 7.9** indicates that London Bridge Underground Station provides 30 Jubilee Line services and a minimum of 23 Northern Line services in both directions during the weekday AM and PM peak hours. Over Saturday and Sunday, the station provides 24 hourly Jubilee Line and 20 hourly Northern Line services in both directions throughout the day.

7.88 Planning capacity figures obtained from TfL indicate that each Jubilee Line train has a planning capacity of 960 passengers. With regard to the Northern Line, each train has a planning capacity of 800 passengers. A summary of the planning capacity expressed as the number of passengers per hour per direction (pphd) is set out below in **Table 7.10**.

Table 7.10: Capacities from London Bridge Underground Station

Service	Direction	Monday – Friday		Planning Capacity (pphd)	
		0800-0900	1700-1800	0800-0900	1700-1800
Jubilee Line	Westbound	30	30	28,800	28,800
	Eastbound	30	30	28,800	28,800
Northern Line	Northbound	25	23	20,000	18,400
	Southbound	23	23	18,400	18,400

National Rail Network and Services

7.89 London Bridge National Rail Station provides services operated by Southern, Southeastern Rail and Thameslink.

7.90 **Table 7.11** presents the peak hour frequencies of National Rail services departing from London Bridge National Rail Station. These include through trains heading north (Thameslink) or

terminating / leaving London Charring Cross or Cannon Street as well as the services to the south, to destinations in Sussex, Kent and Surrey.

Table 7.11: Services & Frequencies from London Bridge National Rail Station

Destination	Monday – Friday		Saturday	Sunday
	0800-0900	1700-1800		
Bedford and northern destinations	11	13	6	4
Other London Terminating stations	53	29	29	15
Sussex, Kent and Surrey	57	71	21	9
Total	121	113	56	28

7.91 The station is served by 121 trains arriving and departing in the AM Peak with 113 services arriving and departing in the PM peak hour including South-eastern, Southern and Thameslink services. Based on the information provided on each of the train operators' websites, the average capacity of each train has been taken as 980 passengers. This equates to a capacity of 118,580 passengers in each direction in the AM Peak and 110,740 passengers in the PM peak hour. This is illustrated in **Table 7.12**.

Table 7.12 Capacities from London Bridge National Rail Station

Destination	Monday – Friday		Planning capacity (pphd)	
	0800-0900	1700-1800	0800-0900	1700-1800
Bedford and northern destinations	11	13	10,780	12,740
Other London Terminating stations	53	29	51,940	28,420
Sussex, Kent and Surrey	57	71	55,860	69,580
Total	121	113	118,580	110,740

River Taxi services

7.92 The London Bridge City Pier is located approximately within a 550m walking distance (5-7 minute walk) to the north-east of the Site. It is served by services RB1, RB1X, RB2 and RB6.

7.93 RB1 and RB1X provide services between Westminster and North Greenwich. RB1 operates daily whereas RB1X provides additional services on the weekend. RB2 operates daily and provides services between Battersea Power Station and London Bridge City. RB6 provides services between Blackfriars to Canary Wharf on weekday mornings and evenings only.

7.94 The river services during the AM, PM and weekend peak hours are summarised in **Table 7.13**.

Table 7.13 River Taxi Services

Service	Destination	AM Peak 0800–0900	PM Peak 1700-1800	Saturday	Sunday
RB1	Westminster	3	1	2	2
	North Greenwich	2	3	2	2
RB1X	Westminster	-	-	2	2
	North Greenwich	-	-	2	2
RB2	Battersea Power Station	-	-	2	2
	London Bridge City	-	-	2	2
RB6	Blackfriars	2	3	-	-
	Canary Wharf	3	1	-	-

Highway Network

Whilst there are currently temporary alterations and restrictions in place to provide enhanced pedestrian facilities to better accommodate the COVID-19 pandemic, for the purposes of this assessment the pre-COVID arrangements are described. This is in line with the overall approach to the trip generation analysis and assessment of effects undertaken in this chapter.

St. Thomas Street

7.95 St. Thomas Street is a TfL Red Route and is marked with double red lines on both sides of the carriageway which restrict stopping at all times. The eastern section of the road only allows for one-way westbound traffic whilst the western section of the road allows for two-way traffic. The road allows for two-way traffic from the vicinity of the junction with Weston Street (approximately 80m to the west of the junction).

7.96 There are a number of on-street parking facilities located on the western section of the road, near the Site's access and in the vicinity of the junction with Borough High Street. At this location, there are marked taxi and 'Pay and Display' bays located on the southern side of the carriageway. The 'Pay and Display' bays have restrictions from Monday to Saturday between 08:00 and 18:30 and allow for a maximum stay of four hours. There is also a loading bay located on the southern side of the carriageway which has a 'No stopping' restriction between 07:00 and 19:00 except between 10:00 and 16:00. During these times, loading is available for a maximum of 20 minutes. The northern side of the carriageway provides bays restricted to authorised vehicles only.

7.97 TfL have consulted on proposals to manage the direction of vehicles along St Thomas Street. This includes an original scheme to make St Thomas Street one way westbound along its entire length. This is in keeping with the eastern end which is already one way in this direction. They have also more recently proposed another alternative making the entire length of St Thomas Street run from west to east, with a contraflow cycle lane.

7.98 TfL has also proposed an interim solution whereby the western end of the road remains two-way but with a 7.5 ton restriction i.e. taxis will be able to access from Borough High Street but large delivery vehicles will not.

7.99 Due to the constantly changing options associated with St Thomas Street, it is unclear which, if any, option is most likely to be taken forward. None of the above schemes have been approved or funded and so there is no firm commitment that any of these will be progressed. In light of this, the

current scheme, with a simple vehicular access off St Thomas Street would not preclude any of the above options.

7.100 This assessment is based on vehicles approaching from the east as, due to the inability for vehicles to turn around, this is likely in the existing situation and for the one-way westbound option indicated on the Development design plans.

Borough High Street

7.101 Borough High Street provides a wide carriageway which ranges between 12m and 15m in width. The section of the road in the vicinity of the Site is a TfL Red Route and is marked with double red lines on both sides of the carriageway which restrict stopping at all times.

7.102 There are loading bays provided on Borough High Street, near the access junction with Talbot Yard and King's Head Yard / White Hart Yard. The loading bays have a 'No stopping' restriction between 07:00 and 19:00 except between 13:00 and 16:00 or between 10:00 and 13:00. During these times, loading is available for a maximum of 20 minutes and parking for disabled users is available for up to three hours.

King's Head Yard and White Hart Yard

7.103 King's Head Yard and White Hart Yard are marked with single yellow lines on both sides of the carriageway with restrictions from Monday to Saturday between 08:00 and 18:30. A disabled bay is provided at the south-eastern end of White Hart Yard and is available for use only by disabled badge holders.

Baseline Traffic Flows

7.104 Traffic data has been obtained for roads and junctions surrounding the Site. The existing baseline flows are summarised in **Table 7.14** and are based on the 2018 baseline flows used in the 2018 ES and 2020 ES Addendum and increased by adding the vehicle flows associated with developments that have since been constructed and operational. This provides a suitable and robust baseline for the assessment since nay new surveys undertaken are likely to have recorded lower levels of traffic due to the current pandemic. The developments that have been included are listed below:

- Tower Bridge Magistrates Court and Police Station, 209-211 Tooley Street;
- 25-29 Harper Road;
- Isis House, 67-69 Southwark Street; and
- 175-179 Long Lane.

Table 7.14: Baseline Traffic Flows

Link	AM Baseline Flows		PM Baseline Flows		Daily Flows	
	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs
London Bridge to the north of Tooley Street	1,294	276	1,108	236	25,402	4,664
Borough High Street to the south of London Bridge	2,347	673	2,525	572	19,636	3,567
St. Thomas Street	258	7	213	4	6,104	567
White Hart Yard	4	1	2	1	26	5
Southwark Street to the east of Southwark Bridge Road	413	56	381	34	12,379	1,375
Southwark Street to the west of Southwark Bridge Road	890	87	741	72	14,837	1,447
Southwark Bridge Road	759	134	623	88	14,501	1,768
Marshalsea Road	763	160	755	107	14,319	2,044
Borough High Street to the north of Union Street	862	160	837	127	14,336	2,372
Long Lane	683	45	570	38	11,406	756
Tower Bridge Road to the south of Druid Lane	1,392	145	1,160	95	23,202	1,909
Tooley Street	537	116	460	100	8,965	1,934

Assessment Baseline Flows

7.105 Given that the Development is not expected to be completed before 2026, the future baseline conditions which are expected to be in place at the year of opening are considered more applicable in terms of assessing of the Development effects. To this end, a future baseline scenario has been created incorporating committed developments.

7.106 The 2026 assessment baseline flows for the AM and PM peak hour as well as across the whole day are provided in **Table 7.15**.

Table 7.15 Assessment Baseline Traffic Flows

Link	AM Baseline Flows		PM Baseline Flows		Daily Flows	
	All vehicles	HGVs	All vehicles	HGVs	All vehicles	HGVs
London Bridge to the north of Tooley Street	1,311	276	1,134	236	25,529	4,675
Borough High Street to the south of London Bridge	2,359	673	2,546	572	19,731	3,572
St. Thomas Street	271	7	256	4	6,158	579
White Hart Yard	4	1	2	1	26	5
Southwark Street to the east of Southwark Bridge Road	416	56	391	34	12,485	1,385
Southwark Street to the west of Southwark Bridge Road	890	87	74	72	14,902	1,455
Southwark Bridge Road	784	134	645	88	14,566	1,776
Marshalsea Road	788	160	779	107	14,374	2,050
Borough High Street to the north of Union Street	869	160	871	127	14,406	2,379
Long Lane	714	45	604	38	11,461	762
Tower Bridge Road to the south of Druid Lane	1,418	145	1,194	95	23,257	1,915
Tooley Street	567	116	499	100	9,025	1,940

Accident Data

7.107 Road traffic collision data has been provided by Transport for London (TfL) and provides an account of all incidents within the local area in the three year period between September 2017 and September 2020. This represents the most recent collision data available.

7.108 **Table 7.16** presents a summary of the collisions that occurred within the previous three years. Whilst it is noted that the traffic survey data could not be updated due to the impact of COVID-19 , the accident data is based on the most recent available data provided by TfL and was not subject to any caveats pertaining to how representative this data is..

Table 7.16: Road Collision Data for 2017 to 2020

Year	Collision severity			Total
	Slight	Serious	Fatal	
September 2017 - September 2018	37	7	0	44
September 2018 - September 2019	47	14	0	61
September 2019 - September 2020	37	14	0	51
Total	**121**	**35**	**0**	**156**

7.109 As shown in **Table 7.16,** there were a total of 156 collisions recorded over the three year period in the area surveyed as part of the Healthy Streets Assessment, the majority of which (78%) were classified as slight in severity. Of the casualties involved in the 156 collisions, 49 were pedestrians and 14 were cyclists with remainder being drivers or motorbike riders.

7.110 It is noted that no collisions were recorded on King's Head Yard and White Hart Yard.

7.111 The majority of collisions occurred at / near the junctions between Borough High Street and St. Thomas Street and between Borough High Street and Bedale Street. A total of 23 collisions took place at or near the junction of Borough High Street with St. Thomas Street most of which were slight, although one was serious.

7.112 The highest location of 'killed or seriously injured' (KSI) clusters occurred at the junction of Borough High Street and Tooley Street, to the north of the Development.

7.113 All of the collisions that occurred over the three-year period primarily occurred due to human error. "Failure to look properly", "reckless" behaviour and "poor manoeuvring" were among the main reasons for the collisions occurring.

7.114 Overall, it can be concluded that the local area is reasonably safe given the relatively few serious injuries and absence of fatal collisions over the three year study period. However, it should be noted that there are a couple of locations, in particular the junction of Borough High Street and Tooley Street where there are repeated incidences of serious accidents.

Assessment of Likely Significant Effects

The Works

7.115 Information related to the Works has been provided within **Chapter 6: Development Programme, Demolition, Deconstruction, Refurbishment and Construction** which includes an indicative construction programme, predicted construction traffic flows, vehicle routing and the proposed hours of working.

Vehicle Movements

7.116 The Works would generate short-term increases in vehicle movements on the highway in the vicinity of the Site. It should also be noted that these increases would not be constant throughout

the construction period and consideration has only been given in the assessment to the highest peak frequency of vehicle movements as this gives a worst case assessment.

7.117 Based on the information provided within **Chapter 6: Development Programme, Demolition, Deconstruction, Refurbishment and Construction**, there is expected to be a maximum of 62 two-way Heavy Goods Vehicles (HGVs) movements a day during the most intense construction period (piling and excavation activities). Based on a ten-hour day, the peak hour two-way HGV traffic would be 6 movements (i.e. 3 in, 3 out). This represents a worst-case assessment as it looks at only the peak operational periods, at other times of construction traffic movements would be less.

Construction Vehicle Distribution

7.118 All construction vehicles would enter the Site via St. Thomas Street from the east. In order to depart, vehicles would travel in the westbound direction on St. Thomas Street and turn left onto Borough High Street which is a strategic route and enables connections with other major road links.

Impact of Construction Vehicles

7.119 The predicted increases in traffic flows during construction based on assessment baseline traffic are shown in **Tables 7.17, 7.18** and **7.19** for the AM peak, PM peak and 24 hours respectively.

Table 7.17 AM Peak Percentage on Local Roads Attributed to Construction Traffic

Link	Assessment Baseline Flows		Assessment Baseline Flows + Construction Traffic		Percentage Increase	
	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
London Bridge to the north of Tooley Street	1,311	276	1,311	276	0.0%	0.2%
Borough High Street to the south of London Bridge	2,359	673	2,359	673	0.0%	0.0%
St. Thomas Street	271	7	274	10	1.1%	42.9%
White Hart Yard	4	1	4	1	0.0%	0.0%
Southwark Street to the east of Southwark Bridge Road	416	56	418	58	0.4%	2.7%
Southwark Street to the west of Southwark Bridge Road	890	87	892	89	0.2%	1.7%
Southwark Bridge Road	784	134	785	135	0.1%	0.8%
Marshalsea Road	788	160	789	161	0.1%	0.7%
Borough High Street to the north of Union Street	869	160	871	162	0.2%	0.9%
Long Lane	714	45	717	48	0.4%	5.7%
Tower Bridge Road	1,418	145	1,420	147	0.1%	1.2%
Tooley Street	567	116	567	116	0.1%	0.4%

Table 7.18 PM Peak Percentage on Local Roads Attributed to Construction Traffic

Link	Assessment Baseline Flows		Assessment Baseline Flows + Construction Traffic		Percentage Increase	
	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
London Bridge to the north of Tooley Street	1,134	236	1,134	236	0.0%	0.2%
Borough High Street to the south of London Bridge	2,546	572	2,546	572	0.0%	0.0%
St. Thomas Street	256	4	259	7	1.2%	75.0%
White Hart Yard	2	1	2	1	0.0%	0.0%
Southwark Street to the east of Southwark Bridge Road	391	34	393	36	0.4%	4.4%
Southwark Street to the west of Southwark Bridge Road	748	72	750	74	0.2%	2.1%
Southwark Bridge Road	645	88	646	89	0.2%	1.2%
Marshalsea Road	779	107	780	108	0.1%	1.0%
Borough High Street to the north of Union Street	871	127	873	129	0.2%	1.2%
Long Lane	604	38	607	41	0.4%	6.7%
Tower Bridge Road	1,194	95	1,196	97	0.2%	1.9%
Tooley Street	499	100	499	100	0.1%	0.5%

Table 7.19 Daily Percentage on Local Roads Attributed to Construction Traffic

Link	Assessment Baseline Flows		Assessment Baseline Flows + Construction Traffic		Percentage Increase	
	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
London Bridge to the north of Tooley Street	25,529	4,675	25,533	4,679	0.0%	0.1%
Borough High Street to the south of London Bridge	19,731	3,572	19,731	3,572	0.0%	0.0%
St. Thomas Street	6,158	579	6,184	605	0.4%	4.4%
White Hart Yard	26	5	26	5	0.0%	0.0%
Southwark Street to the east of Southwark Bridge Road	12,485	1,385	12,498	1,398	0.1%	0.9%
Southwark Street to the west of Southwark Bridge Road	14,902	1,455	14,915	1,468	0.1%	0.9%
Southwark Bridge Road	14,566	1,776	14,575	1,785	0.1%	0.5%
Marshalsea Road	14,374	2,050	14,383	2,059	0.1%	0.4%
Borough High Street to the north of Union Street	14,406	2,379	14,419	2,392	0.1%	0.5%
Long Lane	11,461	762	11,483	784	0.2%	2.9%
Tower Bridge Road	23,257	1,915	23,272	1,930	0.1%	0.8%
Tooley Street	9,025	1,940	9,029	1,944	0.0%	0.2%

7.120 From the above analysis, it can be seen that construction vehicle activity would have a negligible effect on the majority of the surrounding roads (i.e. resulting in an increase of less than 10%). The greatest changes in traffic would occur on St. Thomas Street which has existing low HGV flows in the AM and PM peak hour. The increase in HGVs would be up to 75% for St. Thomas Street in the PM peak. This equates to a major adverse effect, but this is only as a result of the low baseline HGV movements on this road. In real terms, there would only be an increase of three HGV movements (which is the equivalent of 1-2 HGVs) in the AM and PM peak hour which averages an additional 1 HGV vehicle movement every 20 minutes; this level of increase is not considered significant. It is also noted that St. Thomas Street has been closed to through traffic since 2012 as part of the London Bridge Station redevelopment project, resulting in a lower amount of HGV traffic that would otherwise be expected to occur on this road. It is also noted that in respect of the overall traffic flows, the increase in vehicle movements would be less than 10% on all road links and therefore **negligible**.

7.121 On the basis of the above, the overall effects of construction traffic on the road users on local highway network are assessed as being **negligible** for all links but a **temporary adverse** effect of **major significance** as a result of HGV flows only on the road users on St. Thomas Street during the AM and PM peak hour. This will be mitigated through the implementation of Construction Traffic Management Plan (CTMP).

Pedestrian Movement, Capacity, Severance, Delay, Amenity, Fear and Intimidation

7.122 Potential traffic and transportation related effects could arise causing temporary disruption to road users and pedestrians from vehicles (particularly HGVs) entering and leaving the Site. These include footway closure on the southern side of St. Thomas Street outside the Site with pedestrians being diverted onto the opposite side of the road. Given the low number of construction vehicles associated with the Development, the effects on pedestrian movement would be **negligible**.

7.123 Pedestrian capacity, severance, delay, amenity, fear and intimidation effects are considered to be **local** to immediately outside the Site, and **temporary adverse** effects of **moderate significance** in the absence of mitigation, based on professional judgement and the traffic flow changes predicted.

Dust and Dirt on the Road

7.124 Another potential effect as a result of construction would be mud and dirt on road surfaces. This effect is considered to be **temporary adverse** effect of **minor significance** on pedestrians and cyclists in the absence of mitigation. Further consideration of dust generation as a result of the Works is set out in **Chapter 9: Air Quality**.

Cyclists

7.125 The existing cycle flow data set out within the baseline conditions in this Chapter shows that St Thomas Street and Borough High Street are well used by cyclists during the peak periods. However, cyclists already share road space with traffic in those locations. The addition of the development construction traffic onto those roads would result in negligible increases in traffic and the roads are not sensitive to such a small increase in flows. Given the low number of construction vehicles associated with the Development, the effects on cyclists as a result of construction activities would be **negligible.**

Public Transport Users

7.126 During the Works there would be an increased number of workers in the local area who would use the public transport network. However, based on the proposed working hours, which would be from 8am – 6pm, the majority of the construction workers would be travelling outside of the peak periods. Therefore, the significance of effects on the bus, rail and underground network users would be **negligible.**

Completed and Operational Development

Land Uses within the Development

7.127 Full description of the Proposed Development is provided within **Chapter 5: The Proposed Development**. In summary, the proposals are to redevelop and extend the existing site to provide the following:

- 44,312 sqm (GIA) of high-quality office floorspace (Class E);
- 340 sqm (GIA) of flexible office/retail floor space (Class E) at ground floor level of proposed office building;
- 5,017 sqm (GIA) of affordable workspace (Class E) within the Georgian Terrace, Keats House and levels 1 and 2 of the proposed office building; and
- Delivery of publicly accessible rooftop garden and a complementary café and restaurant providing 421 sqm (GIA) food/drink floorspace (Class E).

Public Realm Improvements

7.128 The pedestrian realm will be improved throughout, with increased permeability between King's Head Yard and St Thomas Street. The public realm within the Development comprises a variety of new spaces including squares, passages and yards. A new pedestrian route will be created within the Site to link with St Thomas Street through the Site to the new London Bridge Underground station entrance and King's Head Yard. Pedestrian entrances to the proposed building will be taken from the new pedestrian route.

7.129 Permeability will be further enhanced through opening up of the original passage through the Georgian Terrace linking the Site with St Thomas Street.

7.130 Outside of the Site's red line boundary there is a proposal to open up the rear of the London Bridge Underground station building at ground level to provide a new exit directly into the site's public space. This is supported by TfL and London Underground. The Applicant would enter into a development agreement with London Underground to undertake these works.

7.131 As part of the Development proposals King's Head Yard will also be improved to offer a better pedestrian environment. The yard will operate predominantly as a car-free area given the very low vehicle movements on this road. In order to maintain the very low traffic flows and ensure that the route is as attractive to pedestrians as possible, the Development generates no vehicle trips on the yards, with all access via St Thomas Street.

Proposed Parking Provision

7.132 The proposed Development would be car-free with the exception of two accessible parking bays within the service area for the use of blue badge holders. The parking will be accessible via St Thomas Street.

7.133 Facilities for cyclists are divided into long stay and short stay across the various users types on site, as per LBS and TfL's policies. 79 showers and circa 415 lockers are also provided and located within easy reach of the cycle parking.

7.134 Cycle parking spaces and associated shower and locker provisions have been allocated across ground level and Basement Level 1. Short stay Sheffield stand parking has been provided at ground level and a mixture of double stacking racks, Sheffield stands and folding bike lockers are proposed at Basement Level 1 in secure access zones.

7.135 Access to the basement for cyclists with bikes is provided from King's Head Yard via a combined cycle stair ramp with a special conveyor system to assist. This is wide enough to allow two people to pass on the stair. A shuttle lift allows cyclists to return to reception once bikes have been stored.

7.136 The proposed Development will provide a total of 1,103 long stay cycle parking spaces and 219 short stay spaces to comply with the London Plan, the LBS Local Plan and the Draft New Southwark Plan.

Proposed Access and Servicing

7.137 Vehicle access to the proposed Development will be taken from St Thomas Street. An on-site service yard will be provided allowing for servicing to take place away from the public highway.

7.138 The proposed arrangement is for servicing to take place from the Development's service yard away from the public highway. A vehicle consolidation strategy has been developed whereby all deliveries are made to an off-site logistics centre where goods will be stored, consolidated and then transported to the Site. This would significantly reduce the number of servicing trips that would otherwise be attracted by the proposed building.

7.139 The strategy has been developed based on a quantitative approach in consultation with highly experienced logistics experts providing a high level of confidence in the proposed consolidation opportunities.

Development Trips

7.140 **Table 7.20** provides the multi-modal trip generation for the Development for the weekday AM and PM peak hour with servicing vehicle generation shown in **Table 7.21**. Trip generation figures for the individual land uses along with the trip generation methodology are set out in greater detail within the Transport Assessment.

Table 7.20 Development Trips (Net Change)

Mode	AM Peak (08:30-09:30)			PM Peak (17:00-18:00)		
	In	Out	Total	In	Out	Total
Underground	350	21	371	35	318	352
Underground (having used train as main mode)	156	9	166	16	142	157
Train	601	36	637	60	545	605
Bus	127	8	134	13	115	128
Bicycle	69	4	74	7	63	70
On foot	63	4	67	6	58	64
Car	-5	0	-5	0	-5	-5
Taxi (Person)	2	0	3	0	2	2
Motorcycle	19	1	20	2	17	19
Passenger in a car	5	0	5	0	4	5
Other (River Taxi)	4	0	4	0	3	4
Total	**1,391**	**83**	**1,475**	**1,39**	**1,262**	**1,401**

Table 7.21 Servicing Trips – Net Change

Mode	AM Peak (08:30-09:30)			PM Peak (17:00-18:00)			Daily		
	In	Out	Total	In	Out	Total	In	Out	Total
Cars + LGVs	2	2	4	2	2	4	15	15	30
HGVs	0	0	0	0	0	0	5	5	10
Taxi Vehicles	2	2	4	3	3	6	28	28	56

Effect on Pedestrian Movement and Capacity

7.141 The total two-way pedestrian trips to and from the Development are calculated to be 1,213 and 1,152 in the AM and PM peak hours respectively. These include walking trips between the Development and transport access points such as to/from the local bus stops and Underground/train station with the remainder being undertaken solely on foot. The breakdown of the pedestrian trips associated with the Development is set out below in Table **7.22**:

Table 7.22 Breakdown of Development Wallking Trips

Mode	AM Peak (08:30-09:30)			PM Peak (17:00-18:00)		
	In	Out	Total	In	Out	Total
Walking to/from Underground	350	21	371	35	318	352
Walking to/from Underground (having used train as main mode)	156	9	166	16	142	157
Walking to/from London Bridge Train Station *	445	27	471	44	403	448
Walking to from Buses	127	8	134	13	115	128
Walking to from Other (River Taxi)	4	0	4	0	3	4
Solely on Foot	63	4	67	6	58	64
Total	1145	68	1213	114	1038	1152

*Note: *Trips to/from railway stations other than London Bridge excluded from walking trips as they would use the Underground to get to/from the area and are already accounted for in the table.*

7.142 The walking trips would be dissipated across the existing network and the main pedestrian desire lines are anticipated to be to/from the London Bridge Underground Station and National Rail Mainline Station and to local bus stops on Borough High Street and St. Thomas Street. Nearly 45% of the walking trips are predicted to be between the Site and London Bridge Underground station. The nearest entrance to London Bridge Underground Station is adjacent to the Site on Borough High Street and as such these trips would be contained within the immediate vicinity of the Development minimising impacts on the local highway network. Furthermore, as part of the Development, there are proposals to provide a new entrance to London Bridge Underground station directly from the Development's public square. With the new entrance in place, the Development walking trips to access the Underground would be expected to use the new entrance as this would be the quickest and easiest route to London Bridge Underground Station. As such those trips, would be contained within the Site's boundary rather than across the wider pedestrian network associated with the Underground access would be contained within the Site's boundary and would have no impact on the pedestrian network.

7.143 It is noted that approximately 39% of walking trips would be between the Site and London Bridge National Rail station. The Development would have a pedestrian entrance directly off St. Thomas Street approximately 100m to the west of London Bridge Street which provides access to the station either via the retail arcade or the escalators adjacent to the Shard. The pedestrian provision between the Development's entrance and London Bridge station is of high quality with some recently improved sections especially in the vicinity of the Shard. The only walking trips that would be expected to be undertaken over a wider pedestrian network are those being made solely on foot which only account for approximately 6% of all walking trips. Pedestrian trips to and from the bus stops would be on the local pedestrian network.

7.144 The new routes proposed by the Development (as shown in Appendix 4.1 of the TA - Space Syntax report) create more permeability, adding circulation choices and alternative routes, which helps to evenly disseminate movement at the busy Borough High Street and St. Thomas Street junction, and therefore takes pressure off Borough High Street and St. Thomas Street. For example the new route through the Site would reduce flows by 16% along the Borough High Street eastern footway compared with a do-nothing scenario. The additional permeability and the improved public realm of the Development results in a significant improvement of Pedestrian Comfort Levels (PCL) around the Site. All locations within the Development are comfortable and well above the minimum PCL recommended."

7.145 The existing and proposed infrastructure is therefore considered sufficient to meet the additional pedestrian and cyclists demand and bring benefits to the local area. Hence the Development would have a **permanent beneficial** effect of **moderate significance** on pedestrian movement and available pedestrian facility capacity in the local area.

Effect on Pedestrian Severance, Delay, Amenity and Fear and Intimidation

7.146 The pedestrian environment within the Site would be of high quality with the provision of fully accessible public realm, providing enhanced connectivity through new public routes and a public square. The public areas would be well maintained and would benefit from natural natural/passive surveillance provided by the office lobby and entrances to the retail/restaurant units. The Development would also contribute to the perception of pedestrian safety on Site by significantly enhancing the public realm.

7.147 The Development would enhance permeability by providing a pedestrian route through the Site linking King's Head Yard with St. Thomas Street. At present, no such connection is possible.

7.148 An assessment of the PCL has been undertaken for the future baseline with and without the development flows to determine the effect that the proposals could have on the local network. This is illustrated in the table below.

Table 7.23 Changes to PCL

Link Ref	Future Assessment Baseline (without NCCPCL (Without the Development)		Future Assessment Baseline (with NCCPCL (With the Development)	
	Average	AM Peak	Average	AM Peak
1a (St Thomas Street)	B	B	B	B+
1b (St Thomas Street)	F	F	F	F
1c (St Thomas Street)	B	B	B	A-
2a (St Thomas Street)	F	F	B-	B
2b (St Thomas Street)	B-	B-	B+	A+
3a (St Thomas Street)	F	F	B-	B+
3b (St Thomas Street)	B-	B-	B-	B+
4a (Borough High Street)	C+	C+	B	B
4b (Borough High Street)	C	C	B-	B-
5a (Borough High Street)	C	C	B	B-
5b (Borough High Street)	D	D	C	C
5c (Borough High Street)	C+	C+	B-	B-
6 (King's Head Yard)	A+	A+	A	A
7 (King's Head Yard)	A+	A+	A+	A+

7.149 The highlighted cells indicate where a significant change in pedestrian comfort is predicted as a result of the improved connections and the associated changes to pedestrian movement. This shows that many locations will operate in accordance with the recommended level of comfort as a result of the Development where otherwise they would be expected to operate with below the recommended level of comfort.

7.150 With the above in mind, the effects local to the Site would be:

- **permanent beneficial** effect of **moderate significance** on pedestrian severance given that the Development would open up the existing Site to pedestrians and potentially offer a new connection to the London Bridge Underground Station in future;
- **permanent beneficial** effect of **moderate significance** on pedestrian delay due to increased connectivity and permeability.;
- **permanent beneficial** effect of **minor significance** on pedestrian fear and intimidation due to provision of active frontages and improvements to and creation of public amenity spaces which is considered significant. The Development would allow for natural surveillance, provision of lighting and CCTV to provide security coverage within public and private areas; and
- **permanent beneficial** effect of **major significance** on pedestrian amenity due to public realm enhancements, provision of active frontages, seating, landscaping and improvements to open spaces and improvement to pedestrian comfort level as a result of the Development.

Effect on Cycle Network

7.151 As shown on **Table 7.22,** the Development is expected to generate 74 and 70 cycle trips in the AM and PM peak respectively. The proposed long-stay cycle parking at the Site would more than meet the operational demand. Additionally, cycle stands would be provided within the public realm for the use of the visitors/customers and the general public.

7.152 With the above in mind, the Development is expected to have a **negligible** effect on cyclists on the local cycle network.

Effect on Bus Services

7.153 As shown on **Table 7.22**, the Development is predicted to generate 134 two-way bus trips during the AM peak and 128 two-way bus trips during the PM peak.

7.154 Based on an average bus operational capacity of 63 persons and a weekday AM and PM peak bus frequency of 128 buses in each direction, the planning bus capacity was calculated as 8,064 passengers per direction per hour. On this basis, the effect of the additional bus trips associated with the Development on the bus network is set out in **Table 7.24**.

Table 7.24 Bus Network Impact Assessment

Time and direction		Bus Trips	Bus network capacity (hr)	% of bus network capacity
AM Peak	In	127	8,064	1.57%
	Out	8	8,064	0.10%
PM Peak	In	13	8,064	0.16%
	Out	115	8,064	1.43%

7.155 **Table 7.24** shows that the greatest impact on the bus network as a result of the Development would be 1.57% which would occur as a result of the arrival trips in the AM peak and equates to approximately on average one additional person per bus. This level of increase in passengers is considered **negligible** on the existing bus users.

Effect on Underground Services

Planning Capacity

7.156 As shown on **Table 7.24**, the Development is predicted to generate 371 and 352 two-way London Underground person trips during the AM and PM peak hour respectively. Additionally, some of the Development rail trips are expected to use the underground to get to London Bridge having used one of the other railway stations in London as their main mode. Based on the analysis of the 2011 Census "*Location of usual residence and place of work by method of travel to work*" it has been found that about 26% of rail trips would terminate at stations other than London Bridge and therefore, 26% of these rail trips have been added onto the number of Underground trips (166 and 157 in the AM and PM peak hour respectively). As a result, the total number of Underground trips is 537 and 509 two-way trips in the AM and PM peak hour respectively.

7.157 London Bridge Underground station is served by the Jubilee Line and the Bank branch of the Northern Line and thus the Underground trips would be split between the various services. The 2011 Census data: Special Workplace Statistics (SWS), which provides travel to work data, has been used to determine the direction employees would be travelling to and from and then which Underground services is most appropriate. The split of the main mode underground trips is set out in **Table 7.25**.

Table 7.25 Split of Underground Trips

Underground Line	Direction	Arrivals	Departures
Jubilee Line Westbound	From Bermondsey to London Bridge	22.7%	0%
	To Southwark from London Bridge	0%	22.7%
Jubilee Line Eastbound	From Southwark to London Bridge	20.3%	0%
	To Bermondsey from London Bridge	0%	20.3%
Northern Line Northbound	From Borough to London Bridge	16.1%	0%
	To Bank from London Bridge	0%	16.1%
Northern Line Southbound	From Bank to London Bridge	40.9%	0%
	To Borough from London Bridge	0%	40.9%

7.158 In respect of the rail trips that have been added on the underground as a secondary mode, the expected split is as follows based on the location of the railways stations relative to London Bridge and available underground connections:

- Jubilee Line to/from Southwark 44.4%; and
- Northern Line to/from Bank 55.6%.

Planning Capacity

7.159 Planning capacity figures obtained from TfL indicate that each Jubilee Line train has a planning capacity of 960 passengers. Based on the AM Peak frequency of 30 trains per hour per direction there is a planning capacity of 28,800 passenger per hour per direction (pphd) on the Jubilee Line. With regard to the Northern Line, each train has a planning capacity of 800 passengers and therefore capacity of 20,000 pphd in the northbound direction in the AM peak and 18,400 in the southbound direction. In the PM peak the capacity is 15,295 per each direction. The assessment of the Development underground trips on the Jubilee Line and the Northern Line planning capacity is set out in **Table 7.26** and **Table 7.27** respectively.

Table 7.26 Assessment of Development Jubilee Line trips on Jubilee Line Planning Capacity

Time	Direction	Jubilee Line person trips	Jubilee Line planning capacity (pphd)	% of Jubilee Line network capacity
AM Peak	Westbound To Southwark	88	28,800	0.31%
	Eastbound To Bermondsey	145	28,800	0.50%
PM Peak	Westbound To Southwark	135	28,800	0.47%
	Eastbound To Bermondsey	86	28,800	0.30%

7.160 The largest impact on the Jubilee Line network would be 0.50% of the planning capacity, due to AM peak arrivals from the west. The likely effect of the Development on the users of the Jubilee Line network is therefore assessed as **negligible.**

Table 7.27 Assessment of Development Northern Line trips on Northern Line Planning Capacity

Time	Direction	Northern Line person trips	Northern Line planning capacity (pphd)	% of Northern Line network capacity
AM Peak	Northbound to Bank	70	20,000	0.35%
	Southbound to Borough	233	18,400	1.27%
PM Peak	Northbound to Bank	214	18,400	1.16%
	Southbound to Borough	74	18,400	0.40%

7.161 It can be seen that the largest impact on the Jubilee Line network would be 1.27% of the planning capacity, due to AM peak arrivals from the north. The likely effect of the Development on the users of the Northern Line network is therefore assessed as **negligible.**

Demand Capacity

7.162 The passenger numbers on the Jubilee Line and the Northern Line have been obtained from TfL in order to establish the effects of the Development on the assessment baseline line flows. The assessment baseline flows have been created by applying predicted growth in passenger numbers to the existing baseline flows, supplied by TfL. This has been undertaken for the AM peak hour when the impact of the Development on the Underground network is predicted to be greater than the PM peak.

Table 7.28 Development (Demand Capacity) Underground Person Trips AM Peak

Direction		Baseline Planning Capacity (pphd)	Assessment Baseline Flows	Ratio of Demand to Capacity	Development Trips	Assessment Baseline + Development	Ratio of Demand to Capacity	% Change
Jubilee Line	From Bermondsey	28,800	18,450	64.1%	80	18,530	64.3%	0.3%
	To Southwark	28,800	18,206	63.2%	8	18,214	63.2%	0.0%
	From Southwark	28,800	15,816	54.9%	140	15,956	55.4%	0.5%
	To Bermondsey	28,800	16,699	58.0%	5	16,704	58.0%	0.0%
Northern Line	From Borough	20,000	14,784	73.9%	56	14,840	74.2%	0.3%
	To Bank	20,000	16,366	81.8%	14	16,380	81.9%	0.1%
	From Bank	18,400	6,741	36.6%	230	6,971	37.9%	1.3%
	To Borough	18,400	4,741	25.8%	3	4,744	25.8%	0.0%

7.163 **Table 7.28** shows that in respect of the Jubilee Line services, the greatest increase of ratio to flow capacity is 0.49% on inbound services from the west. Regarding the Northern Line, the highest increase of ratio to flow capacity is 1.3% for inbound services from the North. Therefore, the effect of the Development on the users of the Jubilee Line and the Northern Line network is assessed as **negligible**.

Effect on Rail Services

7.164 As shown in **Table 7.20**, the Development is predicted to generate 637 two-way rail trips during the AM peak and 605 two-way rail trips during the PM peak. As mentioned previously, based on the SWS Census data, approximately 74% of rail trips would be expected to use London Bridge

Station with 26% of trips using other railways stations within London and then using the Underground. The number of total trips expected to use London Bridge Station is therefore calculated as 471 and 448 trips in the AM and PM peak respectively.

7.165 London Bridge Station is served by 121 trains arriving and departing in the AM Peak with 113 services arriving and departing in the PM peak hour including South-eastern, Southern and Thameslink services. Based on the information provided on each of the train operators' websites, the average capacity of each train has been taken as 980 passengers. This equates to a capacity of 118,580 passengers in each direction in the AM Peak and 110,740 passengers in the PM peak hour. Therefore, based on the Development rail trips, the impact of on the rail network has been calculated in **Table 7.29**.

Table 7.29 Rail Network Impact Assessment

Time and direction		Rail Trips	Rail network capacity (hr)	% of rail network capacity
AM Peak	In	445	118,580	0.37%
	Out	27	118,580	0.02%
PM Peak	In	44	110,740	0.04%
	Out	403	110,740	0.35%

7.166 The above shows that the largest impact on the current rail network is expected to be 0.37% which would occur in the weekday AM peak hour as a result of the additional 445 inbound trips. This represents a **negligible** effect on rail users.

Effect on Traffic Flows

7.167 The Development is predicted to generate 8 two-way vehicle trips during both the AM and PM peak hour and 258 two-way vehicle trips across the whole day. **Table 7.30, Table 7.31** and **Table 7.32** show the predicted effect these trips would have on the local highway network during the AM, PM peak and across the whole day.

Table 7.30 Effect of Development Trips on Traffic Flows – AM Peak

Link	Assessment Baseline Flows		Assessment Baseline Flows + Development		Percentage Increase	
	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
London Bridge to the north of Tooley Street	1,311	276	1,313	276	0.1%	0.0%
Borough High Street to the south of London Bridge	2,359	673	2,360	673	0.0%	0.0%
St. Thomas Street	271	7	276	7	1.9%	0.0%
White Hart Yard	4	1	4	1	0.0%	0.0%
Southwark Street to the east of Southwark Bridge Road	416	56	418	56	0.5%	0.0%
Southwark Street to the west of Southwark Bridge Road	890	87	892	87	0.2%	0.0%
Southwark Bridge Road	784	134	784	134	0.0%	0.0%
Marshalsea Road	788	160	788	160	0.0%	0.0%
Borough High Street to the north of Union Street	869	160	871	160	0.3%	0.0%
Long Lane	714	45	714	45	0.0%	0.0%
Tower Bridge Road to the south of Druid Lane	1,418	145	1,418	145	0.0%	0.0%
Tooley Street	567	116	567	116	0.0%	0.0%

Table 7.31 Effect of Development Trips on Traffic Flows – PM Peak

Link	Assessment Baseline Flows		Assessment Baseline Flows + Development		Percentage Increase	
	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
London Bridge to the north of Tooley Street	1,134	236	1,136	236	0.1%	0.0%
Borough High Street to the south of London Bridge	2,546	572	2,547	572	0.0%	0.0%
St. Thomas Street	256	4	261	4	2.1%	0.0%
White Hart Yard	2	1	2	1	0.0%	0.0%
Southwark Street to the east of Southwark Bridge Road	391	34	393	34	0.6%	0.0%
Southwark Street to the west of Southwark Bridge Road	748	72	750	72	0.2%	0.0%
Southwark Bridge Road	645	88	645	88	0.0%	0.0%
Marshalsea Road	779	107	779	107	0.0%	0.0%
Borough High Street to the north of Union Street	871	127	873	127	0.3%	0.0%
Long Lane	604	38	604	38	0.0%	0.0%
Tower Bridge Road to the south of Druid Lane	1,194	95	1,194	95	0.0%	0.0%
Tooley Street	499	100	499	100	0.0%	0.0%

Table 7.32 Effect of Development Trips on Traffic Flows – Daily

Link	Assessment Baseline Flows		Assessment Baseline Flows + Development		Percentage Increase	
	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
London Bridge to the north of Tooley Street	25,529	4,675	25,540	4,676	0.0%	0.0%
Borough High Street to the south of London Bridge	19,731	3,572	19,735	3,572	0.0%	0.0%
St. Thomas Street	6,158	579	6,207	584	0.8%	0.9%
White Hart Yard	26	5	26	5	0.0%	0.0%
Southwark Street to the east of Southwark Bridge Road	12,485	1,385	12,508	1,388	0.2%	0.2%
Southwark Street to the west of Southwark Bridge Road	14,902	1,455	14,921	1,458	0.1%	0.2%
Southwark Bridge Road	14,566	1,776	14,574	1,778	0.1%	0.1%
Marshalsea Road	14,374	2,050	14,382	2,052	0.1%	0.1%
Borough High Street to the north of Union Street	14,406	2,379	14,429	2,382	0.2%	0.1%
Long Lane	11,461	762	11,479	766	0.2%	0.6%
Tower Bridge Road to the south of Druid Lane	23,257	1,915	23,270	1,918	0.1%	0.2%
Tooley Street	9,025	1,940	9,028	1,941	0.0%	0.0%
London Bridge to the north of Tooley Street	25,529	4,675	25,540	4,676	0.0%	0.0%

7.168 The above tables show that all of the road links would experience change in traffic flows of less than 10% with traffic flows predicted to increase by negligible amounts. With this in mind, the Development traffic would have a **negligible** effect on the road users in respect of all road links.

Mitigation Measures and Likely Residual Effects

7.169 As part of the Applicant's commitment to ensure an appropriate development response, the Applicant and the design team have developed a number of measures within the Development proposals to ensure that the potential for adverse effects are avoided. These are discussed in the following paragraphs.

The Works

Construction Traffic Vehicular Movements

7.170 Consideration has been given to the likely numbers of construction vehicles and the routes to and from the Site. The construction vehicles would be managed in accordance with a CLP and a SEMP. These documents would be agreed with the LBS prior to the commencement of works and are expected to be secured by planning conditions.

7.171 Other potential effects as a result of construction would be on road surfaces from mud and dirt, as well as temporary footway closure on the southern side of St. Thomas Street which would be actively managed in accordance with measures set out in the SEMP and the CLP. These measures would be expected to be incorporated as planning conditions / Section 106 measures and are therefore considered as mitigation measures rather than part of the scheme design, hence their consideration as such within this assessment. These measures are summarised as follows:

- restricted hours of work;
- demolition and construction method statements;
- Considerate Constructors Scheme;
- management of deliveries and trade contractors;
- management of noise, vibration and dust; and
- management of construction waste.

7.172 With the implementation of a SEMP and CLP, the residual effects of the Works traffic are considered to be **negligible** on the road users.

Dust and Dirt on the Road

7.173 In respect of dust and dirt mitigation, this would be undertaken as per details provided within SEMP which would be agreed with LBS and TfL. This includes washing down vehicles before leaving the Site. This is further discussed within **Chapter 9: Air Quality**.

Pedestrian and Cyclist Movement and Amenity

7.174 Details on the management of footway closures and routing would be agreed with the LBS through the SEMP post-planning and prior to commencement of the Development as part of discharging the expected planning conditions / Section 106 Obligations for the CLP and SEMP.

7.175 Given the predicted level of hourly volumes of construction vehicles associated with Works activities on the Site and the control measures within the CLP and SEMP that would be implemented, the residual effects of construction traffic on pedestrian movement and capacity would be **negligible.**

7.176 Details on the management of road closures and routing would be agreed with LBS through the CLP and SEMP post-planning. The residual effects of construction traffic on cyclists would be **negligible**.

Public Transport (Rail, London Underground, Bus Network)

7.177 During the construction period there would be an increased number of workers in the local area that would use the public transport network. As the majority of the construction workers would be

travelling outside of the peak periods due to their normal working hours, the residual effect on public transport users would therefore be **negligible**.

Completed and Operational Development

Pedestrian and Cyclist Facilities and Conditions

7.178 The pedestrian and cyclist environment within the Site would be enhanced by the Development and therefore no mitigation is required.

7.179 The Development would create an attractive pedestrian route using King's Head Yard which would be largely car-free.

7.180 The residual effects are assessed as follows:

- Pedestrian movement and capacity – **beneficial** effect of **moderate significance**.
- Pedestrian severance – **beneficial** effect of **moderate significance**.
- Pedestrian delay – **beneficia**l effect of **moderate significance**.
- Pedestrian fear and intimidation – **beneficial** effect of **minor significance**.
- Pedestrian amenity - **beneficial** effect of **major significance**.
- Cyclists – **negligible** effect.

7.181 As shown above, there would be **beneficial residual** effects **of major, moderate and minor significance** on pedestrians and cyclists within the study area.

Public Transport Network and Accessibility

7.182 The completed Development is predicted to have a negligible effect on bus, London Underground and rail service capacities. It is noted that TfL might require contributions towards improving bus service frequencies as part of the Development to accommodate the additional patronage predicted. This would be secured through a financial contribution to bus services, if required. As this would increase service frequencies or the number of services provided it would also benefit the wider public within the area.

7.183 The residual effect on bus, London Underground and rail services would be **negligible**.

Traffic Flows and Highways

7.184 The effects on the wider highway network are considered to be **negligible** and therefore no mitigation is required in respect of traffic flows on the surrounding highway network.

7.185 The completed Development would be subject to a Travel Plan, and a Delivery and Service Management Plan (DSMP). Each of these would be subject to planning conditions or Section 106 Obligations within any planning consent for discharge post-planning.

- Travel Plan – The Development would be subject to a Workplace Travel Plan which would be expected to be subject to planning condition or Section 106 Obligation for discharge post-planning, prior to first occupation. As the Development is car-free and has a central London location with excellent public transport accessibility, it is already sustainable and staff and visitors would already be influenced towards sustainable modes. Therefore, the proposed measures would be focused on provision of information to staff to make them aware of all travel options available to them to encourage employees to move up within the sustainable transport hierarchy (e.g. from public transport to walking or cycling where practical). Other

measures would include provision of high quality cycle parking, lockers and shower facilities which form part of the design of the Development, to make cycling a viable alternative as a transport mode. With the above in mind, it is considered that no other measures would be necessary as part of the Travel Plan as staff would be expected to select sustainable and active modes for travel to and from the Development.

- DSMP – this would manage the arrival and departure of delivery and servicing vehicles and their activities when on-site.

7.186 The residual effect on traffic flows and highway capacity is **negligible**.

7.187 **Table 7.33** summarises the likely significant effects, mitigation measures and likely residual effects identified within this Chapter.

Table 7.33: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Effects of traffic flows from construction vehicle movements upon the local highway network users.	Adverse effect of major significance on St. Thomas Street (HGVs only), negligible on all other links.	Site Environmental Management Plan (SEMP) and Construction Logistics Plan (CLP) prior to commencement	Negligible
Effects of construction activities on pedestrians in terms of movement and capacity, severance, delay, fear and intimidation, amenity.	Adverse effect of moderate significance to Negligible	Management of walkways, any temporary closures and routing would be agreed with the LBS through the CLP and SEMP post-planning and prior to commencement.	Negligible
Dust and dirt	Negligible	Dust and dirt to be prevented and managed as set out in SEMP.	Negligible
Effects of construction on cyclists.	Negligible	Management of road closures and routing would be agreed with the LBS through the CLP and SEMP post-planning and prior to commencement.	Negligible
Effects of increased number of public transport trips as a result of construction workers' travel on public transport users.	Negligible	None required	Negligible
Completed and Operational Development			
Effects of the Development on pedestrians in respect of pedestrian movement and	Beneficial effect of moderate significance.	New pedestrian connection through the Site and public realm enhancements to encourage diversion of pedestrian movements onto King's Head Yard from White Hart Yard.	Beneficial effect of moderate significance. .

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
capacity.			
Effects of the Development on pedestrian severance.	Beneficial effect of moderate significance. Negligible	New pedestrian connection through the Site and public realm enhancements to encourage diversion of pedestrian movements onto King's Head Yard from White Hart Yard.	Beneficial effect of moderate significance. Negligible
Effects of the Development on pedestrian delay.	Beneficial effect of moderate significance.	New pedestrian connection through the Site and public realm enhancements to encourage diversion of pedestrian movements onto King's Head Yard from White Hart Yard.	Beneficial effect of moderate significance.
Effects of the Development on pedestrian fear and intimidation.	Beneficial effect of minor significance. Negligible	New pedestrian connection through the Site and public realm enhancements to encourage diversion of pedestrian movements onto King's Head Yard from White Hart Yard.	Beneficial effect of minor significance. Negligible
Effects of the Development on pedestrian amenity.	Beneficial effect of major significance. Negligible	New pedestrian connection through the Site and public realm enhancements to encourage diversion of pedestrian movements onto King's Head Yard from White Hart Yard.	Beneficial effect of major significance. Negligible
Effects of the Development cycle trips on cyclists using the local cycle network	Negligible	None required	Negligible
Effects of the Development bus services on bus users.	Negligible	None required	Negligible
Effects of the Development underground trips on Underground passengers.	Negligible	None required	Negligible
Effects of the Development Rail trips on train passengers.	Negligible	None required	Negligible
Effects of the Development Traffic Flows on road users on the local highway network.	Negligible	DSMP minimising servicing vehicles during peak periods.	Negligible

Monitoring

7.188 The Development would be subject to a Travel Plan which would be expected to be subject to planning condition or Section 106 Obligation for discharge post-planning, prior to first occupation. As part of the Travel Plan, staff travel patterns would be monitored by means of a travel survey in accordance with LBS and TfL requirements. The usage of the cycle parking facilities would also be monitored as part of the Travel Plan.

7.189 The Development would also be subject to a DSMP as part of which, monitoring would be undertaken of the delivery and servicing vehicles in terms of arrival profile and dwell times.

References

1 Institute of Environmental Management and Assessment (1993); Guideline for the Environmental Assessment of Road Traffic

2 https://tfl.gov.uk/info-for/urban-planning-and-construction/transport-assessment-guidance

3 Department for Transport (2007): Guidance on Transport Assessment.

4 Department for Transport (1993); Design Manual for Roads and Bridges – Volume 11, Section 3, Part 8: Pedestrians, Cyclists, Equestrians and Community Effects.

5 Transport for London (2010): Pedestrian Comfort Guidance for London.

6 https://tfl.gov.uk/info-for/urban-planning-and-construction

8. Noise and Vibration

Introduction

8.1 This chapter, which was prepared by Waterman Infrastructure & Environment (Waterman IE), presents an assessment of the likely noise and vibration effects of the Development. Information on traffic flows during the operation of the Development has been provided by Transport Planning Practice (TPP) (the project's transport consultants). Information has been supplied by Gardiner & Theobald, Chapman BDSP and Sandy Brown Associates on construction, servicing plant and acoustic design limits respectively.

8.2 A description of the assessment methodology, a description of the relevant baseline conditions at the Site and surrounding area; and an assessment of the likely significant effects of the Development that could arise during demolition, deconstruction, refurbishment and construction (the 'Works'), and once the Development is completed and operational is presented within this chapter. Where appropriate, mitigation measures are identified to avoid, reduce or offset adverse effects and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described.

8.3 This chapter addresses the impact of the Development on surrounding land-uses. Suitability of the Site for office use and its amenity is not a direct impact of the Development and, therefore, does not form part of the ES. An assessment of vibration from London Underground Limited (LUL) infrastructure on the Development has been included within this chapter at the request of the London Borough of Southwark (LBS), however, it should be noted that this is not a direct impact of the Development and would not normally be included within an ES

8.4 This chapter is accompanied by the following appendices, presented in **ES Part 4**:

- **Appendix 8.1**: Acoustic Glossary
- **Appendix 8.2**: Baseline Survey
- **Appendix 8.3:** The Works Noise Calculations
- **Appendix 8.4:** Correspondence with LBS Environmental Health Officer (EHO)

Assessment Methodology and Significance Criteria

8.5 The assessment of likely significant noise and vibration effects has involved the following:

- identifying potentially sensitive existing and future receptors within the area surrounding the Site;
- establishing the baseline noise and vibration conditions currently existing at the Site and at existing sensitive receptors surrounding the Site through survey;
- assessing likely noise and vibration levels generated by the Works;
- assessing likely noise levels from the complete and operational Development;
- establishing design criteria for plant and building services associated with the Development;
- formulating proposals for mitigation (where appropriate); and
- assessing the likely significance of any residual noise and vibration effects.

Assessment Methodology

Consultation

8.6 Within the EIA Scoping Opinion dated 4 October 2018 for the 2018 Scheme, LBS provided the Applicant with the consultation responses that they had received in relation to noise and vibration. **Table 8.1** below summarises these Consultation responses, alongside the subsequent action taken by Waterman IE to address these.

Table 8.1: Southwark Council Consultation Responses

Item	Waterman Action
The scope and measurement procedures for baseline noise and vibration surveys are required to be agreed in consultation with LBS EHO and confirmation of this should be provided in the ES.	In a conversation with Ken Andrews, Principal EHO at LBS, it was confirmed that he had no objections to the scope and measurement procedures for baseline noise and vibration surveys.
The ES should confirm that receptor locations identified include amenity areas.	**Figure 8.2** illustrates receptor locations and includes three amenity areas.
The ES should confirm how the construction noise assessment has taken account of existing ambient noise conditions at receptors.	BS5228-1:2009+A1:2014 ABC method was used, which sets construction threshold levels based on existing ambient noise levels established through baseline survey.
The potential effects of Jubilee Line vibration on the completed development should also include an assessment of potential groundborne noise.	An assessment of potential effects resultant from groundborne noise associated with the London Underground Limited (LUL) Jubilee Line has been undertaken based on measured vibration levels, which were established as part of the baseline survey.
The ES should include a summary of residual effects following mitigation and consideration of the potential cumulative effects from other nearby developments.	Residual noise and vibration effects following mitigation are presented within this chapter. Cumulative effects are presented within Chapter 14.

8.7 A further informal EIA scoping request was submitted in February 2021 to confirm whether the 2018 Scoping Opinion would be relevant for this Application. As set out in **Chapter 2**, LBS response requested the scope of the EIA was amended as follows:

- Updated legislation, guidance, industry best practice and policy context;
- Updated baseline information;
- Further and updated surveys undertaken since the 2018 ES Scope was agreed;
- Additional assessment and information, as is relevant, that was identified as being required within the detailed ES reviews undertaken by Land Use Consultants (LUC) on behalf of LBS of the 2018 ES;
- Current data availability and representativeness due to the Covid-19 restrictions; and
- Revised scheme proposals.

8.8 This amended scope has been accounted for in this chapter.

Establishing Baseline Conditions

8.9 At the time of writing a number of restrictions are in place in England in response to COVID-19, subsequently levels of road traffic are significantly lower than would be expected once the Development is completed. As such, it is considered that any survey works, whether noise or traffic, completed at this time would not be representative of typical baseline conditions with respect to the noise climate. Therefore, the assessment has based upon the previous noise surveys completed in 2016 and traffic data from 2018.

8.10 It is noted that, although it is possible that there would be an increase in noise levels between 2016 and 2021, for a perceptible increase in noise levels to arise (>3dB) a doubling of road traffic flows would be required. A review of the 2018 traffic data provided by TPP indicates that such an increase has not arisen. As such, use of the 2016 baseline data is considered to be representative of the post-COVID-19 baseline noise conditions. The 2016 noise surveys are described below.

8.11 Long-term noise monitoring was undertaken at two key locations on the periphery of the Site over a six-day period from Thursday 13 October to Tuesday 18 October 2016 (refer to **Figure 8.1** Noise and Vibration Monitoring Locations). The survey period covered both a typical weekday and weekend period. Four additional concurrent short-term noise measurements were undertaken at each Site boundary.

8.12 Short-term vibration monitoring was undertaken towards the west of the Site at basement and ground floor level (refer to **Figure 8.1**) to determine the magnitude of existing vibration from train passes on the Jubilee Line, which runs underneath the north western corner of the Site. It is understood that there has been no change to the rolling stock or number of train movements on the Jubilee Line since the time of the vibration survey. As such, the monitored levels remain valid.

Assessment of Likely Significant Noise and Vibration Effects

The Works - Noise

8.13 As noted in **Chapter 6: Development Programme, Demolition, Deconstruction, Refurbishment and Construction**, the Works are to be carried out over a 44 month period, planned to commence in the Quarter 3 of 2022 with a completion date of Quarter 1 2026. Noise levels associated with these works have been estimated based upon the plant typically used for such a development, as detailed in **Chapter 6**, 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*'.

8.14 The Works which are considered to be the noisiest can be divided into the following main activities:

- demolition;
- earthworks;
- piling;
- concreting; and

- road paving.

8.15 To assess the likely significant effects of the Works on existing and future Sensitive Receptors (SRs) surrounding the Site, as shown on **Figure 8.2**, the 'ABC Method' provided in BS 5228-1:2009+A1:2014[1], 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 the Works activities is compared with the threshold value. If the Works noise level exceeds the 'threshold value', a significant effect is deemed to occur.

8.16 Noise threshold levels have been established for the relevant 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 will tend to be lower owing to greater separation distances between plant machinery and SRs, screening effects of boundary hoarding and periods of plant inactivity.

The Works - Vibration

8.17 There are two aspects of vibration that require consideration:

- potential vibration effects on people or equipment within buildings; and
- potential vibration effects on buildings.

8.18 There are currently no British Standards that provide a methodology for predicting levels of vibration from demolition and construction activities other than BS 5228-2[2] 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration', which relates to percussive, or vibratory, rolling and piling only. As stated in BS 5228-2, and as generally accepted, the threshold of vibration perception for humans in residential environments is typically in the Peak Particle Velocity (PPV) range 0.15 to 0.3 mm/s at frequencies between 8 Hertz (Hz) and 80Hz with complaints likely at 1 mm/s. Based on historical field measurements undertaken by Waterman IE and having regard to information contained within BS 5228-2, **Table 8.2** details the distance at which certain activities may give rise to 'just perceptible' levels of vibration.

Table 8.2: Distance at which Vibration May be Just Perceptible

Construction Activity	Distance from Activity when Vibration may be just Perceptible, *m*[1]
Heavy Vehicles	5-10
Excavation	10-15
Continuous Flight Auger (CFA) Piling	15-20
Rotary Bored Piling	20-30
Vibration Piling	40-60

Note:

[1] Distances for perceptibility are only indicative and dependent upon several factors, such as the radial distance between source and receiver, ground conditions, and underlying geology

8.19 **Table 8.3** presents typical levels of vibration with distance from continuous flight auger (CFA) piling methods.

Table 8.3: Typical Levels of Vibration from CFA Piling

Distance, m	Peak Particle Velocity[1] (PPV), mm/s
5	0.54
10	0.38
20	0.3
30	0.3

Note:
[1] PPV Levels are indicative only and dependent upon ground conditions and underlying geology

8.20 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 will not arise at PPV levels below 12.5 mm/s.

8.21 Vibration from piling operations has the potential to affect utilities and will be a function of the distance of the piling works from the utility location. Some statutory undertakers have introduced criteria governing the maximum level of vibration to which their services should be subjected although no specific criteria are relevant to the Development. As such, 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.

8.22 In the event of encountering older and dilapidated brickwork sewers, the base data should be reduced by 20% to 50%. For most metal and reinforced concrete service pipes however, BS5228-2 consider that the values stated within BS5228-2 should be tolerable.

8.23 At this stage, the detail of the methods and equipment to be used during the 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 has been assessed qualitatively based on typical plant used and distance of works to the SRs. Vibration level data has been drawn from BS5228-2.

The Works Road Traffic Noise

8.24 Assessment of noise level changes arising from demolition and construction traffic has been undertaken using the calculation methodology detailed within the Calculation of Road Traffic Noise[3] (CRTN). This involved the use of the forecast construction traffic flow data (as set out in **Chapter 6: Development Programme, Demolition, Deconstruction, Refurbishment and Construction**) and the baseline traffic data provided by TPP as set out in **Chapter 7: Transportation and Access**.

Completed and Operational Development

Fixed External Plant & Building Services

8.25 The guidance provided in BS 4142:2014[4] 'Methods for rating and assessing industrial and commercial sound', has been used to assess whether noise from fixed plant and building services associated with the Development will be likely to give rise to significant adverse impacts for existing and future SRs. Predicted noise levels have also been assessed in accordance with the requirements of LBS later in this chapter.

Commercial Uses and Servicing Noise

8.26 Specific details concerning the end users of the commercial elements of the Development are not known at this stage and will 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.

8.27 Assessment of servicing noise has been undertaken based on the Leq prediction methodology set out in the Noise Advisory Council document entitled '*A Guide to the Measurement and Prediction of the Equivalent Continuous Sound Level Leq*'[5] and guidance provided in BS4142:2014 based on the forecast volume of servicing vehicles and the resultant predicted change in the prevailing noise level at SR locations.

Significance Criteria

The Works - Noise and Vibration

8.28 As outlined above, to assess the significance of effects from the Works noise on existing and future SRs, 'The ABC Method' provided in BS 5228-1:2009+A1:2014 was used. The vibration assessment has been made against the criteria for human perception as presented in BS 5228-2:2009. Regard has also been given to the requirements of LBS detailed within their Technical Guidance Note on 'Demolition and Construction[6]'. **Table 8.4** presents the significance criteria to assess both noise and vibration from the Works.

Table 8.4: Significance Criteria for Assessment of Noise and Vibration from the Works

Significance	Noise Level Above Threshold Value, dB(A)	Level of Vibration, mm/s	Definition
Negligible	≤ 0 - 2.9	< 0.14	The effect is not of concern.
Adverse effect of minor significance	3.0 - 4.9	0.14 - <1	The effect is undesirable but of limited concern.
Adverse effect of moderate significance	5.0 - 9.9 or ≥75dB $L_{Aeq,15\ min}$ (short-term), ≥70dB $L_{Aeq,10\ hr}$ (08:00-18:00) whichever is lower	1 to 3	The effect gives rise to some concern but is likely to be tolerable depending on scale and duration.
Adverse effect of major significance	≥10 or ≥80dB $L_{Aeq,15min}$ (short-term), 75dB $L_{Aeq,10\ hr}$ (08:00-18:00) whichever is lower	>3	The effect gives rise to serious concern and it should be considered unacceptable.

8.29 LBS specify the following vibration limits which are receptor dependent within their Technical Guidance[7] and are expected to be applicable in the absence of other restrictions:

- 1 mm/s PPV at occupied residential and educational buildings;
- 3 mm/s PPV at occupied commercial premises where work is not of an especially vibration sensitive nature or for potentially vulnerable unoccupied buildings;
- 5 mm/s at other unoccupied buildings.

8.30 With regard to potential damage to any utilities and listed buildings / structures, provided vibration is ≤7.5mm/s (derived from BS5228-2 advice) the potential effect is Negligible. For all other buildings, a vibration level of ≤10mm/s is Negligible with regard to building damage.

The Works - Road Traffic Noise

8.31 The significance criteria normally used in the short-term assessment of operational road traffic noise, presented as **Table 8.5**, has been used to assess the significance of changes in road traffic noise as a result of traffic generated by the Works.

Table 8.5: Significance Criteria for Change in Road Traffic Noise

Significance	Change in Road Traffic Noise Level, dB(A)
Negligible	0 – 0.9
Adverse effect of minor significance	1 – 2.9
Adverse effect of moderate significance	3 – 4.9
Adverse effect of major significance	>5

Complete and Operational Development

Fixed External Plant & Building Services

8.32 The guidance provided in BS 4142[8] 'Methods for Rating and Assessing Industrial and Commercial Sound,' together with the requirements of LBS detailed with their Technical Guidance for Noise[7], has been used to assess whether noise from fixed plant and building services will be likely to give rise to significant adverse impacts for existing and future SRs.

8.33 In order for planning permission to be recommended, as detailed within the Technical Guidance, LBS require:

"Rating sound level does not exceed the typical minimum $L_{A90\ (15\ minute)}$ background sound level at any time. Furthermore, in order to prevent gradually creeping background levels over time it is required that the unrated 'Specific' sound level does not exceed 10dB below the typical minimum $L_{A90\ (15\ minute)}$ background sound level at any time. The 'Specific', 'Rating' and 'Background' sound levels shall be calculated fully in accordance with the methodology of BS4142:2014."

8.34 At this stage of the Development specific detail on plant with regard to make, model and numbers is not known. On this basis, plant noise limits have been recommended at SR locations based on the noise monitoring data and in accordance with the requirements of LBS.

Commercial Uses and Servicing Noise

8.35 In the absence of published guidelines for assessing the effects of noise from delivery and servicing, the significance criteria in **Table 8.6**, which are based on the predicted change in the prevailing noise level, have been adopted. The criteria are widely used by acoustic practitioners and are based on human perception and response to changes in environmental noise levels.

Table 8.6: Significance Criteria for Non-Residential and Servicing Noise Assessment

Significance	Change in Prevailing Noise Level, dB(A)	Definition
Negligible	< 3	The effect is not of concern.
Adverse effect of minor significance	3.0 – 4.9	The effect is undesirable but of limited concern.
Adverse effect of moderate significance	5 – 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.

8.36 With regard to commercial uses where specific detail is unknown a qualitative assessment has been undertaken.

Environmental Vibration

8.37 Vibration resultant from the LUL Jubilee Line which runs under the north western corner of the Site has been undertaken against BS6472:2008 Vibration Dose Value (VDV) criteria, which are reproduced in Table 8.7.

Table 8.7: Significance Criteria for the Assessment of VDV

Place and Time	Low Probability of adverse comment $m/s^{-1.75}$	Adverse comment possible $m/s^{-1.75}$	Adverse comment probable $m/s^{-1.75}$
Office Buildings 16 h day	0.4 – 0.8	0.8 – 1.6	1.6 – 3.2

Limitations and Assumptions

The Works

8.38 The BS 5228 calculation methods 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.

8.39 A number of assumptions have therefore been made regarding the number and type of plant to be utilised, their location, and detailed operating arrangements based upon Waterman IE's experience of demolition and construction sites such as the proposed. Some of this information

will be clarified as the detailed design progresses and later when resources are mobilised, and the contractor is appointed, but other information (such as exactly where the plant operates and for how long) will remain uncertain, even after works have commenced. As such, the Works noise levels have been based on generic plant detail contained within BS5228-1:2009+A1:2014 and as detailed in ES **Chapter 6: Development Programme, Demolition, Deconstruction, Refurbishment and Construction**.

8.40 The available information is considered sufficient to undertake a noise assessment of the Works, 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 and Building Services

8.41 At this stage in the design of the Development, the number, location, specific type and configuration of fixed plant and building services connected with the Development are not defined. Consequently, it is not possible to undertake predictions to determine whether appropriate standards might be met. Plant noise emission limits have therefore been recommended which are compliant with the requirements of LBS.

Baseline Conditions

Receptors

8.42 The nearest existing and future SRs to the Site which may be affected by the Development are shown in **Table 8.8** and **Figure 8.2.** The dominant noise source was constant vehicular traffic on St. Thomas Street / Borough High Street. Contributory noise from aircraft movements (approximately one plane every 10 minutes going over the Site) and distant mainline railways were audible. Where a number of receptors are located close to the Works the closest and hence worst effected has been included.

Table 8.8: Sensitive Receptors

Receptor	Receptor Type	Description / Name	Approximate Distance to Site Boundary, *m*
SRA	Residential	4-6 London Bridge Street	45m North
SRB	Future Residential	Shard Place, 28 London Bridge Street	35m North East
SRC	Hospital	Guy's Hospital and associated buildings including Guy's Chapel	12m East
SRD	Residential on Upper Floors	Bunch of Grapes, 2 St. Thomas Street	12m West
SRE	Residential on Upper Floors	The Old King's Head, 47-49 Borough High Street	10m South
SRF	Student Halls	Iris Brook House / Orchard Lisle House	12m South
SRG	Amenity Space	Guy's Hospital Courtyard	30m South East
SRH	Amenity Space	Iris Brook House Courtyard	40m South
SRI	Amenity Space	Guy's Hospital Forecourt	25m East
SRJ	Residential on Upper Floors	43 Borough High Street	10m West

8.43 SRs that lie further away would, due to distance and potentially screening effects, be exposed to lower noise levels than the SRs presented in **Table 8.8**. Should the significance of effects be acceptable for the nearest SRs, it is automatically assumed that it will also be for those located at greater distance from the Site.

Baseline Noise Surveys

8.44 The noise monitoring locations are shown on **Figure 8.1** and described in **Table 8.9**. A summary of the measured daytime (07:00 to 23:00) and night-time (23:00 to 07:00) noise levels at these locations are presented in **Table 8.10**, with full results displayed graphically in time-history format in **Appendix 8.2**.

Table 8.9: Noise Monitoring Locations

Monitoring Location[1]	Description	Observations and Predominant Noise Sources
LT1	Façade measurement taken at rooftop level on the northern Site boundary overlooking St. Thomas Street	Noise climate dominated by constant vehicular traffic on St. Thomas Street/Borough High Street. Contributory noise from nearby construction activities[2], as well as noise from flying aircraft movements (approximately one plane every 10-minute going over the Site) and distant mainline railway noise was audible.
LT2	Façade measurement taken at rooftop level on the southern Site boundary overlooking King's Head Yard.	
ST1	Façade measurement taken at ground level on the northern Site boundary fronting St. Thomas Street.	Noise climate dominated by constant vehicular traffic on St. Thomas Street. Contributory noise from nearby construction activities, as well as noise from flying aircraft movements (approximately one plane every 10-minute going over the Site) and distant mainline railway noise was audible.
ST2	Façade measurement taken at ground level on the eastern Site boundary fronting Talbot Yard.	
ST3	Façade measurement taken at ground level on the southern Site boundary fronting King's Head Yard.	Noise climate dominated by constant vehicular traffic on Borough High Street. Contributory noise from nearby construction activities, as well as noise from flying aircraft movements (approximately one plane every 10-minute going over the Site) and distant mainline railway noise was audible.
ST4	Façade measurement taken at ground level on the western Site boundary fronting carpark / service yard.	

Note: [1]LT – Long Term; ST – Short Term;

Table 8.10: Summary of Measured Baseline Noise Levels

Monitoring Location (Table 8.7)	Period	Duration	$L_{Aeq,T}$, dB	$L_{AFmax,T}$, dB	$L_{A10,T}$ dB	$L_{A90,T}$ dB
			Average[1]	90th %tile	Average[2]	Average[3]
LT1	Day	12 hour	64	81	65	58
	Evening	4 hour	62	80	63	58
	Night	8 hour	60	77	61	54
LT2	Day	16 hour	61	78	62	58
	Evening	4 hour	62	77	63	60
	Night	8 hour	58	74	59	54
ST1	Day	35 min	70	85	68	58
ST2	Day	30 min	55	70	56	53
ST3	Day	20 min	56	77	59	53
ST4	Day	30 min	59	76	60	56

Notes: [1]Logarithmic average of measured values [2]Arithmetic average of measured values [3]Modal value of data sets

8.45 The average measured daytime noise levels at LT1 during the weekend period were slightly lower (approximately 2 to 3dB lower) when compared to the weekday measured noise levels for the L_{Aeq}, L_{A10} and L_{A90} parameters. The measured night-time noise levels were comparable for both the weekday and weekend period. Full analysis details are presented in **Appendix 8.2.**

8.46 The average measured daytime noise levels at LT2 during the weekend period were 2dB lower when compared to the weekday measured noise levels for the L_{Aeq}, L_{A10} and L_{A90} parameters. There was no difference between the average measured night-time noise levels for the weekday and weekend periods.

8.47 The Site is situated in an urban location adjoining the strategic road network with transportation noise being the dominant noise source. Prevailing ambient noise levels during both the weekday and weekend periods are comparable as illustrated in the time history plots presented in **Appendix 8.2**.

Baseline Vibration Surveys

8.48 On Monday 17 October 2016 short term attended vibration measurements were undertaken at two key locations (as shown in **Figure 8.1**) to determine the magnitude of existing vibration from train passes on underground lines beneath the north-western corner of the Site for a representative sample of train events.

8.49 Vibration measurements were undertaken using a calibrated Rion DA-20 waveform recorder (*Serial Number: 11160666*) with PV-87 high sensitivity accelerometers (*Serial Numbers: x-axis 23749; y-axis 23760; z-axis 23754*) fixed to a tri-axial mounting weighted DIN plate with ground spikes. The meter was set-up to continuously record vibration levels for each axis of vibration (*tri-axial*), the x-axis positioned perpendicular to the rail line for all measurements.

8.50 **Table 8.11** describes each measurement location and the predominant source of vibration.

Table 8.11: Vibration Monitoring Locations

Monitoring Location	Description	Observations and Predominant Vibration Sources
V1	Measurement taken at basement level on the western Site boundary	Trains pass-by from the Jubilee Line operating to and from London Bridge Underground Station.
V2	Measurement taken at ground floor level, north of monitoring position V1	

8.51 **Table 8.12** presents the measured maximum event VDV level in each axis. At each measurement location the highest vibration level was measured in the vertical (z) axis which has been used for assessment purpose.

Table 8.12: Summary of Measured Baseline Vibration Levels

Monitoring Location (Table 8.7)	Period	Measured VDV Level for Single Event, m/s$^{1.75}$			Estimated Number of Train Passes
		X-Axis	Y-Axis	Z-Axis	
V1	Day	0.75×10^{-3}	0.58×10^{-3}	2.4×10^{-3}	835
	Night				103
V2	Day	0.51×10^{-3}	0.42×10^{-3}	2.5×10^{-3}	835
	Night				103

Assessment of Likely Significant Effects

The Works

Noise

8.52 **Table 8.13** presents the predicted unmitigated noise levels at the selected receptors listed in **Table 8.8** during the Works.

8.53 Noise levels presented are representative of a worst-case scenario when the Works are undertaken at the closest practical point to the sensitive receptors. This is taken as being either the Site boundary or the closest existing structure to be demolished/deconstructed.

8.54 Predicted construction noise levels are based on the shortest distance of the Works to the SRs, with the significance of effect assessed against the relevant construction threshold noise level of 65-70dB $L_{Aeq,T}$ depending on receptor location. Threshold levels determined by existing ambient noise levels measured on the Site, are shown in Table 8.10. These levels are then compared with the Site noise level. If the Site noise level exceeds the appropriate category value described in in BS 5228-1:2009+A1:2014[1], then a potential significant effect is indicated.

Table 8.13: Predicted Unmitigated The Works Noise Levels dB $L_{Aeq,T}$

SR	Location	Threshold dB	Demolition	Earth-Works	CFA Piling	Concreting	Pavement
A	4-6 London Bridge Street	70	59	51	51	52	46
B	Shard Place (Fielden House)	70	82	74	74	75	69
C	Guy's Hospital including Chapel	70	91	83	83	84	78
D	Bunch of Grapes	70	91	83	83	84	78
E	The Old King's Head	65	70	62	62	63	57
F	Iris Brook House / Orchard Lisle House	65	89	81	81	82	76
G	Guy's Hospital Courtyard	65	54	46	46	47	41
H	Iris Brook House Courtyard	65	54	46	46	47	41
I	Guy's Hospital Forecourt	66	55	47	47	48	42
J	43 Borough High Street	65	70	62	62	63	57

8.55 **Table 8.14** presents the level of significance of noise effects at the nearest receptors resultant from the Works. All significant effects identified will be **temporary, local, short-term and adverse**. Three receptors including 4-6 London Bridge Street, Guy's Hospital Courtyard and Iris Brook House Courtyard are predicted to experience Negligible effects throughout the duration of the Works. The Old King's Head would experience Negligible effects except during the demolition works.

Table 8.14 Significance of Unmitigated Demolition and Construction Noise Effects

SR	Location	Demolition	Earth-Works	CFA Piling	Concreting	Pavement
A	4-6 London Bridge Street	Negligible	Negligible	Negligible	Negligible	Negligible
B	Shard Place (Fielden House)	Major Adverse	Minor Adverse	Minor Adverse	Moderate Adverse	Minor Adverse
C	Guy's Hospital including Chapel	Major Adverse	Major Adverse	Major Adverse	Major Adverse	Major Adverse
D	Bunch of Grapes	Major Adverse	Major Adverse	Major Adverse	Major Adverse	Major Adverse
E	The Old King's Head	Moderate Adverse	Negligible	Negligible	Negligible	Negligible
F	Iris Brook House / Orchard Lisle House	Major Adverse	Major Adverse	Major Adverse	Major Adverse	Major Adverse
G	Guy's Hospital Courtyard	Negligible	Negligible	Negligible	Negligible	Negligible
H	Iris Brook House Courtyard	Negligible	Negligible	Negligible	Negligible	Negligible
I	Guy's Hospital Forecourt	Negligible	Negligible	Negligible	Negligible	Negligible
J	43 Borough High Street	Moderate Adverse	Negligible	Negligible	Negligible	Negligible

8.56 It should be noted that in reality the Works will be transient in nature, with most works taking place at locations significantly removed from the Site boundary. Nonetheless, given that some potential effects of moderate to major significance have been predicted, mitigation measures will be required and are discussed in the relevant section below.

Vibration

8.57 During the Works, vibration impacts could arise at nearby premises when vibration generating activities are carried out. These activities include the breaking up of concrete slabs during demolition and piling. Based on **Tables 8.3** and **8.4**, there is the potential for adverse effects to occur at premises located within 15m of the works.

8.58 Receptors SR A, SR B and SR F are located in excess of 15m from the Site boundary and therefore **Negligible** vibration effects are anticipated due to the distance from the Works. This statement is based on the method of piling, being Continuous Flight Auger (CFA), which is the method which gives rise to the lowest levels of vibration. There is the potential for adverse

vibration effects to occur at SR C, SR D and SR E due to their proximity to the Site boundary. The significance of the effect will be dependent on type and distance of works to the receptor. As such, there is the potential for **local**, **short term, adverse** effects of **minor significance** to arise at these locations.

8.59 The potential for building damage arising from the Works is considered to be **Negligible** at all SRs located at a distance ≥10 metres, based on use of CFA piling method. Where piling or breaking up of concrete slabs is undertaken at a distance of less than 10 metres there is the potential for **local, permanent**, **adverse** effects of **minor significance**.

8.60 As previously described with regard to potential damage to any utilities and listed buildings / structures, provided vibration is ≤7.5mm/s (derived from BS5228-2 advice) the potential effect is Negligible. For all other buildings, a vibration level of ≤10mm/s is Negligible with regard to building damage. In line with this guidance the potential for damage to listed structures and rail infrastructure is considered to be **Negligible** where distance of works is ≥10 metres. Where vibration generating works are taking place within 10m of listed buildings there is the potential for **adverse** effects to occur of **minor or above significance**. This will need to be reviewed once specific detail of plant and construction activities is known. Potential mitigation measures to control the effects of construction vibration upon listed structures are discussed within the mitigation section of this chapter.

Works Traffic

Construction Traffic Noise

8.61 In addition to construction plant operating on the Site, there will be some movement of materials to and from the Site by road, though these are predicted to be low in relation to existing road traffic flows. The peak daily two-way movement is forecast to be during the piling and excavation works with 62 Heavy Goods Vehicles (HGV) per day. Peak levels of noise or vibration arising from construction vehicles will not be any greater than can presently arise from existing heavy-duty vehicle movements on the existing roads. Further to this the increase in base flows resultant from the Work traffic on the existing road network will be less than 10% increase and therefore will give rise to an increase in road traffic noise of less than 1dB(A) and therefore is **Negligible**.

Completed and Operational Development

Fixed External Plant & Building Services

8.62 Any items of fixed external plant and building services associated with the operation of the Development will have the potential to generate noise. At this stage in the design, specific details of the plant associated with the Development are not yet known. Consequently, suitable limits to which plant should adhere have been recommended to safeguard existing amenity and are presented in **Table 8.15.**

Table 8.15: Plant Noise Emission Limits

SR	Location	Period	Representative $L_{A90,5min}$	Plant Noise Emission Limit, $L_{Aeq,t}$
A	4-6 London Bridge Street	Daytime (07:00 – 23:00)	58	48
		Night Time (23:00 – 07:00)	54	44
B	Shard Place	Daytime (07:00 – 23:00)	58	48
		Night Time (23:00 – 07:00)	54	44
C	Guy's Hospital including Chapel	Daytime (07:00 – 23:00)	58	48
		Night Time (23:00 – 07:00)	54	44
D	The Bunch of Grapes	Daytime (07:00 – 23:00)	58	48
		Night Time (23:00 – 07:00)	54	44
E	The Old King's Head	Daytime (07:00 – 23:00)	58	48
		Night Time (23:00 – 07:00)	54	44
F	Iris Brook House / Orchard Lisle House	Daytime (07:00 – 23:00)	58	48
		Night Time (23:00 – 07:00)	54	44
G	Guy's Hospital Courtyard	Daytime (07:00 – 23:00)	58	48
		Night Time (23:00 – 07:00)	54	44
H	Iris Brook House Courtyard	Daytime (07:00 – 23:00)	58	48
		Night Time (23:00 – 07:00)	54	44
I	Guy's Hospital Forecourt	Daytime (07:00 – 23:00)	58	48
		Night Time (23:00 – 07:00)	54	44
J	43 Borough High Street	Daytime (07:00 – 23:00)	58	48
		Night Time (23:00 – 07:00)	54	44

8.63 The recommended plant noise emission limits have regard to the results of the baseline noise survey and the noise requirements of LBS, thereby ensuring the acoustic acceptability of plant that may be introduced as part of the Development.

8.64 Based on the above noise emission limits for new building plant being achieved (and potentially being controlled by a standard planning condition), noise generated from new building plant will have a **Negligible** effect on surrounding existing and future SRs.

Commercial Uses and Servicing Noise

8.65 An assessment of predicted noise levels has been undertaken based on peak HGV movements, as provided by TPP within servicing areas at St. Thomas Street and White Hart Yard. Results of this assessment are shown in **Table 8.16**.

8.66 It should be noted that the servicing area for the Development is enclosed at ground floor level, with access off. Access to the service area is off White Hart Yard and St. Thomas Street. The majority of SRs are completely screened from access routes to and from the service yard areas except Guy's Hospital to St. Thomas Street service area and Iris Brook House and Orchard Lisle House to White Hart Yard.

Table 8.16: Predicted Servicing Noise Levels & Significance of Effect

SR Position	Measured Ambient Noise Level, dB		Predicted Servicing Noise at 1m from SR, dB		Noise Level Increase due to Servicing Noise		Significance of Level Difference	
	Day	Night	Day	Night	Day	Night	Day	Night
St. Thomas Street Deliveries								
SR A	64	60	25	25	0	0	Negligible	
SR B			25	25	0	0		
SR C			52	51	0.3	0.5		
SR D			53	52	0.3	0.6		
SR E	61	58	Negligible		0	0		
SR F					0	0		
SR G					0	0		
SR H					0	0		
SR I					0	0		
SR J					0	0		
White Hart Yard Deliveries								
SR A	64	60	Negligible		0	0	Negligible	
SR B					0	0		
SR C					0	0		
SR D					0	0		
SR E	61	58	53	50	0.7	0.6		
SR F			14	11	0	0		
SR G			13	9	0	0		
SR H			15	12	0	0		
SR I			13	9	0	0		
SR J			53	50	0.7	0.6		

8.67 Due to screening and distance attenuation, the effects resultant from delivery and servicing noise associated with the Development are predicted to be **Negligible** at all SRs when assessed against the significance criteria set out in **Table 8.6**.

8.68 It is not possible at this stage to predict effects from the non-office elements of the Development as specific details of these elements are not known. The assumption however is that planning controls will be in place to control potential adverse effects so that they are **Negligible**.

Environmental Vibration

8.69 Predicted day and night-time Vibration Dose Value (VDV) levels have been predicted based on measured maximum VDV event level and number of train movements derived from the timetable and are presented in **Table 8.17.**

Table 8.17 Predicted Day and Night VDV Values

Monitoring Location	Period	Estimated Number of Train Passes	Maximum Vertical VDVd, $m/s^{1.75}$
V1	Day	835	0.013
	Night	103	0.008
V2	Day	835	0.013
	Night	103	0.008

8.70 **Table 8.18** presents the predicted VDV values at the first four floors of the Development and are based on transfer functions described in Association of Noise Consultants (ANC) Guidelines[9]: Measurement and Assessment of Groundborne Noise and Vibration and the floor by floor attenuation described in UK Transportation Noise Reference Book[10].

Table 8.18: Predicted Building VDV Levels

Monitoring Location	Measured Z-Axis VDV Level, $m/s^{1.75}$	Predicted VDV Level, $m/s^{1.75}$				
		Ground Floor	First Floor	Second Floor	Third Floor	Fourth Floor
V 1	0.013	0.013	0.018	0.013	0.009	0.007
V 2	0.013	0.013	0.018	0.013	0.009	0.007

8.71 All of the predicted VDV levels are below the level of low probability of adverse comment within office buildings (refer to **Table 8.7**). On this basis vibration arising from the LUL Jubilee Line which passes under the north-western corner of the Site should not adversely affect the proposed commercial use of the Site.

8.72 An additional assessment has been undertaken of the potential for structure-borne noise based on measured VDV Values and based on attenuation and amplification factors taken from the *UK Transportation Noise Reference Book.* The predicted structure borne noise levels are presented as **Table 8.19**.

Table 8.19: Predicted Structure-borne Noise

Monitoring Location	Predicted Z-Axis structure-borne noise, dB L_{ASmax}				
	Ground Floor	First Floor	Second Floor	Third Floor	Fourth Floor
V 1	30	27	24	21	18
V 2	19	16	14	11	9

8.73 Open plan office space is located on second floor and above within the Development. The BS8233:2014 guideline internal ambient noise level criteria for open plan offices is $L_{Aeq,t}$ 40-45 dB. Structure-borne noise L_{ASmax} levels presented in **Table 8.18** are therefore considered to be **Negligible** when compared against these criteria.

Mitigation Measures and Likely Residual Effects

The Works

8.74 Measures to control the noise and vibration effects from the Works will be incorporated into a Site Environmental Management Plan (SEMP). This SEMP will have regard to appropriate legislation, guidance and measures to minimise construction noise, including but not limited to:

- Application of the principle of Best Practical Means (BPM) as defined in Section 72 of the Control of Pollution Act 1974, 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 is known to generate significant levels of noise then it is to be used sparingly and the construction activity closely monitored to minimise noise levels.
- All plant brought on to Site should comply with the relevant EC / UK noise limits applicable to that equipment. 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 SRs 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.
- The use of tower cranes for vertical transportation to reduce noise and vibration.
- Adoption of a noise monitoring regime and the establishment of noise Action Levels in consultation with LBS, above which consideration will 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 area.
- Implementation of a Construction Logistics Plan (CLP) to pre-plan and manage traffic associated with the works to minimise disturbance to SRs.

8.75 Accounting for the implementation of mitigation, as outlined above, **Table 8.20** summarises the predicted mitigated Works noise levels with the significance of these presented in **Table 8.21**. It should be noted that when works are being undertaken in close proximity to SRs C and D, then it is assumed that deconstruction will be adopted rather than normal demolition methods where appropriate and practical and that enhanced mitigation such as provision of localised screening will be employed when works are being undertaken in close proximity to all SRs, affording up to 15dB attenuation for earthworks, CFA piling and concreting operations.

Table 8.20: Predicted Mitigated[2] Noise Levels dB L_{Aeq} during the Works

SR	Location	Threshold dB	Demolition	Earth-Works	CFA Piling	Concreting	Pavement
A	4-6 London Bridge Street	70	44	36	36	37	31
B	Shard Place	70	65	57	57	58	52
C	Guy's Hospital including Chapel	70	70-75	68	68	69	63
D	Bunch of Grapes	70	70-75	68	68	69	63
E	The Old King's Head	65	55	47	47	48	42
F	Iris Brook House / Orchard Lisle House	65	74	66	66	67	61
G	Guy's Hospital Courtyard	65	39	31	31	32	26
H	Iris Brook House Courtyard	65	39	31	31	32	26
I	Guy's Hospital Forecourt	66	40	32	32	33	27
J	43 Borough High Street	65	55	47	47	48	42

Note: [1]Assumed that deconstruction methods are employed thereby affording attenuation to ensure short term noise level of 75dB $L_{Aeq,15\ minutes}$ is not exceeded together with 70dB $L_{Aeq,10\ hr}$. [2] Enhanced mitigation affording 15dB attenuation when compared to unmitigated noise levels when works undertaken proximate (within 15 metres) to SR. [3] Standard demolition techniques being used adjacent to SRF, and so a short-term exceedance of LBS criteria is expected

Table 8.21: Significance of Mitigated Demolition and Construction Noise Effects

SR	Location	Demolition	Earth-Works	CFA Piling	Concreting	Pavement
A	4-6 London Bridge Street	Negligible	Negligible	Negligible	Negligible	Negligible
B	Shard Place	Negligible	Negligible	Negligible	Negligible	Negligible
C	Guy's Hospital including Chapel	Moderate Adverse	Negligible	Negligible	Minor Adverse	Negligible
D	Bunch of Grapes	Moderate Adverse	Negligible	Negligible	Minor Adverse	Negligible
E	The Old King's Head	Negligible	Negligible	Negligible	Negligible	Negligible
F	Iris Brook House / Orchard Lisle House	Moderate Adverse	Minor Adverse	Minor Adverse	Minor Adverse	Negligible
G	Guy's Hospital Courtyard	Negligible	Negligible	Negligible	Negligible	Negligible
H	Iris Brook House Courtyard	Negligible	Negligible	Negligible	Negligible	Negligible
I	Guy's Hospital Forecourt	Negligible	Negligible	Negligible	Negligible	Negligible
J	43 Borough High Street	Negligible	Negligible	Negligible	Negligible	Negligible

8.76 Based on the implementation of mitigation measures as detailed above, the likely residual effects from construction noise are assessed as **Negligible** at all SRs apart from SRC, SRD & SRF. This conclusion is predicated on the basis that all on-Site plant activities operate simultaneously at the shortest distance to the SR, a situation which in practice is seldom likely to occur. This assessment therefore represents a worst-case scenario. As such, for the majority of the construction phase potential impacts will be **Negligible** to, at worst, a **temporary local adverse** effect of **moderate significance**.

Works Vibration

8.77 With regards to the potential effects of construction generated vibration on SRs, agreed vibration limits will be set to ensure compliance with national standards and, hence, minimise the risk of complaints or building damage. These limits will be controlled through the implementation of a SEMP and planning conditions as required. Consequently, residual vibration levels are anticipated to be reduced to a level that is **Negligible.**

8.78 With regards to the potential effects of construction generated vibration on listed buildings, utilities and the Jubilee Line as previously described, the potential for damage to listed structures and rail infrastructure is considered to be **Negligible** where distance of works is ≥10 metres from the

receptor. However, where listed structures and rail assets are located within 10 metres of piling or breaking up of concrete slabs mitigation including the use of low vibration generating techniques should be considered to ensure vibration levels at these locations do not exceed 10mm/s.

8.79 Monitoring of vibration should also be undertaken, where necessary, to ensure vibration levels at these receptors do not exceed 10mm/s when piling works are being undertaken within 10m. Given this level is not exceeded, effects are expected to be **Negligible.**

Works Traffic Noise

8.80 Although **Negligible** effects are predicted to arise from construction related traffic noise, due to the small percentage increase in base flows, a Construction Logistics Plan (CLP) will be implemented. The CLP will pre-plan and manage traffic associated with the Works as far as practically possible to minimise any potential disturbance to local-residents and businesses from noise associated with road-going vehicles, including haulage vehicles.

8.81 Following the application of the principle of BPMs and implementation of a Site-specific CLP, the likely residual effects from construction traffic are expected to remain **Negligible**.

Completed Development

Building Services Plant Noise

8.82 Mitigation for building services plant may include the following measures:

- procurement of ‘quiet’ non-tonal plant;
- locating plant and air vents away from SRs;
- use of acoustic enclosures;
- use of in-duct attenuators; and
- use of acoustic louvres.

8.83 Provided appropriate mitigation measures are implemented to achieve the recommended noise limits set out in **Table 8.15** either through specification of plant and / or the use of the above attenuation measures, the likely residual noise effects of building services plant associated with the Development are likely to be **Negligible.**

Commercial Uses and Servicing Noise

8.84 During the detailed design stages of the Development, the sound insulation performance requirements of the external building fabric will be appropriately specified to control noise break-out, having regard to the nature of future uses. Noise from commercial uses will be subject to standard controls that could be secured through planning conditions. The likely residual noise effects associated with commercial uses of the Development on existing and future sensitive receptors are expected to be **Negligible**.

8.85 Despite predicted potential impacts arising from servicing and delivery being Negligible, a Delivery, Servicing and Waste Plan (DSWP) is proposed to be implemented to manage the arrival and departure of delivery and servicing vehicles and their activities when on-site. It will assist in mitigating noise emissions from this source. This may 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.

8.86 With the implementation of the DSWMP, the likely residual effects of noise from the servicing and deliveries within the Development will be **Negligible**.

Environmental Vibration

8.87 Based on results of the vibration survey and subsequent predictions of VDV and structure-borne noise, as previously discussed, the indication is that mitigation is not required for the Development given the results are below the level of low probability of adverse comment within office buildings.

Summary

8.88 **Table 8.22** presents a summary of the likely significant effect resultant from the Development together with proposed mitigation and likely residual effects.

Table 8.22: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue		Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works				
Noise	*SR A*	**Negligible**	Adoption of BPM mitigation measures which will be outlined in the SEMP as well as noise and vibration limits. The SEMP is expected to be secured by planning condition. Monitoring of Site vibration levels when piling within 10m of listed buildings, utilities or LUL lines.	**Negligible**
	SR B	**Local, temporary, short to medium term effects of minor to major adverse significant**		**Negligible**
	SR C	**Local, temporary, short to medium term effects of major adverse significant**		**Negligible to Local, temporary, short to medium term effects of moderate adverse significance**
	SR D	**Local, temporary, short to medium term effects of major adverse significant**		**Negligible to Local, temporary, short to medium term effects of moderate adverse significance**
	SR E	**Negligible, except during demolition where local, temporary, short to medium-term effects of moderate adverse significance**		**Negligible**
	SR F	**Local, temporary, short to medium term effects of major adverse significant**		**Negligible to local, temporary, short to medium term effects of moderate adverse significance**
	SR G	**Negligible**		**Negligible**
	SR H	**Negligible**		**Negligible**
	SR I	**Negligible**		**Negligible**
	SR J	**Negligible**		**Negligible**
Vibration		**Negligible to local, temporary, short to medium term effects of minor adverse significant**		**Negligible**
Traffic Noise		**Negligible**	Adoption of a CLP	**Negligible**
Completed and Operational Development				
Building Services Plant Noise		**Negligible**	Plant noise limit secured through planning condition.	**Negligible**
Commercial Uses and Servicing Noise		**Negligible**	Building envelope and Delivery, Servicing and Waste Plan (DSWP)	**Negligible**

Monitoring

8.89 Monitoring of Site of vibration should be undertaken when piling works are being carried out within 10m of listed buildings, utilities and LUL lines. Monitoring will ensure vibration at these assets does not exceed 10mm/s.

8.90 The Development will be subject to a SEMP which is anticipated to be secured by means of a planning condition. The SEMP, which will be agreed prior to the commencement of the work with LBS, will include a requirement for ongoing noise and vibration monitoring during the works.

8.91 It is anticipated that there will be a planning condition which states the plant noise limits and requires monitoring to ensure these limits are adhered to.

8.92 As stated in **Chapter 7: Transportation and Access**, monitoring will be undertaken of the delivery and servicing vehicles in terms of arrival profile and dwell times.

References

1 British Standard (BS) 5228:1 (2014) +A1 2014: Code of practice for noise and vibration control on construction and open sites, Part one: Noise, BSI, Great Britain

2 British Standard (BS) 5228:2, 2009. Code of practice for noise and vibration control on construction and open sites, Part Two: Vibration, BSI, Great Britain.

3 Department of Transport (1988) Calculation of Road Traffic Noise, HMSO

4 British Standard (BS) (2014) BS414 'Methods for rating and assessing industrial and commercial sound. BSI. Great Britain.

5 Nosie Advisory Council, 1978, '*A Guide to the Measurement and Prediction of the Equivalent Continuous Sound Level Leq*'

6 LBS (2016) Technical Guidance for Demolition and Construction Guidance document for all developers and contractors undertaking works in the Borough. LBS. Available from: https://www.southwark.gov.uk/assets/attach/3817/Technical-Guidance-for-Demolition-Construction.pdf

7 LBS (2017) London Borough of Southwark Technical Guidance for Noise. LBS. Available from: https://www.southwark.gov.uk/assets/attach/3818/Noise-Technical-Guidance-rev3-2019.pdf

8 British Standard (BS) 4142 (2014): Methods for rating and assessing industrial and commercial sound', BSI, Great Britain.

9 Rupert Taylor (2012) Association of Noise Consultants Guidelines: Measurement and assessment of ground borne noise and vibration. ANC.

10 Paul Nelson (1987) Transportation Noise Reference Book. Butterworth-Heinemann Ltd

9. Air Quality

Introduction

9.1 This chapter, prepared by Waterman Infrastructure & Environment (Waterman IE), presents an assessment of the likely air quality effects of the Development from changes in transport emissions associated with the operational Development. Information on the transport trips have been provided by Transport Planning Practice Limited (TPP).

9.2 A description of the assessment methodology, a description of the relevant baseline conditions of the Site and surrounding area and an assessment of the likely significant effects of the Development, that could arise during demolition, deconstruction, refurbishment and construction (the 'Works') and once the Development is completed and operational is presented in this chapter. Where appropriate, mitigation measures are identified to avoid, reduce or offset adverse effects and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are also described.

9.3 This chapter is accompanied by the following appendices, presented in **ES Part 4**:

- **Appendix 9.1**: Previous Correspondence with London Borough of Southwark (LBS);
- **Appendix 9.2**: Air Quality Assessment Detailed Methodology; and
- **Appendix 9.3**: Air Quality Neutral Assessment.

Assessment Methodology and Significance Criteria

Assessment Methodology

Consultation

9.4 As well as the EIA Scoping Report (submitted in August 2018), EIA Scoping Opinion (dated 4 October 2018) and further informal scoping request submitted in February 2021 (described in **Chapter 2: EIA Methodology**), consultation was previously undertaken with the Environmental Health Department at LBS to confirm the methodology to be used within the air quality assessment (see **Appendix 9.1**).

Establishing Baseline Conditions

9.5 To establish baseline conditions at and around the Site, information has been taken from a review of LBS' Air Quality Updating and Screening Assessment and Progress Reports[1], published as part of the Local Air Quality Management (LAQM) regime. It was previously agreed with the Principal Enforcement Officer within the Environmental Health Department at LBS in May 2018 that site specific diffusion tube baseline NO_2 monitoring was not required (see **Appendix 9.1**).

Assessment of Likely Significant Air Quality Effects

9.6 This section of this chapter outlines the methodology used to assess the likely significant air quality effects arising from the Works and the completed and operational Development.

9.7 This air quality assessment has been undertaken using a variety of information and procedures, and professional judgement, as follows:

- review of the local area to identify potentially sensitive receptor locations that could be affected by changes in air quality due to the Development;
- identification of air quality sensitive receptors within the Site, to determine the air quality conditions to which future users of the Development would be exposed;
- review and use of relevant traffic flow and car park data from the Applicant's transport consultant (TPP), which inherently accounts for traffic flows relating to the schemes considered within the cumulative effect's assessment (**Chapter 14**);
- Dispersion modelling of pollutant emissions using the ADMS-Roads model[2] to predict the likely pollutant concentrations at the Site and surrounding area; and the likely effect of the complete and operational Development on local air quality from additional traffic emissions. Version 8.1 of the NO_X Calculator, is available from the LAQM Support website[3] and has been applied to derive the road-related NO_2 concentrations from the modelled NO_X concentrations;
- comparison of the predicted air pollutant concentrations with monitored concentrations from three LBS diffusion tubes. The tubes are located on Lamppost No 02 on Borough High Street (SDT 81), Lamppost No 01 Adjacent to 125 Borough High St (SDT 82), and Little Dorritt Park Entrance Lamppost No 8 (SDT 84) located approximately 45m, 170m and 360m from the Site boundary respectively. Adjustment of the model results was then undertaken, details are provided in **Appendix 9.2**);
- determination of the effects of the operational phase of the Development on air quality, based on the application of the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) significance criteria[4] to modelled results;
- qualitative assessment of the likely effects of the proposed activities during the Works;
- an Air Quality Neutral Assessment has been completed which compares the Development against the relevant building emissions benchmarks to determine whether the Development is Air Quality Neutral. This concludes the Development would be Air Quality Neutral and that no further mitigation measures are required. Details are provided in **Appendix 9.3**; and
- identification of mitigation measures, where appropriate.

9.8 The UK Air Quality Strategy (AQS) identifies the pollutants associated with road traffic emissions and local air quality as:

- Nitrogen oxides (NOx);
- Particulate matter (as PM_{10} (particles with a diameter up to 10µm) and $PM_{2.5}$ (particles with a diameter up to 2.5µm));
- Carbon monoxide (CO);
- 1, 3-butadiene (C_4H_6); and
- Benzene (C_6H_6).

9.9 Emissions of total NO_x from motor vehicle exhausts comprise nitric oxide (NO) and nitrogen dioxide (NO_2). NO oxidises in the atmosphere to form NO_2. The most significant pollutants associated with road traffic emissions, in relation to human health, are NO_2 and particulate matter (PM_{10} and $PM_{2.5}$). This assessment therefore focuses on NO_2 and particulate matter (PM_{10} and $PM_{2.5}$).

The Works

Dust Emissions

9.10 In line with the Mayor of London Control of Dust and Emissions Supplementary Planning Guidance (SPG)[5], the assessment of the effects of the activities undertaken during the Works in relation to dust has been based on the IAQM's Guidance on the Assessment of Dust from Demolition and Construction[6] (the 'IAQM Guidance') and the following:

- 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.

9.11 The SPG identifies receptors within 350m of the Site boundary, and within 50m of construction routes would be sensitive to emissions and nuisance dust from construction activities. **Figure 9.1** shows the area surrounding the Site where sensitive receptors could be affected. **Table 9.3** presents the location of individual sensitive receptors assessed for the operational phase of the Development.

9.12 Following the SPG, construction activities can be divided into the following four distinct activities:

- Demolition - any activity involved in the removal of an existing building, including any deconstruction;
- Earthworks – the excavation, haulage, tipping and stockpiling of material, but may also involve levelling the site and landscaping;
- Construction – any activity involved with the provision of a new structure; and
- Trackout – the movement of vehicles from unpaved ground on a site, where they can accumulate mud and dirt, onto the public road network where dust might be deposited.

9.13 The SPG considers three separate dust effects, within 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.

9.14 In accordance with the SPG, to determine the risk of the Works phase, the following four step process, as set out in **Table 9.1**, has been undertaken.

Table 9.1: Summary of the 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 would normally be required where there are 'human receptors' within 50m of the boundary of the site and / or within 50m of the route(s) used by construction vehicles on public highway, up to 350m from the site entrance or 'ecological receptors' within 50m of the boundary of the site and/or within 50m of the route(s) used by construction vehicles on public highway, up to 500m from the site entrance.

Step		Description
2.	Assess the Risk of Dust Impacts	The risk of dust arising in sufficient quantities to cause annoyance and/or health or ecological effects should be determined using four risk categories: insignificant, 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.
	a. Define the potential Dust Emission Magnitude	Classify the magnitude of the likely risk as small, medium or large for the four activities.
	b. Define the Sensitivity of the Areas	Define the sensitivity of receptors as High, Medium or Low. Define sensitivity of people to Dust Soiling Effects and define the sensitivities of people to the health effects of PM10.
	c. Define the Risk of Impacts	Combine the magnitude (as detailed in 2a) and the sensitivity (in 2b) to determine the risk of impacts with no mitigation applied. Summarise the risk of dusts impacts for the four activities in a table

9.15 Following the above air quality dust risk assessment, appropriate dust and pollution measures are provided to ensure the air quality impacts of construction are minimised and any mitigation measures employed are effective.

9.16 The potential impacts and effects of construction activities on local air quality were based on professional judgement and reference to the criteria set out in the SPG. This includes an assessment of the risk of dust effects arising from the likely construction activities, based on the magnitude of potential dust emissions and the sensitivity of the area.

Construction Vehicle Exhaust Emissions

9.17 The IAQM Guidance states that:

"Experience of assessing the exhaust emissions from on-site plant and site traffic suggests that they are unlikely to make a significant effect on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed…… For site traffic on the public highway, if it cannot be scoped out (for example by using the EPUK's criteria), then it should be assessed using the same methodology and significance criteria as operational traffic impacts"

9.18 The Applicant's construction advisors have stated the peak daily number of Heavy Goods Vehicles (HGVs) movements would peak at 62 in July 2023. As presented in **Chapter 7: Transport and Access** the Works result in a change of 26 AADT Heavy Duty Vehicles (HDV) on St Thomas Street and a change of less than 25 AADT HDV flows on all other links. In line with the EPUK/IAQM Guidance, a quantitative assessment of construction vehicle exhaust emissions can therefore be scoped out (using the same approach as the 2018 Scheme) as the construction phase would not cause a significant change in HDV flows on local roads. As such a qualitative

assessment of the exhaust emissions from construction traffic is appropriate and has been undertaken.

Construction Plant Emissions

9.19 In accordance with Part 7 of the Mayor of London Control of Dust and Emissions SPG, all construction plant would need to adhere to the emissions standards for NO_2 and PM_{10} set out for Non-Road Mobile Machinery (NRMM). As such, in line with the IAQM Guidance, it is considered that an assessment is not required.

Completed and Operational Development

ADMS Model

9.20 The likely impacts on local air quality from traffic emissions have been assessed using the atmospheric dispersion model ADMS-Roads. **Appendix 9.2** presents the details of the dispersion modelling.

9.21 For the purposes of modelling, traffic data for the relevant local road network and car park trips, was provided by TPP. Further details are provided in **Appendix 9.2**. At the time of writing a number of restrictions are in place in England in response to COVID-19, subsequently levels of road traffic are significantly lower than would be expected once the Development is completed. As such, it is considered that any survey works completed at this time would not be representative of typical baseline conditions with respect to the air quality. Therefore, the assessment has based upon the previous traffic surveys completed in 2018.

9.22 The year 2019 has been used to assess the baseline, as this is the latest year of available air quality monitoring data available from LBS contained in the public domain. The year 2026 was used for the 'without Development' and 'with Development' scenarios, which is the anticipated year of completion of the Development.

9.23 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 anticipated completion year, using background data and vehicle emission rates for 2026 as inputs. For the verification assessment (referred to later in this Chapter), background data and vehicle emission rates for 2019 have been used, which would be higher than the 2026 data. Pollutant concentrations have been modelled at locations representative of nearby sensitive receptors.

9.24 Full details of the dispersion modelling study, including the road traffic data used in the assessment, are presented within **Appendix 9.2**.

Model Uncertainty

9.25 Analyses of historical monitoring data by Defra[7] 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. In February 2020, Air Quality Consultants Limited published a report on Performance of Defra's Emission Factor Toolkit 2013-2019[8]. The report concluded that recent analysis of recent NO_X measurements provides evidence that vehicle controls are working and, as a result, the Emission Factor Toolkit (EFT) is now

reflecting the rate of observed reductions. This air quality assessment has been undertaken using the latest emission factors published by Defra in the EFT version 10, which accounts for the uptake of low carbon passenger cars and light good vehicles with electric and hybrid electric propulsion systems.

Background Pollutant Concentrations

9.26 To estimate the total concentrations due to the contribution of any other nearby sources of pollution, background pollutant concentrations need to be added to the modelled concentrations. Full details of the background pollution data used within the air quality assessment are included in **Appendix 9.2**.

Model Verification

9.27 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 2019, with the 2019 results from the LBS diffusion tubes on Lamppost No 02 on Borough High Street (SDT 81); Lamppost 01 Adjacent to 125 Borough High St (SDT 82); and Lamppost 8 Little Dorritt Park Entrance (SDT 84). Modelled concentrations have then been adjusted accordingly. The verification and adjustment process are described in detail in **Appendix 9.2**.

UK Air Quality Strategy Objectives

9.28 The Government has established a set of air quality standards and objectives to protect human health. The current AQS objectives was published in July 2007[9] and sets out the objectives for Local Planning Authorities (LPA) in undertaking their LAQM duties. The AQS objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Box 1.1 of Defra's Local Air Quality Management Technical Guidance (LAQM.TG16)[10] explains the locations where these objectives apply.

9.29 The European Union (EU) also sets Limit Values for NO_2, PM_{10} and $PM_{2.5}$[11], which have been adopted by the UK[12]. The Limit Value for NO_2 is the same numerical level but the target date differs. Achievement of these values is a national obligation rather than a local obligation. In the UK, only monitoring and modelling carried out by Defra and Central Government meets the specification required to assess compliance with the Limit Values. Further, Defra and Central Government does not recognise local authority monitoring or local modelling studies when determining the likelihood of the Limit Values being exceeded. As such the Limit Values have not been considered further in the Air Quality Assessment.

9.30 The UK AQS objectives in relation to air pollutants relevant to this assessment are summarised in **Table 9.2**.

Table 9.2: National Air Quality Strategy Objectives

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

Note: (a) Particulate matter with a mean aerodynamic diameter less than 10 microns (or micrometres – µm)
(b) Particulate matter with a mean aerodynamic diameter less than 2.5 microns

Potentially Sensitive Receptors

9.31 The approach adopted by the UK AQS is to focus on locations at, and close to, ground level where members of the public (in a non-workplace area) are likely to be exposed over the averaging time of the objective in question (i.e. over 1-hour, 24-hour or annual periods). Objective exceedances principally relate to the annual mean NO_2 and 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.

9.32 **Table 9.3** presents worst-case existing (R) and proposed (P) sensitive receptors selected due to their proximity to the road network and location of the proposed heating and energy plant flues. The locations of the selected receptors assessed are located at ground floor level and presented in **Figure 9.2**.

Table 9.3: Selected Receptor Locations

Receptor		Classification	Grid Reference	Height Above Ground (m)	Approximate Distance and Direction from Stack
ID	Address				
R1	Orchard Lisle House	Student	532749, 180109	0	30m South
R2	Orchard Lisle House	Student	532708, 180105	0	50m South
R3	Boland House	Student	532821, 180095	0	85m Southeast
R4	Guy's Hospital	Hospital	532857, 180054	0	135m Southeast
R5	The Shard	Residential	532863, 180114	0	115m East
R6	Nuffield House	Residential	532724, 179952	0	190m South
R7	26 Park Street	Residential	532472, 180261	0	280m West

Receptor		Classification	Grid Reference	Height Above Ground (m)	Approximate Distance and Direction from Stack
ID	Address				
R8	21 Park Street	Residential	532475, 180218	0	265m West
R9	31-41 Park Street	Residential	532446, 180288	0	315m West
R10	St. Thomas Church	Residential	532748,180184	0	15m North
R11	2 St. Thomas Street	Residential	532714,180174	0	5m West
R12	70 Southwark Bridge Road	Residential	532248, 179980	0	500m Southwest
R13	Ilfracombe Flats	Residential	532770, 179867	0	525m Southwest
R14	Maple Building	Residential	532504, 179922	3	300m Southwest
R15	57 Borough High Street	Residential	532659, 180146	3	60m Southwest
P1	Proposed: West Tower	Office	532717, 180152	137.7	-
P2	Proposed: Georgian Terrace	Office	532733, 180162	21.6	-
P3	Proposed: Terrace Level 25	Office	532760, 180126	98.3	-

Note: Receptors R2, R16, P1, and P2 are located within the London Bridge at Borough High Street TfL NO_2 Focus Area.

9.33 The public exposure of the office and retail uses of the proposed Development are only subject to short-term AQS objectives, as stated in the LLAQM Technical Guidance[1].

Significance Criteria

The Works

Dust Emissions

9.34 The potential effects of the Works on local air quality were based on professional judgement and with reference to the criteria in the Mayor of London Control of Dust and Emissions SPG set out in **Appendix 9.2**. Details of the assessor's experience and competence to undertake the dust assessment is provided in **Appendix 9.2**.

9.35 The assessment of the risk of dust effects arising from each of the construction activities as part of the Works, as identified by the SPG, 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 criteria set out in the SPG, are presented in **Table 9.4** to **Table 9.7**. Examples of the magnitude of potential dust emissions for each construction activity and factors defining the sensitivity of an area are provided in **Appendix 9.2**.

Table 9.4: 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

1 Defra (2016), 'London Local Air Quality Management (LLAQM) Technical Guidance 2016 (LLAQM.PG (16))', DEFRA, London.

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Low	Medium Risk	Low Risk	Insignificant

Table 9.5: 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	Insignificant

Table 9.6: 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	Insignificant

Table 9.7: 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	Insignificant
Low	Low Risk	Low Risk	Insignificant

9.36 The risk category determined for each of the construction activity types is used to define the appropriate and Site-specific mitigation measures that should be applied. The IAQM Guidance recommends that significance is only assigned to the effect after considering mitigation because it assumes that all actions to avoid or reduce the environmental effects are an inherent part of the Development, and that, in the case of demolition / construction, mitigation measures (secured through planning conditions, legal requirements or required by regulations) would ensure that likely significant adverse residual effects would not occur.

9.37 However, to maintain consistency with the structure of this EIA and ES, as outlined in **Chapter 2: EIA Methodology**, pre-mitigation significance criteria as outlined in **Table 9.8** have been applied which are based on professional judgement.

Table 9.8: Pre-Mitigation Significance Criteria for the Works

Significance Criteria	Definition
Adverse effect of major significance	Receptor is less than 20m from an active construction or demolition site.
Adverse effect of moderate significance	Receptor is 20m to 100m from an active construction or demolition site.
Adverse effect of minor significance	Receptor is between 100m and 350m from an active construction or demolition site.
Negligible	Receptor is over 350m from an active construction or demolition site.

9.38 IAQM outlines that experience of implementing mitigation measures for construction activities demonstrates that total mitigation is normally possible such that residual effects would not be 'significant'. Therefore, it follows that, within this assessment, no post-mitigation matrix of significance criteria is provided for the likely residual effects of the Works.

Construction Vehicle Exhaust Emissions

9.39 Using the IAQM Guidance, an assessment of construction vehicle exhaust emissions can be scoped out using the IAQM/EPUK Guidance as the construction phase would not cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads. The significance of the effects from construction vehicle exhaust emissions on air quality were therefore based on professional judgement.

Construction Plant Emissions

9.40 The significance of the effects from construction plant emissions on air quality is also based on professional judgement because all construction plant is required to meet the NRMM emissions standards for NO_2 and PM_{10}, as set out in Part 7 of the Mayor of London Control of Dust and Emissions SPG.

Completed and Operational Development

9.41 The EPUK / IAQM Guidance provides an approach to assigning the magnitude of changes because 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.

9.42 **Table 9.9** 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 9.9: Impact Descriptors for Individual Receptors for Annual Mean Objective

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	Minor	Moderate
76-94% of AQAL	Negligible	Minor	Moderate	Moderate
95-102% of AQAL	Minor	Moderate	Moderate	Major
103-109% of AQAL	Moderate	Moderate	Major	Major
110% or more of AQAL	Moderate	Major	Major	Major

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 Insignificant.
The table is only to be used with annual mean concentrations

9.43 The approach set out in the EPUK / IAQM Guidance provides a method for describing the impact magnitude at individual receptors only. The Guidance outlines that this change may have an effect on the receptor depending on the severity if the impact and other factors that may need to be considered. The assessment framework for describing impacts can be used as a starting point to make a judgement on significance of effect. However, whilst there may be 'slight', 'moderate' or 'substantial' impacts described at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances.

9.44 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.

Limitations and Assumptions

9.45 For the purposes of the assessment of dust nuisance during the Works it has been assumed that the works would be carried out at the boundary of the Site to provide a worst-case assessment.

9.46 Currently there is no methodology to assess and determine the impact of a development against the EU Limit Values. In addition, compliance with the EU Limit Values is the UK Government's responsibility given that national measures (such as vehicle scrappage schemes and increased diesel fuel prices) would be required to meet compliance. As such the effect of the Development has been assessed against the UK AQS objectives rather than the EU Limit Values.

9.47 There is no standard or recognised methodology to predict the reduction in pollutant concentrations from all air quality mitigation measures or measures likely to have a positive impact on local air quality (such as cycle spaces, electric charging points, sustainable transport options, green infrastructure etc) as these measures are either based on holistic behavioural changes and/or there is a lack of real-world quantifiable data (in µg/m^3). However, the mitigation measure and measures to benefit air quality proposed as part of the Development are consistent with those identified by LBS in their Air Quality Action Plan (discussed below) and Defra's Air Quality Plan[13]. As such the results presented in the assessment do not consider the potential reduction from these mitigation measures and are therefore considered to be worst-case.

9.48 It is understood that the Development proposes the use of air source heat pumps rather than gas fired boilers for the provision of heating and hot water. The Development would also provide two emergency generators – one for life safety and the other a tenant fit option. It is assumed that the life safety generator would be tested for a maximum of 16 hours annually and apart from testing would only be used for life safety purposes. The generator flue would be located at a suitable distance from sensitive receptors to allow for good dispersion and prevent any air quality impacts. The tenant fit out generator, if installed, would be designed to meet relevant guidance. A planning condition attached to the granting of any planning permission would ensure that emissions generated by the tenant generator would not result in an impact to local air quality. Combustion plant has therefore not been considered within the air quality assessment.

Baseline Conditions

London Borough of Southwark's Review and Assessment of Existing Air Quality

9.49 Because of work undertaken to date as part of their review and assessment of air quality process, LBS has declared the entire northern part of its Borough, from the A205 north to the boundary with the River Thames, as an Air Quality Management Area (AQMA)[2] for both annual mean NO_2 and 24-hour mean PM_{10} which are attributable to road traffic emissions. The Site is located within this AQMA.

9.50 The Site is also located in London Bridge at Borough High Street Transport for London (TfL) nitrogen dioxide (NO_2) Focus Area.

London Borough of Southwark's Local Air Quality Monitoring

9.51 LBS currently undertakes monitoring of NO_2 and PM_{10} at one roadside location and one urban background location within the Borough using automatic monitors. NO_2 is also measured at 45 locations by LBS using diffusion tubes. The nearest monitor to the Site is the kerbside diffusion tube on Borough High Street (ID – SDT81), located approximately 0.08km from the Site. The 2019 mean monitored NO_2 concentration at the SDT81 Borough High Street diffusion tube was 61.2µg/m^3, indicating the annual mean NO_2 objective of 40µg/m^3 was exceeded at the diffusion tube closest to the Site in 2019.

[2] AQMA's are declared if a local authority finds any places where the national air quality objectives are not likely to be achieved

Assessment of Likely Significant Effects

The Works

Nuisance Dust

9.52 The following construction dust assessment follows the methodology set out in **Table 9.1**.

Step 1- Site Evaluation / Screen the Need

9.53 The nearest sensitive receptors are residential properties on Borough High Street and student accommodation at White Hart Yard, located within 20m of the Site boundary. There are also residential and commercial receptors located further afield and Guy's Hospital is located approximately 100m to the east of the Site boundary. Therefore, in accordance with **Table 9.1** the assessment would proceed to detailed assessment. There are no ecological receptors within 50m of the Site boundary or the routes used by construction vehicles, therefore ecological effects have not been considered further.

Step 2 - Potential Dust Emission Magnitude

9.54 The risk of dust impacts from the Works has been considered based upon the magnitude of works as detailed in **Table A1** in **Appendix 9.2**. This includes:

- Demolition and deconstruction – It is estimated the total volume of building to be demolished would be between 20,000m^3 and 50,000m^3. Based on this and considering the criteria in **Table A1** in **Appendix 9.2**, the potential dust emissions during demolition activities would be of medium magnitude.
- Earthworks – **ES Chapter 6** states an approximate total of 23,014m^3 of excavated material is expected to be removed from the Site. Based on this and considering the criteria in **Table A1** in **Appendix 9.2**, the potential dust emissions during earthworks activities would be of large magnitude.
- Construction– the total volume of building to be constructed is greater than 100,000m^3. Based on the criteria in **Table A1** in **Appendix 9.2**, the potential dust emissions during construction activities would be of large magnitude.
- Trackout – the Applicant's construction advisors (Gardiner & Theobald) estimated the number of HGV trips during the construction period would peak at 31 outward daily trips in July 2023. Based on this and considering the criteria in **Table A1** in **Appendix 9.2**, the potential for dust emissions due to trackout activities would be of medium magnitude.

9.55 A summary of the potential dust emission magnitude is presented in **Table 9.10**.

Table 9.10: Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	Medium
Earthworks	Large
Construction	Large
Trackout	Medium

Step 3 - Sensitivity of the Area

9.56 In accordance with the Mayor of London Control of Dust and Emissions SPG (paragraph 4.36 of the SPG, Step 2B: Define the Sensitivity of the Area), the sensitivity of the area has taken account of the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- the local background PM_{10} concentration; and
- Site-specific factors, such as whether there are trees or other vegetation to reduce the risk of wind-blown dust.

Step 4 - Sensitivity of the Area to Dust and Soiling Effects on People and Property

9.57 As discussed above, the nearest sensitive receptors are residential properties located within 20m of the Site boundary. Based on **Table A3** in **Appendix 9.2**, given that there are 10-100 high sensitivity receptors within 50m, it is considered the area would be of **medium sensitivity** to dust and soiling effects on people and property.

9.58 The summary of the sensitivity of people to dust and soiling effects is detailed in **Table 9.11**.

Table 9.11: Sensitivity of the Area to Dust and Soiling Effects on People and Property

Activity	Sensitivity of Area to Dust and Soiling Effects
Demolition	Medium
Earthworks	Medium
Construction	Medium
Trackout	Medium

Step 5 - Sensitivity of the Area to Human Health Impacts

9.59 As shown in **Table A7** of **Appendix 9.2**, the annual mean PM_{10} concentration at the Elephant and Castle automatic monitor, the closest monitoring location to the Site, was 17.0µg/m^3 in 2019. This is below the annual mean AQS objective for PM_{10} of 40ug/m^3.

9.60 Based on **Table A4** in **Appendix 9.2**, given that there are estimated to be 10-100 receptors within 50m and that PM_{10} concentrations are 17.0ug/m^3, it is considered the area is of **low sensitivity** to human health impacts.

9.61 The summary of the sensitivity of people to the health effects of particulate matter is detailed in **Table 9.12** below.

Table 9.12: Sensitivity of the Area to Human Health Effects

Activity	Sensitivity of Area to Human Health Effects
Demolition and deconstruction	Low
Earthworks	Low
Construction and refurbishment	Low
Trackout	Low

Step 6 - Risk of Impacts

9.62 Based on the dust emissions magnitude as set out in **Table 9.10** and taking account of the sensitivity of the area as detailed in **Tables 9.11** and **9.12**, the overall risk impacts have been identified and presented in **Table 9.13**. This is based on the matrices set out in **Tables 9.4** to **9.7**. The predicted risks are prior to, and do not take account of, mitigation applied.

Table 9.13: Summary of Risk

Potential Effect	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	Medium Risk	Medium Risk
Human Health	Low Risk	Low Risk	Low Risk	Low Risk

9.63 As outlined in **Table 9.13**, the Site is a **medium risk** site, due to dust soiling effects. Therefore, Site specific mitigation measures would be required to ensure that there are no adverse effects from the Works. However, based on the criteria in **Table 9.8**, in the absence of mitigation, the worst-case nuisance dust from the Works would give rise to:

- **short-term, local effects of major adverse** significance at receptors within 20m from the Site boundary;
- **short-term, local effects of moderate adverse** significance at receptors between 20m and 100m of the Site boundary;
- **short-term, local effects of minor adverse** significance at receptors between 100m and 350m of the Site boundary; and
- **negligible** effects at receptors over 350m from the Site boundary.

Construction Vehicle Exhaust Emissions

9.64 Emissions from Works traffic (62 HGVs peak daily movements in July 2023) would be relatively small compared to existing road traffic emissions on St. Thomas Street (6,874 daily vehicles including 8.2% HDVs) and on Borough High Street (25,930 daily vehicles including 14.9% HDVs)[14]. Therefore, the likely effect of construction vehicles entering and egressing the Site on air quality would be **negligible** during the Works.

Construction Plant Emissions

9.65 In accordance with Part 7 of the SPG, all construction plant would need to adhere to the emissions standards for NO_2 and PM_{10} set out for NRMM. It is therefore considered the likely effect of construction plant on local air quality would be **negligible**.

Completed and Operational Development

Nitrogen Dioxide (NO_2)

9.66 **Table 9.14** presents the predicted worst-case NO_2 concentrations at relevant existing receptors and receptors introduced as part of the Development, assuming a progressive reduction in forecast emission rates and background concentrations from 2019 to 2026.

Table 9.14: Results of the Annual Mean NO_2 ADMS Modelling at Sensitive Receptors

ID	Receptor Location	Annual Mean NO_2 Concentrations (µg/m^3)			
		2019 Baseline	2026 Without Development	2026 With Development	2026 Change
R1	Orchard Lisle House	**40.9**	33.0	33.0	0.0
R2	Orchard Lisle House	**41.5**	33.4	33.4	0.0
R3	Boland House	**40.4**	32.5	32.5	0.0
R4	Guy's Hospital	40.0	32.2	32.2	0.0
R5	The Shard	**41.6**	33.2	33.2	0.0
R6	Nuffield House	34.4	28.1	28.1	0.0
R7	26 Park Street	39.6	32.0	32.0	0.0
R8	21 Park Street	39.7	32.0	32.0	0.0
R9	31-41 Park Street	39.5	31.9	31.9	0.0
R10	St. Thomas Church	**43.9**	35.3	35.3	0.0
R11	2 St. Thomas Street	**45.1**	36.6	36.6	0.0
R12	70 Southwark Bridge Road	38.6	30.8	30.8	0.0
R13	Ilfracombe Flats	36.8	29.6	29.6	0.0
R14	Maple Building	37.5	30.2	30.2	0.0
R15	57 Borough High Street	**52.3**	**42.5**	**42.5**	0.0
P1	Proposed: West Tower	-	-	34.9	-
P2	Proposed: Georgian Terrace	-	-	37.7	-
P3	Proposed: Terrace Level 25	-	-	31.6	-

Note: For accuracy, the changes arising from the Development have been calculated using the exact output from the ADMS models rather than the rounded numbers within Table 9.14.

9.67 The results in **Table 9.14** indicate that for 2019, the NO_2 annual mean UK AQS objective of 40 µg/m^3 is exceeded at seven of the existing 15 receptor locations. These results are consistent with the existing receptors being located within the LBS AQMA declared by LBS and the London

Bridge at Borough High Street TfL NO_2 Focus Area. The highest concentration is predicted at Receptor 15, located on Borough High Street and within the Focus Area (52.3µg/m^3).

9.68 In 2026, both 'without' and 'with' the Development, all but one sensitive receptor modelled (Receptor 15) are predicted to be below the NO_2 annual mean objective.

9.69 As discussed in **Appendix 9.2,** 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/m^3. As shown in **Table 9.14**, the predicted NO_2 annual mean concentrations in 2019 were below 60µg/m^3 at all existing receptors and as such it is likely the 1-hour mean objective would be met at all existing receptors.

9.70 In 2026, both 'without' and 'with' the Development, Receptor 15 is the only existing receptor predicted to exceed the NO_2 annual mean objective. In 2026 both 'without' and 'with' the Development were below 60µg/m^3 at all sensitive receptors modelled. It is therefore likely the 1-hour mean objective would be met. This is discussed in further detail in **Appendix 9.2**.

9.71 Using the impact descriptors outlined in **Table 9.9,** the Development is predicted to result in a 'negligible' impact on NO_2 concentrations at all existing sensitive receptors modelled. Using professional judgement, based on the magnitude of the impact and the concentrations predicted at sensitive receptors, it is considered that the effect of the Development on NO_2 concentrations would be **negligible**.

Particulate Matter (PM_{10} and $PM_{2.5}$)

9.72 **Table 9.15** presents the predicted PM_{10} and $PM_{2.5}$ concentrations, assuming a progressive reduction in forecast emission rates and background concentrations from 2019 to 2026.

Table 9.15: Results of the PM_{10} and $PM_{2.5}$ ADMS Modelling at Sensitive Receptors

ID	PM_{10} Annual Mean (µg/m^3)				PM_{10} Number of Days >50µg/m^3				$PM_{2.5}$ Annual Mean (µg/m^3)			
	2019 Baseline	2026 Without Development	2026 With Development	2026 Change	2019 Baseline	2026 Without Development	2026 With Development	2026 Change	2019 Baseline	2026 Without Development	2026 With Development	2026 Change
R1	19.9	18.2	18.2	0.0	3	1	1	0	12.8	11.6	11.6	0.0
R2	20.0	18.3	18.3	0.0	3	1	1	0	12.9	11.7	11.7	0.0
R3	19.9	18.2	18.2	0.0	3	1	1	0	12.8	11.6	11.6	0.0
R4	19.8	18.1	18.1	0.0	3	1	1	0	12.8	11.6	11.6	0.0
R5	20.1	18.5	18.5	0.0	3	1	1	0	13.0	11.8	11.8	0.0
R6	20.2	18.5	18.5	0.0	3	1	1	0	12.8	11.7	11.7	0.0
R7	19.7	18.1	18.1	0.0	3	1	1	0	12.7	11.5	11.5	0.0
R8	19.7	18.1	18.1	0.0	3	1	1	0	12.7	11.5	11.5	0.0

ID	PM_{10} Annual Mean (µg/m³)				PM_{10} Number of Days >50µg/m³				$PM_{2.5}$ Annual Mean (µg/m³)			
	2019 Baseline	2026 Without Development	2026 With Development	2026 Change	2019 Baseline	2026 Without Development	2026 With Development	2026 Change	2019 Baseline	2026 Without Development	2026 With Development	2026 Change
R9	19.7	18.0	18.0	0.0	3	1	1	0	12.7	11.5	11.5	0.0
R10	20.3	18.6	18.6	0.0	3	1	1	0	13.0	11.8	11.8	0.0
R11	20.2	18.5	18.5	0.0	3	1	1	0	13.0	11.8	11.8	0.0
R12	20.8	19.1	19.1	0.0	4	2	2	0	13.2	12.0	12.0	0.0
R13	20.8	19.0	19.0	0.0	4	2	2	0	13.1	12.0	12.0	0.0
R14	20.8	19.1	19.1	0.0	4	2	2	0	13.2	12.0	12.0	0.0
R15	21.1	19.3	19.3	0.0	4	2	2	0	13.5	12.2	12.2	0.0
P1	-	-	18.1	-	-	-	1	-	-	-	11.7	-
P2	-	-	18.4	-	-	-	1	-	-	-	11.9	-
P3	-	-	17.6	-	-	-	1	-	-	-	11.5	-

Note: For accuracy, the changes arising from the Development have been calculated using the exact output from the ADMS models rather than the rounded numbers within Table 9.15.

9.73 As shown in **Table 9.15**, the annual mean concentrations of PM_{10} are predicted to be below the objective of 40µg/m³ in 2019 and in 2026, both 'without' and 'with' the Development, at all sensitive receptors modelled. The maximum predicted concentration is 21.1µg/m³ at Receptor 15 in 2019.

9.74 The results in **Table 9.15** indicate that in 2019 and in 2026, both 'without' and 'with' the Development, all existing sensitive receptors are predicted to be below the 24-hour mean PM_{10} objective value of 35 days exceeding 50µg/m³.

9.75 The results in **Table 9.15** indicate that in 2019 and in 2026, both 'without' and 'with' the Development, all sensitive receptors are predicted to be below the annual mean $PM_{2.5}$ objective value of 25µg/m³. The maximum predicted concentration is 13.5µg/m³ at Receptor 15 in 2019.

9.76 Using the impact descriptors outlined in **Table 9.9,** the Development is predicted to result in a 'negligible' impact on $PM_{2.5}$ and $PM_{2.5}$ concentrations at all sensitive receptors modelled. Using professional judgement, based on the magnitude of the impact and the concentrations predicted at the existing sensitive receptors modelled, it is considered that the effect of the Development on PM_{10} and $PM_{2.5}$ concentrations would be **Negligible**.

Conditions within the Development

9.77 In accordance with LLAQM Technical Guidance only the short-term AQS objectives apply for office and retail users. The modelling undertaken in **Table 9.14** indicates that the predicted NO_2 annual mean concentrations are below 60µg/m³ at all proposed receptors and as such it is likely the 1-hour mean objective would be met at all proposed receptor locations. Based on the

predicted future concentrations, the effect on future users of the proposed Development is **Negligible**.

Mitigation Measures and Likely Residual Effects

The Works

Nuisance Dust

9.78 An outline Construction Management Plan (CMP) has been submitted to support planning that commits the Main Contractor to dust mitigation measures. A Site Environmental Management Plan (SEMP) will be issued to any demolition or construction contractors and in line with best practice on construction sites a range of environmental management controls would be implemented. The controls, with reference to the SPG relating to medium risk sites, are set out in **Table 9.16**.

Table 9.16: Works Phase Mitigation Measures

Communications
Develop and implement a stakeholder communications plan that includes community engagement before work commences on Site.
Display the name and contact details of person(s) accountable for air quality and dust issues on the Site boundary. This may be the environment manager/engineer or the site manager.
Display the head or regional office contact information.
Dust Management
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by LBS. The level of detail would depend on the risk and should include as a minimum the recommended measures as set out in this Table.
Site Management
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
Make the complaints log available to the local authority when asked.
Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.
Hold regular liaison meetings with other high-risk construction sites within 500m of the Site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.
Monitoring
Monitoring during the Works as required by the Scoping Opinion. Monitoring could include dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.

Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
Agree monitoring approach and locations with LBS.
Preparing and maintaining the site
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
Erect solid screens or barriers around dusty activities or the Site boundary that are at least as high as any stockpiles on Site.
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
Avoid Site runoff of water and mud.
Keep site fencing, barriers and scaffolding clean using wet methods.
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on Site. If they are being re-used on-site cover as described below.
Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle/machinery and sustainable travel
Ensure all vehicles switch off engines when stationary – no idling vehicles.
Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Operations
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
Ensure an adequate water supply on the site for effective dust/particulate matter suppression / mitigation, using non-potable water where possible and appropriate.
Use enclosed chutes and conveyors and covered skips.
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste Management

Avoid bonfires and burning of waste materials.
Demolition
Ensure effective water suppression is used during demolition operations.
Avoid explosive blasting, use appropriate manual or mechanical alternatives.
Bag and remove any biological debris or damp down such material before demolition.
Construction
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
Trackout
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
Avoid dry sweeping of large areas.
Ensure vehicles entering and leaving sites 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 hauls routes and any subsequent action in a site log book.
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
Implement a wheel washing system, with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
Access gates to be located at least 10m from receptors where possible.

9.79 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 construction work. As such, it is expected that such measures would be employed throughout the course of the Works and therefore, it is considered that residual effects due to fugitive emissions would be **negligible**.

Construction Vehicle Exhaust Emissions

9.80 All construction traffic logistics would be agreed with LBS, as set out in **Chapter 8: Transportation and Access**. Consideration would also be given to the avoidance (or limited) use of roads during peak hours, where practicable. However, it is anticipated that the likely residual effect of construction vehicles entering and egressing the Site to air quality would remain as per

the likely impact. That is, during the construction period the likely worst-case residual impact, given the impacts would be temporary, is **negligible**.

Construction Plant Emissions

9.81 In accordance with Part 7 of the SPG, all construction plant would need to adhere to the emissions standards for NO_2 and PM_{10} set out for NRMM. It is therefore considered the likely residual effects of construction plant on local air quality would be **negligible**.

Completed and Operational Development

9.82 As identified earlier in this chapter, even in the absence of mitigation, the Development is predicted to have an insignificant effect on local air quality. Accordingly, mitigation measures would not be required so residual effects would remain as **negligible**.

9.83 The Development incorporates a number of measures that would benefit local air quality. These include:

- Ability to accommodate a new entrance / exit to the London Bridge Underground Station, which would reduce pedestrian footfall on Borough High Street and encourage the use of public transport;
- New open space surrounding the area identified as a potential new entrance / exit to the London Bridge Underground Station, which would be planted with medium and tall trees which would absorb carbon dioxide and vehicle and heating plant emissions;
- The provision of a rooftop garden and private terraces with associated planting;
- The provision of 1,322 cycle spaces, to encourage sustainable forms of transport;
- Implementation of a Delivery, Servicing and Waste Management Plan (DSWMP) to manage the arrival and departure of delivery and servicing vehicles and their activities when on-site; and
- Implementation of a Travel Plan to encourage employees to move up within the sustainable transport hierarchy.

9.84 **Table 9.17** summarises the likely significant effects, mitigation measures and likely residual effects identified within this chapter.

Table 9.17: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Dust emissions arising from the demolition and construction works	**Negligible**	None required. However, some of the routine management controls prescribed in the SEMP would relate to good practice measures to limit the impacts of construction traffic and the use of plant and machinery	**Negligible**

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Emissions from demolition and construction vehicles	**Negligible**	None required. However, some of the routine management controls prescribed in the SEMP would relate to good practice measures to limit the impacts of construction traffic and the use of plant and machinery	**Negligible**
Emissions from demolition and construction plant	**Negligible**	Plant to meet standards set for NRMM	**Negligible**
Completed and Operational Development			
Emissions from traffic generation associated with the Development	**Negligible**	None required.	**Negligible**

Monitoring

9.85 Monitoring would be undertaken during the Works as required by the Scoping Opinion. Monitoring could include dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.

9.86 Regular site inspections would be carried out to monitor compliance with the Dust Management Plan (DMP), record inspection results, and make an inspection log available to the local authority when asked.

9.87 The frequency of Site inspections would be increased by the person accountable for air quality and dust issues on Site when activities with a high potential to produce dust were being carried out and during prolonged dry or windy conditions.

9.88 The monitoring approach and locations for monitoring would be agreed with LBS.

References

1 Southwark Council (2019), Air Quality Annual Status Report. Available from: https://www.southwark.gov.uk/assets/attach/12637/2019-Air-Quality-Annual-Status-Report.pdf

2 Cambridge Environmental Research Consultants Ltd, ADMS-Roads, 2018, Version 4.1.1.

3 AEA, NO_X to NO_2 Calculator, http://laqm1.defra.gov.uk/review/tools/monitoring/calculator.php Version 8.1, August 2020

4 Moorcroft and Barrowcliffe. et al. (2017) Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London

5 Greater London Authority (2014), 'Sustainable Design and Construction - Supplementary Planning Guidance', Greater London Authority, London. Available from: https://www.london.gov.uk/sites/default/files/gla_migrate_files_destination/Sustainable%20Design%20%26%20Construction%20SPG.pdf

6 Institute of Air Quality Management, 2014, 'Guidance on the Assessment of dust from demolition and construction. Available from: http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf

7 http://laqm.defra.gov.uk/faqs/faqs.html.

8 Air Quality Consultants. 2020. Performance of Defra's Emission Factor Toolkit 2013 – 2019. February 2020

9 Department of the Environment, Food and Rural Affairs (Defra), (2007). 'The Air Quality Strategy for England, Scotland, Wales & Northern Ireland'. Available from: https://uk-air.defra.gov.uk/library/reports?section_id=17

10 Local Air Quality Management Technical Guidance (TG16) February 2018. Available from: https://laqm.defra.gov.uk/technical-guidance/

11 Council Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe.

12 Defra, (2010) The Air Quality Standards (England) Regulations.

13 Defra (2017) 'Air quality plan for nitrogen dioxide (NO2) in UK (2017)'. Available from: https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017

14 https://www.dft.gov.uk/traffic-counts/cp.php?la=Southwark#37699

10. Archaeology

Introduction

10.1 This chapter, which was prepared by MOLA (Museum of London Archaeology), presents an assessment of the likely archaeology effects of the Development.

10.2 This chapter provides a description of the assessment methodology; a description of the relevant baseline conditions of the Site and surrounding area; and an assessment of the likely significant effects of the Development, that could arise during demolition, deconstruction, refurbishment and construction. Where appropriate, mitigation measures are identified to avoid, reduce or offset adverse effects and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described.

10.3 Please note that the demolition, deconstruction, refurbishment, and construction works are referred to as 'the Works'. Where required in this ES chapter, reference to the deconstruction and refurbishment works will be made.

10.4 As agreed in the EIA Scoping Opinion undertaken in 2018 for an earlier application at the same Site (**Appendix 2.2**), an assessment of operational effects has been scoped out on the basis that once the Development has been completed, no further ground disturbance would occur and consequently there would be no additional impacts or resulting environmental effects upon buried heritage assets. Given that the parameters of the baseline have not changed it has been considered that the 2018 EIA Scoping Opinion is still relevant and valid

10.5 The assessment deals solely with the archaeological implications of the Development and does not cover built heritage issues except where buried parts of historic fabric are likely to be affected. The effects on 'above ground' heritage assets are covered in **Part 3: Townscape, Visual Impact and Built Heritage Assessment**.

10.6 This chapter is accompanied by the following appendices, presented in **ES Part 4**:

- **Appendix 10.1**: Archaeological Desk Based Assessment; and
- **Appendix 10.2**: Letter from MOLA to Southwark Council's Archaeological Officer, dated 4 October 2018.

Assessment Methodology and Significance Criteria

Assessment Methodology

10.7 The assessment has been undertaken in accordance with the requirements of the National Planning Policy Framework (NPPF)[1], the London Plan[2], the Southwark Plan, 2007[3],the Southwark Core Strategy, 2011[4] and the draft New Southwark Plan[5]. It conforms to standards specified by the Chartered Institute for Archaeologists[6] [7], and the Greater London Archaeological Advisory Service of Historic England (GLAAS)[8] .

Consultation

10.8 The archive of the excavation carried out on the Site by the Southwark and Lambeth Archaeological Excavation Committee from October 1982 to January 1983 was examined[9] as part of the preparation of the Archaeological Desk Based Assessment (**Appendix 10.1**). Derek Seeley, now a MOLA Senior Project Manager, was present during the excavation and for the purposes of the Archaeological Desk Based Assessment has advised on the nature and scale of the work, the findings and their significance as well as current likely survival of archaeological remains on the Site.

10.9 Archaeology was included in the EIA Scoping Report submitted in August 2018 (included as **Appendix 2.1**) as a topic to be scoped-in, proposing that consultation with the London Borough of Southwark's (LBS) archaeological advisor would be undertaken in order to develop an appropriate archaeological mitigation strategy. Given that the parameters of the baseline have not changed it has been considered that the 2018 EIA Scoping Opinion is still relevant and valid.

10.10 Pre-application meetings were held regarding archaeology on the 6th and 24th of August 2018, attended by representatives from LBS and Derek Seeley, MOLA Senior Project Manager. Correspondence has also taken place between Derek Seeley and LBS' Archaeological Advisor. It has been agreed by LBS 's Archaeological Advisor that due to the current access constraints on the Site (the existing buildings), the scale of the investigation which took place in 1982–3, and the extent and depth of ground disturbance caused by the construction of the current basement and underlying pile caps, further archaeological evaluation pre-determination will not be required and that the archaeological interest of the Site can be secured through appropriate planning conditions. Derek Seeley's letter[10] to LBS 's Archaeological Officer (**Appendix 10.2**) and MOLA's Archaeological Desk Based Assessment (**Appendix 10.1**) are both being submitted to support the planning application.

10.11 The EIA Scoping Opinion, dated 4 October 2018, requested that a colour-coded plan indicating the archaeological potential of the different areas of the Site be included in the HEA. This is included as Figure 22 of the HEA and **Figure 10.2** of the ES.

10.12 An informal EIA Scoping Note was submitted to LBS in February 2021 to inform the LPA of changes to the Development and EIA. The response noted that the EIA methodology previously agreed should be amended as follows:

- Updated legislation, guidance, industry best practice and policy context;
- Updated baseline information;
- Further and updated surveys undertaken since the 2018 ES Scope was agreed;
- Additional assessment and information, as is relevant, that was identified as being required within the detailed ES reviews undertaken by LUC on behalf of LBS of the 2018 ES;
- Current data availability and representativeness due to the COVID-19 restrictions; and
- Revised scheme proposals.

Establishing Baseline Conditions

Study Area

10.13 The original ES baseline study area was a 50m radius around the Site. On 11 February 2021, the LBS 's archaeological advisor, Chris Constable, requested by email that the study area be extended to 150m around the Site. Details of known historic environment features within a study area extending 150m from the Site outline were obtained from the primary repositories of such information within Greater London (the Greater London Historic Environment Record (GLHER) and the Museum of London Archaeological Archive). This provides archaeological and historical context and a baseline characterisation of the Site. The study area is considered sufficient in size and level of information to support a robust baseline and assessment of asset significance.

10.14 *Baseline Characterisation*

10.15 The methodology and sources consulted for the baseline characterisation are set out in detail in **Appendix 10.1**. In summary, this entailed:

- Collating information on known historic environment features in the study area (and if appropriate beyond it), in order to set the Site into its archaeological and historic context;
- Consultation of a broad range of relevant documentary and cartographic sources, including published histories and journals, British Geological Survey data, available geotechnical data and historic maps; and
- A visit to the Site, undertaken on 30th July 2016 by a MOLA Archaeologist in order to determine the topography of the Site and the nature of the existing buildings, and to provide further information on areas of potential past ground disturbance and general historic environment potential.

Assessment of Likely Significant Archaeology Effects

10.16 The methodology used in this assessment entailed the following:

- Consideration of the potential for an archaeological asset to be present in the Site, i.e. the likelihood of its presence, by examining the baseline conditions on the Site using the above methodology, and taking into account factors which may have compromised asset survival (e.g. past land use and development);
- Evaluation of the significance (i.e. sensitivity) of buried heritage assets (based on existing designations; and professional judgement where such resources have no formal designation);
- Prediction of the magnitude of likely impacts of the Development upon the known or potential significance of buried heritage assets;
- Consideration of any inherent mitigation measures that have been included with the development proposals (and any additional mitigation that might be required in the design and construction or operational lifetime of the Development) in order to reduce or eliminate any significant adverse effects upon heritage assets; and
- Quantification of residual effects (those that might remain after mitigation).

The Works

10.17 Impacts on archaeological remains occur during the Works where ground disturbance takes place. They are limited to the area of the physical impact, and are permanent. Such impacts and their resulting effects are assessed below.

Significance Criteria

Significance (sensitivity) of Heritage Assets

10.18 In line with the NPPF[11], for the purposes of this ES Chapter, archaeological 'resources' or 'receptors' are referred to as 'buried heritage assets', and heritage 'significance' is used in place of 'sensitivity'. The use of heritage 'significance' and 'significance of (environmental) effect' are clearly differentiated throughout.

10.19 Significance lies in the value of a heritage asset to this and future generations because of its heritage interest, which may be archaeological, architectural, artistic or historic. **Table 10.1** below sets out the significance of such assets, on a scale typically used in Environmental Impact Assessment[12], based on statutory designation and/or professional judgement against four values set out in English Heritage's (now Historic England) Conservation Principles[13]:

- **Evidential value**: the potential of the physical remains to yield evidence of past human activity. This might take into account date; rarity; state of preservation; diversity/complexity; contribution to published priorities; supporting documentation; collective value and comparative potential;
- **Aesthetic value**: this derives from the ways in which people draw sensory and intellectual stimulation from the heritage asset, taking into account what other people have said or written;
- **Historical value**: the ways in which past people, events and aspects of life can be connected through heritage assets to the present, such a connection often being illustrative or associative; and
- **Communal value**: this derives from the meanings of a heritage asset for the people who know about it, or for whom it figures in their collective experience or memory. Communal values are closely bound up with historical, particularly associative, and aesthetic values, along with educational, social or economic values.

10.20 There is no single defining criterion that dictates the overall asset significance; each asset has to be evaluated using professional judgement against the range of criteria listed above on a case by case basis. Unless the nature and exact extent of buried archaeological remains within any given area has been determined through prior investigation, significance may be uncertain.

10.21 **Table 10.1** describes the significance of designated and non-designated buried heritage assets as applied in this assessment.

Table 10.1 Significance (sensitivity) of Buried Heritage Assets

Asset significance	Asset description
Very high	World Heritage Sites Scheduled Monuments Grade I and II* Registered parks and gardens Non-designated sites, settlements and landscapes of equivalent – national – status (exceptional heritage value).
High	Burial grounds Grade II Registered parks and gardens Designated battlefields Non-designated sites, settlements and landscapes of equivalent – regional or county – status (rare and well-preserved examples).
Medium	Non-designated sites, settlements and landscapes with a district value or interest for education or cultural appreciation (good preservation, sufficient for comparative study and educational/cultural appreciation)
Low	Resources with a local (e. g. parish) value or interest for education or cultural appreciation.
Negligible	Insignificant and/or badly damaged resources of little appreciable value.
Uncertain	Resources that have a clear potential, but for which current knowledge is insufficient to allow significance to be determined.

Magnitude of Change

10.22 Determination of magnitude of change upon the significance of known or potential buried heritage assets is based on the severity of the physical impact, taking into consideration any mitigation measures integral to the Development proposals. **Table 10.2** describes the criteria used in this assessment to determine the magnitude of change.

Table 10.2 Magnitude of Change Criteria

Magnitude	Description
High	Complete removal of asset; or, Change to asset significance resulting in a fundamental change in our ability to understand and appreciate the resource and its historical context, character and setting. The transformation of an asset's setting in a way that fundamentally compromises its ability to be understood or appreciated. The scale of change would be such that it could result in a designated asset being undesignated or having its level of designation lowered.
Medium	Change to asset significance resulting in a considerable change in our ability to understand and appreciate the asset and its historical context, character and setting. Notable alterations to the setting of an asset that affect our appreciation of it and its significance; or the unrecorded loss of archaeological interest.
Low	Change to asset significance resulting in a small change in our ability to understand and appreciate the asset and its historical context, character and setting.
Negligible	Negligible change or no material change to asset significance. No real change in our ability to understand and appreciate the asset and its historical context, character and setting.
Uncertain	Level of survival/condition of resource in specific locations is not known: magnitude of impact is therefore not known.

Significance of Environmental Effect

The significance of the likely environmental effect is determined by comparing the significance value of the baseline heritage asset with the magnitude of impact (change) upon that asset as a result of the Development and are presented initially without mitigation. The likely significant effects may be either adverse (negative) or beneficial (positive). The general approach to determine the significance of the environmental effect is presented in **Table 10.3**. Where information is insufficient to quantify that the asset significance or magnitude of change, the significance of the effect is given as uncertain.

Table 10.3: Significance of Environmental Effect (prior to mitigation)

	Heritage Asset Significance					
Magnitude of Change	**Very High**	**High**	**Medium**	**Low**	**Negligible**	**Uncertain**
High	Major	Major	Major	Moderate	Minor	Uncertain
Medium	Major	Major	Moderate	Minor	Insignificant	Uncertain
Low	Moderate	Moderate	Minor	Minor	Insignificant	Uncertain
Negligible	Minor	Minor	Insignificant	Insignificant	Insignificant	Uncertain
Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain

Mitigation Measures and Residual Effects

10.23 An appropriate mitigation strategy would aim to reduce or offset any adverse effect. Measures to mitigate effects would normally consist of design adjustments, to allow significant resources to be protected and retained (preservation in situ) or, where this is not feasible, investigation and recording before and during development, with dissemination at an appropriate level (preservation by record).

10.24 As heritage assets are an irreplaceable resource it is generally considered as standard practice within the planning system to implement mitigation measures in order to offset any level of adverse effect on a heritage asset, including minor adverse. This is to ensure that finite remains are not removed or lost without record. The level of mitigation proposed is, in each case, proportionate to the significance of the asset being affected.

10.25 The residual effect reflects the success rating for the recommended mitigation strategy. **Table 10.4** defines the significance of residual effects.

Table 10.4 Significance of Residual Effect

Significance of Effect	Description
Major Adverse	Substantial harm to, or loss of, significance of an asset of very high, high or medium heritage significance, as a result of changes to its physical form or setting.
Moderate Adverse	Less than substantial harm to the significance of an asset of very high, high or medium heritage significance, as a result of changes to its physical form or setting.
Minor Adverse	Limited harm to the significance of an asset of very high, high or medium heritage significance, as a result of changes to its physical form or setting, or substantial harm to, or the loss of, significance of an asset of low or negligible heritage significance.
Insignificant	No appreciable change to an asset's significance.
Uncertain	Significance of effect uncertain due to lack of information on buried heritage asset significance.
Minor Beneficial	Limited improvement of an asset's significance as a result of changes to its physical form or setting.
Moderate Beneficial	Notable enhancement of an asset's significance as a result of changes to its physical form or setting.
Major Beneficial	Substantial enhancement of an asset's significance as a result of changes to its physical form or setting.

Limitations and Assumptions

10.26 The assessment relies on available data, and best endeavours have been made to ensure that the data is accurate and up to date. It is assumed that information on the GLHER database is accurate. Whilst compiling the baseline a process of review and validation of the GLHER data has taken place (for example ensuring assets are correctly located, and undertaking further research, where appropriate, into GLHER entries with little information).

10.27 The main limitation to the assessment is the nature of the archaeological resource – i.e. buried and not visible – which means it can be difficult to predict accurately the presence and likely significance of archaeological assets, and consequently the impact upon them, using primarily desk-based sources. Although archaeological investigation has taken place on the Site previously, this was conducted prior to the inclusion of archaeology as a material factor in the planning system, when there was often insufficient resource and time to fully excavate and create as comprehensive an archive as would be expected now. Nevertheless, the archived results, along with appropriate consultation and background research, are considered sufficient to inform the archaeological baseline of the Site.

10.28 Notwithstanding these limitations, the methodology is considered robust, utilising reasonably available information, and conforms to the requirements of local and national guidance and planning policy. Typically, appropriate standard archaeological prospection and evaluation

techniques are utilised to reduce the uncertainties inherent in any desk-based assessment, as part of an overall EIA mitigation strategy.

Baseline Conditions

Designated Heritage Assets

10.29 Historic England's National Heritage List for England includes no specific archaeological heritage assets in the Site. The terrace of early 19th century townhouses (the 'Georgian Terrace') at numbers 4–8 and 12–16 St Thomas Street in the northern part of the Site are Grade II listed buildings (List Entry number 1385871).

10.30 The Site is currently within the *Borough, Bermondsey and Rivers Archaeological Priority Zone*, as designated by LBS. Archaeological Priority Zones are areas within the borough of Southwark that have been identified to contain high potential for archaeological remains. As part of the draft New Southwark Plan Evidence Base[14], archaeological priority zones (APZs) in the borough will be renamed as archaeological priority areas (APAs) and have been reviewed in line with a London-wide review of such areas by GLAAS, which includes a 'tiered' system of sensitivity with Tier 1 being the most sensitive. Once adopted by LBS, the Site will be within the Tier 1 *North Southwark and Roman Roads* APA. APAs will be treated in the same manner as the current APZs following the adoption of the draft New Southwark Plan.

10.31 The south-eastern part of the Site includes the area of the former St Thomas' Hospital burial ground, although the precise extent of this is uncertain. Archaeological excavation on part of the Site in 1982–3 found undated human remains in the foundations of a medieval building[15]. These, and the overlying post-medieval burials, were removed by a graveyard clearance contractor (Necropolis – now known as British Graveyard Services). It is, however, possible that occasional disarticulated bone is still present, which can only be excavated once the appropriate permission has been obtained.

Archaeological background

Natural Geology

10.32 The geology of the area comprises Kempton Park Terrace Gravels. Kempton Park Terrace Gravels are Middle Devensian river deposits comprised of gravel and sand with lenses of silt, clay and peat. The Site is located on the south-eastern edge of a dry gravel eyot (island) surrounded by (now buried) alluvium in a network of former river channels, which influenced the prehistoric use and historic development of the area.

Past Archaeological Investigation

10.33 In 1982–3, an archaeological 'rescue' excavation by professional archaeologists took place in the central and western part of the Site prior to construction of the existing New City Court building (number 1c on **Figure 10.1**) ('The 1982-3 Excavation'). This was before the inclusion of archaeology as a material consideration in the planning process, and the investigation was carried out under challenging circumstances. Archaeologists were not able to fully record and remove all the remains given the strict developer timetables which lead to large areas of the Site being

subject to machine excavation whilst archaeologists were absent. As a result of these excavation constraints, there is some uncertainty as to the exact areas investigated, and the general depth of truncation. One large archaeological trench (Trench 1) and two smaller trenches (Trenches 2 and 3) to the south-west are identified in the archive records, and shown in Figure 5 of the Archaeological Desk Based Assessment, although the area between Trenches 1 and 3 was subsequently excavated and Trench 1 was extended eastwards during the course of the investigation. Trench 1 was excavated down to natural (geological) deposits where possible. i.e. all archaeological remains removed.

10.34 Multi-period remains were recorded including pits with Iron Age pottery, and evidence of Roman buildings. A possible medieval chapel likely to have been associated with St Thomas' Hospital was recorded, along with post-medieval buildings, and human remains associated with the burial ground of the Hospital in the south-east of the Site[16].

Chronological Summary

10.35 For the prehistoric period (800,000 BC–AD 43), evidence of scattered pits and ditches suggests occupation of the eyot on which the Site is located during this period, and some late-prehistoric pottery was recovered during The 1982-3 Excavation (number 1c on **Figure 10.1**). Any more permanent settlement was probably on the high gravel terrace on the north side of the Thames.

10.36 In the Roman period (AD 43–410), a substantial settlement grew up in Southwark on the south side of the Thames, directly opposite the Roman city of Londinium and connected to it by a bridge. The 1982-3 Excavation (number 1c on **Figure 10.1**) revealed evidence of Roman buildings associated with wells and pits and several early Roman ditches running north-south through the Site. At least seven buildings were recorded on the Site, with internal floors and external ditches, pits, wells and possible boundary divisions. The lowest level of building remains was at *c* 0.1m above Ordnance Datum (OD), with timber pile foundations extending to a maximum depth of –0.5m OD. Deep wells and cess pits were found across the Site although many pits were concentrated in the north-east corner of Trench 1. A well pre-dating one of the Roman buildings extended to –0.7m OD.

10.37 Following the withdrawal of the Roman army from England in the early 5th century AD, Londinium and the Southwark suburb were apparently abandoned, and early-medieval remains (AD 410–1066) are scarce in the area. The 1982-3 Excavation revealed that, in the places accessible for investigation, Roman remains were sealed by 'dark earth', indicating that the area of the Site probably fell into disuse and became agricultural land or waste ground after the Roman period. However, it is possible that ephemeral Saxon features such as pits and ditches were missed.

10.38 In the later medieval period (AD 1066–1485), the riverside settlement at Southwark developed into a thriving commercial suburb with a dock, trading shore and fishery; away from the river the generally low-lying topography tended to concentrate occupation on the higher ground of the eyots. From the 12th century, however, the number of ecclesiastic and secular houses in the area grew, and with the construction in stone of a new London Bridge in 1209, north Southwark was opened up for development. In 1212, the hospital of St Thomas the Martyr was relocated from its original position (close to the River Thames) to the east side of Borough High Street within a precinct which included all or most of the Site: its boundary wall ran along the southern and western edges of the Site, on a line later followed by the parish boundary of St Thomas shown on

historic maps. The hospital buildings were located on the north side of present St Thomas Street, *c* 15m to the north of the Site, and the hospital's burial ground was probably in the southern part of the precinct, within the Site. During The 1982-3 Excavation, a later medieval or post-medieval stone building was exposed in the north side of the excavated area and subsequently removed by machine. It was interpreted as a possible chapel. A significant number of burials were removed from the Site, and although at the time assumed to be of a later date, considering the location it is possible that some may have been medieval.

10.39 Maps (included as Figures in **Appendix 10.1**) show that during the early part of the post-medieval period (AD 1485–the present), the Site was open land, but was progressively built up in the 17th and 18th century, although St Thomas' burial ground remained open land in the south-east part, persisting into the mid-20th century. The Site was occupied by a mix of terraced houses, office and light industrial buildings and gardens. Except for the Georgian Terraces (number 1a on **Figure 10.1**) and the facade of Keats House, the majority of the Site, including part of the post-medieval burial ground which lay within it, was cleared for the construction of New City Court in 1982/3. As much archaeology as possible was excavated down to natural deposits within the trenches on the Site.

Factors affecting archaeological survival

10.40 It is recorded in the Site archive that during construction of the current building, most parts of the Site were excavated by machine to a depth of 1.0m OD; nothing is therefore expected to survive above that level in the areas affected, and there may have been further ground reduction after the archaeologists left the Site.

10.41 All archaeological remains will have been removed within the footprint of each piled foundation for the current New City Court building, and piling plans show that the caps and beams extend much deeper and vary between 0.7m OD to –1.3m OD[17].

10.42 Compensation grouting for the Jubilee Line extension was undertaken beneath the Georgian Terraces. However, compensation grouting generally takes place between 3m and 7m below the interface of the Gravels and London Clay, in this case it took place at least 15.5m below ground level which is too deep to have any impact on archaeological remains on the Site.

Statement of significance

10.43 Archaeological survival is considered to be **very limited**, as shown on Figure 22 in the Archaeological Desk Based Assessment (**Appendix 10.1**) and included as **Figure 10.2** of this ES. There is unlikely to be any surviving archaeology beneath the New City Court building other than any very deeply cut features such as timber piles or wells. However, there is a possibility of greater survival beneath the listed Georgian Terrace (of townhouses) and Keats House in the north-east of the Site. Pile caps in the south-eastern corner of the Site are shallower, but this area may also have been subject to the same depth of ground reduction to 1.0m OD as for construction of the current building.

10.44 The Site has a **low to moderate** potential to contain very localised and truncated prehistoric remains. It was on a gravel eyot and could have supported settlement and agriculture, close to the resources of the River Thames and former subsidiary channels. Prehistoric pottery and stone

tools were discovered in pits on the Site, and further such remains may be present in any areas where development has had a lesser impact. Isolated cut features such as pits and ditches would be of medium significance, derived from their evidential value; residual finds would be of **low significance**.

10.45 The Site has a **low to moderate** potential to contain very localised Roman remains. A substantial Roman settlement was established in this area with many archaeological investigations, including those on the Site itself, showing evidence of roadside settlement of clay and timber and stone buildings. There is potential for truncated bases of Roman ditches, pits or foundations, of **medium significance**; isolated residual finds would be of **low significance**, based on their evidential value.

10.46 The Site has a **low** potential to contain medieval remains. Evidence of medieval buildings was recorded prior to their removal by the 1980s construction, and further such remains are very unlikely to survive.

10.47 The Site has a **moderate very localised** potential to contain truncated post-medieval rubbish and cess pits and possible evidence of small-scale industrial activity beneath the listed Georgian terrace. It is possible that occasional disarticulated human bone is still present, especially around the south-eastern edges of the Site. Such remains would be of **low significance**.

Assessment of Likely Significant Effects

Inherent Mitigation

10.48 Development affecting any former burial ground is regulated by statute, principally the *Burial Act 1857*, the *Disused Burial Grounds Act 1884* and *1981*, and the *Pastoral Measure 2011*. The exhumation of any human remains requires approval from either the Secretary of State or the Church of England, depending on whether the land is subject to the Church of England's jurisdiction. Under the *Town and Country Planning (Churches, Places of Religious Worship and Burial Grounds) Regulations 1950*, the removal and re-interment of human remains would be in accordance with the direction of the local Environmental Health Officer.

The Works

10.49 Aspects of the Development which will potentially have an effect on buried heritage assets are those which involve ground disturbance beyond the extent and depth of current truncation. The excavation to a basement formation level of up to approximately –6.0m OD and the installation of secant piles and load bearing piles (to be progressed to an anticipated depth of circa 28m below the first level of the basement) would have permanent effects on the archaeological remains. The insertion of underpinning as part of the increased basement depth would be have a permanent effect on the archaeological remains.

10.50 Physical impacts will truncate or remove entirely any archaeological remains within the area affected in the Site, i.e. locally. **Table 10.5** sets out the predicted significance of effect, without mitigation.

Table 10.5 Significance of Effect (Without Mitigation)

Buried Heritage Asset	Asset Significance	Magnitude of Change	Significance of Effect (Without Mitigation)
Isolated and truncated prehistoric cut features	Medium	High (lowered basement or new foundations)	Adverse effect of major significance
Residual (redeposited) prehistoric flint	Low	High (lowered basement or new foundations)	Adverse effect of moderate significance
Isolated and truncated Roman cut features	Medium	High (lowered basement or new foundations)	Adverse effect of major significance
Residual (redeposited) Roman artefacts	Low	High (lowered basement or new foundations)	Adverse effect of moderate significance
Truncated post-medieval remains beneath the listed terrace	Low	High (lowered basement or new foundations or underpinning)	Adverse effect of moderate significance
Disarticulated human bone	Low	High (lowered basement or new foundations)	Adverse effect of moderate significance

Mitigation Measures and Likely Residual Effects

10.51 The nature and extent of any planning requirement (e.g. planning condition, or preservation in situ) necessary to mitigate the impact of a development scheme, should be proportional to the known significance of the assets affected, and the predicted reduction / loss of significance that would result from the proposals. There is normally a presumption for the preservation in situ of known heritage assets of Very High (national) significance, whether designated or not.

The Works

10.52 Further consultation with the council has not been pursued as the baseline conditions within the site have not changed. It was agreed with LBS' Archaeological Officer in 2018 that the archaeological interest of the Site could be secured through appropriate planning conditions.

10.53 Archaeological survival potential at the Site is very limited, and no buried heritage assets of Very High or High significance are anticipated which would merit a mitigation strategy of permanent preservation in situ. It is therefore considered that the likely adverse effects of Moderate to Major significance can be successfully mitigated by a suitable programme of archaeological investigation before demolition (monitoring of any initial ground investigations, e.g. geotechnical test pits) and / or during groundworks (archaeological trenched evaluation followed by targeted excavation and/or watching brief), to advance understanding of asset significance and achieve preservation by record.

10.54 An archaeological watching brief of any initial ground investigations would help to clarify the potential for archaeological survival should the scale of any ground disturbance in this area require it. As outlined in **Chapter 6 Development Programme, Demolition, Deconstruction, Refurbishment and Construction** the Georgian Terrace would have its existing 1980's under

pinning strengthened. Given the depth of the existing basements it is likely that archaeology has survived in this area and the insertion of the underpinning should be monitored. Elsewhere in the Site, evaluation trial pits or trenches will be excavated once the basement slab is removed. If the results of these investigations indicate that it is necessary, mitigation will comprise targeted excavation and recording, and / or a watching brief during groundworks under a planning condition to secure preservation by record.

10.55 Any archaeological work would need to be undertaken in accordance with a Written Scheme of Investigation (WSI) approved by LBS's Archaeological Advisor. Appropriate consent and reburial would be required if human remains are disturbed.

10.56 The residual environmental effect following mitigation, to the satisfaction of the LBS's Archaeological Advisor, would be considered:

- Moderate Adverse on any truncated prehistoric and/or Roman cut features will be moderate adverse; and
- Minor Adverse on any redeposited prehistoric and/or Roman artefacts, truncated post-medieval remains, and disarticulated human bone will be minor adverse.

10.57 Such residual effects are considered **Significant.**

10.58 **Table 10. 6** summarises the likely significant effects, mitigation measures and likely residual effects identified within this Chapter.

Table 10. 6: 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 Medium (District) significance, i.e. isolated and truncated prehistoric and/or Roman cut features.	***Direct, permanent, local adverse effects of major significance***	*Implementation of an agreed phased programme of archaeological investigation under a planning condition to secure preservation by record. This will comprise evaluation (if feasible this will be combined with any geotechnical works) following removal of the basement slab. The results will inform the need and scope for any necessary subsequent targeted excavation and recording, and/or a watching brief during ground reduction, as appropriate.*	***Direct, permanent, local adverse effects of moderate significance***
Archaeological remains of Low (local) significance, i.e. redeposited prehistoric and/or Roman artefacts, truncated post-medieval remains, and disarticulated human bone.	***Direct, permanent, local adverse effects of moderate significance***	*Implementation of an agreed phased programme of archaeological investigation under a planning condition to secure preservation by record. This will comprise evaluation (if feasible this will be combined with any geotechnical works) following removal of the basement slab. The results will inform the need and scope for any necessary subsequent targeted excavation and recording, and/or a watching brief during ground reduction, as appropriate.*	***Direct, permanent, local adverse effects of minor significance***

Monitoring

10.59 No specific monitoring requirements have been identified for archaeology following completion of the Works.

References

1 Ministry of Housing, Communities and Local Government, (2019); National planning Policy Framework, published 2012 revised July 2018, February and June 2019.

2 Greater London Authority, (2021); The London Plan. The Spatial Development Strategy for Greater London.

3 London Borough of Southwark (2007); Southwark Plan.

4 London Borough of Southwark, (2011); Core Strategy.

5 London Borough of Southwark, (2020); Draft New Southwark Plan

6 Chartered Institute for Archaeologists, (2020a); Standards and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment, Published December 2014, updated October 2020, Reading.

7 Chartered Institute for Archaeologists, (2020b); Standards and guidance for historic environment desk-based assessment, Published December 2014, updated January 2017 and October 2020, Reading.

8 Greater London Archaeological Advisory Service, (2015); Guidelines for Archaeological Projects in Greater London. Historic England.

9 Museum of London Archaeological Archive, site code 4STS82.

10 Derek Seeley, MOLA, to Gillian King, Southwark Senior Planner Archaeology, 4th October 2018.

11 Ministry of Housing, Communities and Local Government, (2019); National planning Policy Framework, published 2012 revised July 2018, February and June 2019.

12 Design Manual for Roads and Bridges: Volume 11.

13 English Heritage, 2008 Conservation principles, policies and guidance. Swindon.

14 London Borough of Southwark, (2017); New Southwark Plan Evidence Base: Archaeological Priority Areas (APAs). Design & Conservation: Archaeology.

15 Cowan C, Seeley F, Wardle A, Westman A, and Wheeler L, (2009); Roman Southwark Settlement and Economy, Excavations in Southwark 1973–91, MOLA Monograph 42, page 254

16 Museum of London Archaeological Archive, site code 4STS82.

17 Depths of the piles, pile caps and beams and service runs as shown on the 1982 foundation plan (Bowden, Sillet and Partners, dwg 1527/505) as reconstructed by Allford Hall Monaghan Morris Architects (Proj. 14032, SK, dwg 0273, Rev A, 30/08/17).

11. Water Resources and Flood Risk

Introduction

11.1 This chapter, which was prepared by Waterman Infrastructure & Environment (WIE), presents an assessment of the likely 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 sewerage and potable water supply infrastructure.

11.2 This chapter provides a description of the assessment methodology, a description of the relevant baseline conditions of the Site and surrounding area and an assessment of the likely significant effects of the Development that could arise during demolition, deconstruction, refurbishment and construction ('the Works'), and once the Development is completed and operational. Where appropriate, mitigation measures are identified to avoid, reduce or offset adverse effects and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described.

11.3 This chapter is accompanied by the following appendices, presented in **ES Part 4:**

- **Appendix 11.1: Flood Risk Assessment**, prepared by AKT II Ltd; and
- **Appendix 11.2: Drainage Strategy**, prepared by AKT II Ltd.

Assessment Methodology and Significance Criteria

Assessment Methodology

Consultation

11.4 The EIA Scoping Opinion (**Appendix 2.2**) related to the 2018 Application, considered that Water Resources and Flood Risk should be scoped into the ES owing to the potential flood risk at the Site, the existing surface water drainage and foul sewer network capacity and demand for potable water. This document remains relevant, as in subsequent informal scoping process LBS requested the EIA for the Development to include the same topic as the one supporting the 2018 Application.

11.5 The EIA Scoping Opinion requests that 10% freeboard is added to any attenuation tanks to comply with the Southwark Strategic Flood Risk Assessment (SFRA) but there is no such requirement in the SFRA[1]. This additional capacity requirement may be appropriate for a pumped solution to non-combined sewers, but as the drainage design is predominantly for gravity discharge and overflow connections to the combined sewer (which are a normal practice for the blue roofs), the additional 10% attenuation seems inappropriate for this design. This would be discussed further with LBS post submission.

8.1 A further informal scoping request was submitted in February 2021, in relation to the Development. As set out in Chapter 2 the LBS response requested the scope of the EIA was amended as follows:

- Updated legislation, guidance, industry best practice and policy context;
- Updated baseline information;

- Further and updated surveys undertaken since the 2018 ES Scope was agreed;
- Additional assessment and information, as is relevant, that was identified as being required within the detailed ES reviews undertaken by LUC on behalf of LBS of the 2018 ES;
- Current data availability and representativeness due to the COVID-19 restrictions; and
- Revised scheme proposals.

11.6 This chapter, therefore, takes account of this amended scope summarised above.

Establishing Baseline Conditions

11.7 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[2];
- Ordnance Survey (OS) maps, topographical surveys and British Geological Society (BGS) maps and borehole logs;
- The Preliminary Environmental Risk Assessment (PERA) in relation to ground conditions and contamination prepared by WIE (see **Appendix 2.3**)[3];
- Consultation with the EA and Thames Water to obtain historical reports on flooding incidents and sewer records; and
- A review of LBS's Strategic Sequential Test[4], 2017 Strategic Flood Risk Assessment (SFRA) and other relevant local planning policy documents.

Assessment of Likely Significant Effects

11.8 The Flood Risk Assessment (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, as detailed below.

Flood Risk Assessment

11.9 The FRA has been undertaken in accordance with the requirements of the National Planning Policy Framework (NPPF)[5] and the accompanying technical guidance[6]. The FRA takes account of the Policy SI 12 Flood Risk Management and Policy SI 13 Sustainable drainage of the London Plan 2021[7] and Southwark's Sustainable Design Supplementary Planning Document[8]. Consideration has also been given to the Policy P67 (Reducing flood risk) Draft New Southwark Plan[9].

11.10 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.

Drainage Strategy

11.11 The Drainage Strategy has been prepared in accordance with the requirements of LBS guidance 'Developers Guide for Surface Water Management'[10] and complies with The London Plan[11]. Consideration has also been given to the Policy P67 (Reducing flood risk) Draft New Southwark Plan.

11.12 The Drainage Strategy 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.

11.13 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.

Potable Water Demand

11.14 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 (Chapman BDSP).

Significance Criteria

11.15 **Table 11.1** includes the criteria used for the classification of the receptors, whilst **Table 11.2** provides the magnitude of the change**.**

11.16 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 11.3**.

Table 11.1 Receptors Sensitivity Criteria

Receptor	Sensitivity	Commentary
Surface water bodies	Low	High Status under the WFD-UK regulation[12.]
	Medium	Moderate to Poor Status under the WFD-UK regulation.
	High	Bad Status under the WFD-UK regulation.
Surface and foul water sewers	Low	Private drainage infrastructure in rural areas.
	Medium	Private drainage infrastructure in urbanised areas.
	High	Public drainage infrastructure in urbanised and rural areas.
Water mains	Low	Private water supply infrastructure in rural areas.
	Medium	Private water supply infrastructure in urbanised areas.
	High	Public water supply infrastructure in urbanised and rural areas.
Aquifer	Low	Non-productive strata
	Medium	Secondary Aquifer
	High	Principal Aquifer
Groundwater quality	Low	Outside a Source Protection Zone
	Medium	Source Protection Zone III
	High	Source Protection Zone I & II
Flood risk receptors	Low	Rural artefacts
	Medium	Commercial properties / Construction Site
	High	Residential properties

Table 11.2: Magnitude of Change

Significance Criteria	Description of Criteria
Unchanged	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. No change in the in the controlled water quality.
Low	Minor local-scale increases/reductions in flood risk. Increase in surface and / or foul water discharge which would require modifications to existing infrastructure / Temporary local scale reduction in demand on surface and / or foul water infrastructure. Increase in water supply which would place additional pressure on existing local supplies and existing water supply infrastructure / Temporary local scale reduction in water supply demand and temporary increase in the capacity of existing infrastructure. Minor change in the controlled water quality.
Medium	Moderate local-scale or minor regional-scale increases / reductions in flood risk. Increase in surface and / or foul water discharge which would place undue pressure on existing infrastructure / Minor permanent reduction in demand on surface and / or foul water infrastructure. Increase in water supply which would place undue pressure on existing local supplies and existing water supply infrastructure. Permanent local scale reduction in water supply demand and permanent increase in the capacity of existing infrastructure. Moderate change in the controlled water quality.
High	Significant local-scale or moderate to significant regional-scale increases/reductions in flood risk. Increase in surface and / or foul water discharge which would require new infrastructure / Major permanent reduction in demand on surface and / or foul water 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 / Permanent regional scale reduction in water supply demand and permanent increase in the capacity of existing infrastructure. Major change in the controlled water quality.

Table 11.3: Significance of the Effects Criteria

	Magnitude of the Impacts			
Receptors Sensitivity	**High**	**Medium**	**Low**	**Unchanged**
High	*Major*	*Moderate*	*Medium/Minor*	*Negligible*
Medium	*Moderate*	*Medium*	*Minor/Negligible*	*Negligible*
Low	*Medium*	*Minor*	*Negligible*	*Negligible*

Limitations and Assumptions

11.17 The assessment relies on available data, and best endeavours have been made to ensure that the data is accurate and up to date. It is assumed that information received from the EA and Thames Water is accurate and up to date. Notwithstanding this, the methodology is considered robust, utilising reasonably available information, and conforms to the requirements of local and national guidance and planning policy.

11.18 The baseline conditions for water resources and flood risk are not considered to evolve. On this basis the 'future' baseline conditions would remain the same as reported within the Baseline Conditions section below. It should be noted that in relation to the flood risk, the available EA data take into account the impact of climate change on future flood levels.

Baseline Conditions

Topography

11.19 The levels adjacent to the Site boundary range from approximately 4.25m Above Ordnance Datum (AOD), at the north east corner of the Site, to 3.50m AOD at the south east corner of the Site on King's Head Yard/ White Hart Yard. The elevation of Borough High Street parallel to the Site on the western side ranges from 5.34m AOD to 4.96m AOD with a slope towards the south. St. Thomas Street to the north ranges from 4.97m AOD to 4.25m AOD with a slope in westerly direction, towards Borough High Street.

Geology, Hydrology and Hydrogeology

11.20 The geology beneath the Site, summarised in **Table 11.4**, has been established from the British Geological Survey (BGS) 1:50,000 scale Geological Map, Sheet 256 (North London, Solid and Drift Edition), BGS boreholes TQ38-SW-2159, TQ38-SW-2157, TQ38-SW-2156, TQ38-SW-2160 and the BGS website.

Table 11.4: Site Geology

Stratum	Area Covered	Thickness of Stratum (m)	Typical Description
Made Ground	May be locally absent beneath the existing lower ground floor	2.4 – 3.5	Brown, silty, very sandy clay with fine to coarse gravel-sized brick, concrete and flint, wax, shell fragments and brick cobbles.
Alluvium	May be locally absent beneath the existing lower ground floor	2.1 – 5.1	Firm orange-brown clay with occasional roots and fine-coarse gravel.
Kempton Park Gravel Member	Whole Site	3.3 – 6.7	Orange-brown fine to coarse sand with rounded flints and chalk gravel, and occasional cobbles.
London Clay Formation	Whole Site	19 – 20	Firm, stiff orange-brown clay with occasional silt beds.

Stratum	Area Covered	Thickness of Stratum (m)	Typical Description
Lambeth Group	Whole Site	43	Very stiff red-brown mottled clay with very silty, sandy clay.
Thanet Formation	Whole Site	60	Green sands and gravel with flints and occasional clay beds.
Chalk Group	Whole Site	-	White chalk with flints.

11.21 The nearest surface water to the Site is the River Thames, approximately 200m north and running west to east. The River Thames forms part of the River Thames and Tidal Tributaries Site of Metropolitan Importance for nature conservation. The section of River Thames nearest to the Site is also known as the Middle Thames and is located within the Thames River Basin Management Area. It has been assessed by the EA as having an overall ‘ Moderate’ status, resulting from a ‘Moderate’ ecological status and ‘Fail’ chemical Quality.

11.22 As the current overall quality of this receptors is ‘Moderate’, the surface water quality receptor is assessed as being of ‘Medium’ sensitivity.

11.23 According to the EA online dataset, the geological deposits underlying the Site are classified as per **Table 11.5**.

Table 11.5: Summary of Hydrogeological Properties of the Main Geological Strata

Stratum	EA Classification	Hydrogeological Significance
Made Ground	Not classified	Likely to be of negligible significance for water supply or base flow.
Alluvium	Secondary (Undifferentiated) Aquifer	May be important in supporting local abstractions or in providing baseflow to rivers and streams
Kempton Park Gravel Member	Secondary A Aquifer	May be important in supporting local abstractions or in providing baseflow to rivers and streams
London Clay Formation	Unproductive Strata	May be important in supporting local abstractions or in providing baseflow to rivers and streams
Lambeth Group	Secondary A Aquifer	Permeable layers capable of supporting water supplies at a local rather than strategic scale.
Thanet Formation	Secondary A Aquifer	Permeable layers capable of supporting water supplies at a local rather than strategic scale.
Chalk Group	Principal Aquifer	High intergranular and/ or fracture permeability – meaning they usually provide a high level of water storage and likely to be used for potable water abstraction.

11.24 Shallow aquifers - Alluvium (Secondary Undifferentiated Aquifer) and the Kempton Park Gravel Member (Secondary A Aquifer) – overlaying the low permeable London Clay Formation (Unproductive Stratum) may be important in supporting local abstractions or in providing baseflow to rivers and streams. As such, considered together, these aquifers are considered to have an overall ‘Medium’ sensitivity.

11.25 Secondary A Aquifers lie within the Lambeth Group and Thanet Formation stratum underneath the Site. These Secondary A Aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale and as such have 'Medium' sensitivity.

11.26 The Site is not located within a groundwater Source Protection Zone.

11.27 According to BGS borehole information, groundwater is likely to be encountered at shallow depths within the Alluvium and underlying Kempton Park Gravel Member. It is anticipated groundwater flow will be in a northerly direction, towards the River Thames.

11.28 There are five recorded active groundwater abstractions within a 1km radius of the Site. The closest is located 605m east.

11.29 No groundwater discharge consents are recorded by the Groundsure dataset within a 1km radius of the Site.

11.30 Since the Site is not located in a groundwater Source Protection Zone. Groundwater vulnerability is therefore classified as 'Low'.

Flood Risk

Tidal and Fluvial Flood Risk

11.31 In estuarine areas such as London, flooding might arise from either fluvial or tidal flooding, or a combination of the two. Fluvial flooding is caused by rivers, watercourses or ditches overflowing. Tidal flooding is caused by elevated sea levels or overtopping by wave action.

11.32 Based on the EA's 'Flood Risk from Rivers or the Sea'[13], the Site is at very low risk - an area assessed as having less than 0.1% annual probability (1 in 1000 annual probability) of river or sea flooding (refer to Figure 6.2 of **Appendix 11.1**).

11.33 The EA data contained in Appendix E of **Appendix 11.1** confirms that the Site is within an area benefiting from flood defences and that these are maintained in good condition and are inspected twice a year to ensure they remain fit for purpose. The LBS SFRA also confirms that the flood defences in the area are maintained in good condition and are therefore unlikely to fail.

11.34 Using all the available evidence it is therefore considered that the Site has a 'very low' probability of flooding from fluvial and tidal sources.

Breach of Tidal Defences

11.35 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 – a breach scenario.

11.36 The EA have provided the modelled flood extents from their 'Thames Tidal Upriver Breach Inundation Modelling Study 2017' completed by Atkins Ltd in May 2017. Those levels are based upon the Thames defences being breached.

11.37 The modelled breach extent confirms that the Site is impacted by the breach of the flood defences and the resulting maximum flood level is 4.75m AOD.

11.38 Comparison of the Site topographic survey and the modelled inundation flood level of 4.75m AOD indicates that the Site would be impacted by a maximum depth of flood water of 1.2m in King's Head Yard.

Flooding from Sewers

11.39 Sewer and highway drainage flooding occurs when the capacity of systems are exceeded, or the function of the system is impeded, which results in surcharging of the system and water being forced to the surface via gullies, manholes, foul water appliances such as toilets or other dedicated overflows.

11.40 The available Thames Water record plan indicates that there are a number of large combined public sewers in the vicinity of the Site (see below section on drainage for further details). As all the drainage infrastructure in the area is combined, the consequences of sewer flooding may be high due to the limited inflow capacity of road drains in the event of an extreme storm. This may be worsened by blocked drains or gullies. However, the LBS's SFRA indicates that the Borough's drainage infrastructure is regularly cleaned and maintained.

11.41 Map A2 in Appendix B of **Appendix 11.1** - 'Flooding History' in the LBS's SFRA indicates that there has been a 'localised flooding incident' close to the Site. However, to ensure a more detailed check, a Sewer Flooding History Enquiry was lodged with Thames Water in March 2018. Thames Water subsequently confirmed that there is no recorded history of sewer flooding at the Site (refer to Appendix C of **Appendix 11.1**). A new enquiry with Thames Water has been lodged in March 2021 (refer to Appendix C of **Appendix 11.1**).

11.42 Using all the available evidence it is considered that the Site has a 'low probability' of flooding from sewers and the local drainage network, as long as they continue to be adequately maintained in the future.

Surface Water (Pluvial) Flood Risk

11.43 Surface water flooding can occur as a result of either overland flow or ponding. Overland flow occurs following heavy or prolonged rainfall, snow melt, or where intense rainfall is unable to soak into the ground or enter drainage systems due to blockages or capacity issues. Unless it is channelled elsewhere, the run-off travels overland, following the gradient of the land. Ponding occurs as the overland flow reaches low lying areas in the local topography. These flood events tend to have a short duration and depend on a number of factors such as geology, topography, rainfall, saturation, extent of urbanisation and vegetation.

11.44 As the surrounding area is highly developed, it almost entirely comprises of impermeable hardstanding area, which during high intensity storms will generate large surface water runoff flows. Map A4 'Flood Map for Surface Water' of the LBS's SFRA (Appendix B of **Appendix 11.1**) shows that the Site is located within an area identified as a Critical Drainage Area and the Site appears to be located within an area identified as a low to medium risk of flooding (between 1 in 100 years (1%) and 1 in 1000 years (0.1%)).

11.45 The EA's Risk of Flooding from Surface Water map breaks down the flood risk for the Site into probabilities ranging from "High" to "Very Low" risk of occurring:

- In the high-probability scenario (each year this area has a chance of flooding greater than 3.3%), there is potential for a small patch of slow moving water (less than 300mm deep and less than 0.25 m/s) on King's Head Yard/ White Hart Yard at the lowest point south east of the Site (refer to Figures 6.6 and 6.7 of **Appendix 11.1**).
- In the medium-probability scenario (each year this area has a chance of flooding of between 1% and 3.3%), localised flooding on the Site occurs in the existing internal courtyard (which would be the New Yard in the Development). The extent of flooding on King's Head Yard/White Hart Yard in this probability is larger in extent and exceeds 300mm in depth with the velocity more than 0.25m/s (refer to Figures 6.8 and 6.9 of **Appendix 11.1**).
- The low-probability scenario (each year this area has a chance of flooding of between 0.1% and 1%) shows further increase in flooding on the surrounding roads with potential for a small patch of water extending onto the south east corner of the Site. There is also surface water flooding alongside the eastern Site boundary which appears to be associated with the existing lightwell. A small patch of water is evident on St. Thomas Street; however, it is believed to be associated with existing lightwells as the extent of surface water flooding on the adjacent highway does not appear to be as severe. The main pluvial flood risk to the Site is from King's Head Yard where the surface water flooding exceeds a depth of 900mm with a velocity greater than 0.25m/s and flows towards the Site because of the additional flows from Collingwood Street in this scenario (refer to Figures 6.10 and 6.11 of **Appendix 11.1**).

Groundwater Flood Risk

11.46 Groundwater flooding is caused by the emergence of water originating from sub-surface permeable strata and is often highly localised and complex. After a prolonged period of rainfall, a considerable rise in the water table can result in inundation for extended periods of time.

11.47 Map A5 in Appendix B - 'Areas at Risk of Flooding from Groundwater' in the LBS's SFRA confirms that the Site is located within an area with potential for groundwater flooding of any property situated below ground level.

11.48 Desktop studies carried out by AKT II as part of the FRA confirm that perched groundwater is likely to be encountered during the basement construction. The groundwater in the Site is expected to be relatively shallow.

Flood Risk from Artificial Sources

11.49 Where infrastructure retains, transmits or controls the flow of water; flooding may result if there is a structural, hydraulic, geotechnical or mechanical failure of the infrastructure.

11.50 Although unlikely, water mains can burst without any warning, resulting in the flooding of nearby properties. A number of water mains surround the Site (refer to the Potable Water Supply and Demand section below for further details). Thames Water are currently replacing the Victorian water mains across London which would reduce the probability of water mains bursting and therefore reduce the risk of flooding to the Site.

11.51 The topography of the surrounding roads suggests that flooding due to any burst will continue to flow southward along Borough High Street and westward along St. Thomas Street rather than entering the Site.

11.52 There are no other artificial sources of flooding in the immediate vicinity of the Site. The EA's Flood Map for Reservoirs indicates that the Site is not at risk from flooding associated with reservoirs or artificial sources (refer to Figure 6.5 of **Appendix 11.1**).

11.53 Based on this information it is considered that the Site is at low risk of flooding from artificial sources. Consequently, flood risk from artificial sources has not been considered further in this chapter.

Sensitivity of the Flood Risk Receptors

Since the Development will introduce commercial uses, the sensitivity of the receptors is anticipated to be 'Medium' once the Development is completed and operational.

Drainage

11.54 The available Thames Water record plans (refer to Figure 6.3 of **Appendix 11.1**) indicate that the closest combined public sewers to the Site are:

- A 1143mm x 762mm combined sewer running under St. Thomas Street to the north of the Site;
- A 375mm diameter combined water sewer running under Keats House in the east of the Site (CCTV surveys record the actual pipe diameter as 300 mm); and
- A 305mm diameter combined water sewer in King's Head Yard to the south of the Site.

11.55 It is understood that all surface and foul water from the existing buildings currently discharges directly to one or more of these public sewers unattenuated, but it is not clear which one. A CCTV survey of the existing Thames Water sewer running through the Site and under Keats House has been carried out. The extent of the existing private on-Site drainage network is currently unknown. A CCTV survey of the existing network is therefore recommended in order to rule out any third-party connections from the adjacent properties and to confirm the existing outfalls.

11.56 For the peak 1-in-1-year return period storm event, the existing surface water discharge rate from the Site has been calculated as 30.9 litres per second (l/s) and for the peak 1-in-100-year return period storm event this gives an existing surface water discharge rate from the Site of 84.4 l/s.

11.57 Based on existing plans of the New City Court building, Keats House and the Georgian Terrace, the total existing foul flow from the Site has been calculated as 8.5l/s.

Thames Water combined public sewers are located adjacent to the Site. It is believed that all surface water and foul water from the existing building currently discharges to one or more of these public sewers. Given these sewers are public (rather than private) these are considered to be have 'High' importance / sensitivity.

Potable Water Supply and Demand

11.58 Thames Water is responsible for public water supply within and in the locality of the Site. 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.

11.59 The Thames Water Asset Map (refer to Figure 6.4 of **Appendix 11.1**) indicates that there are 800mm diameter trunk and 250mm diameter distribution mains running parallel to the Site in St. Thomas Street, they both then turn into Borough High Street and increase in diameter to 900mm and 300mm, respectively. Additionally, a 180mm diameter distribution main is located south of the Site in King's Head Yard.

11.60 Based on historic water meter data provided by the Applicant, the daily water usage for the existing Site buildings is estimated to be around 50m^3 per day.

11.61 Thames Water public water supplies are located adjacent to the Site. Given these water mains are public (rather than private) these are considered to be have 'High' importance / sensitivity.

Assessment of Likely Significant Effects

The Works

Tidal and Fluvial Flood Risk

11.62 Due to the presence of the Thames Tidal Defences, the risk of flooding from tidal and fluvial events is considered to be low. This would remain the case during the Works. In the unlikely event of a breach, construction workers would be able to walk westward from the Site in order to reach dry ground on Borough High Street or Bedale Street. As such, the overall effects associated to the risk of flooding of the Site from tidal and fluvial sources during the Works is likely to be **negligible.**

Groundwater Flooding

11.63 The proposed basement would comprise two storeys. The finished floor levels (FFL) of the first and second basement floors are approximately -0.050m Above Ordnance Datum (AOD), and -4.650m AOD (with the level of the ground lying at approximately 5.0m AOD). The formation levels of the basement, instead, would be approximately -6m AOD under the footprint of the Tower and -5m AOD under the public realm and Keats House, with foundation structures and lift pits extending further down.

11.64 The basement would be confined by secant piling retaining walls. Secant piles would be installed from either existing basement level B1 or ground and would be generally 600mm in diameter, increasing to 900mm diameter along the north side of the proposed building, adjacent to the Georgian Terrace. However, there are two zones (beside off-site buildings Conybeare House on the north-east side and Iris Brook House on the south-east side) where the diameter would be reduced to 450mm. The secant piles would generally be progressed to a depth of 12-16m from the bottom of the capping beam (capping beam section depth 1000mm-1200mm typically) at basement level B1; however, the secant piles along the north elevation of the Tower - opposite to

the Georgian Terraces - are anticipated to be progressed to a depth of circa 28m from basement level B1. Piling depth will be confirmed based on the findings of the geotechnical investigation.

11.65 Bearing piles and plunge columns would be installed from basement level B1 and would be Continuous Flight Auger (CFA) piles with 900mm diameter. The load bearing piles would be extended to a depth of circa 28m from basement level B1. Piling depth will be confirmed based on the findings of the geotechnical investigation.

11.66 Groundwater at the Site is expected to be relatively shallow (approximately 4.6-9m below ground level), as such is likely to be encountered during the excavation works required to construct the basement. This could lead to the ingress of groundwater and potential flooding of excavated areas. The potential effect of increased flood risk from groundwater during construction, however, would be temporary and highly localised on-Site. It is 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 Site, 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

11.67 Construction works, including earthworks, 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 existing 375mm Thames Water sewer running under Keats House would require diverting to allow for basement. The sewer diversions would need to be undertaken prior to the commencement of the basement construction.

11.68 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, towards areas at higher risk of surface water flooding. This could increase run-off from the Site as a result of changes to frequency and intensity of rainfall events as a result of climate change. 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**.

Effects to Controlled Waters from Ground Contamination

11.69 During the Works, it is likely that new sources of contamination would be introduced to the Site, such as 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 underlying aquifers). In addition, contaminated surface water could come from activities such as wheel washing, dust suppression and the washing down of construction areas. Potential pathways include temporary surface water drainage systems, infiltration of surface water towards the saturated strata and migration within the groundwater.

11.70 The Works would be undertaken in accordance with the Control of Substances Hazardous to Human Health (COSHH) Regulations 2002[15], and in-line with best practice. 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**.

Foul and Potable Water Infrastructure Capacity

11.71 Wastewater generation from the Works would include effluent from retained 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 with a suitable discharge consent However, this is not expected to result in an increase in foul water flows compared to the existing Site and due to the low volumes anticipated, this is expected to be **negligible**.

11.72 The Works may require the use of water supply for wheel washing, dust suppression and the washing down of construction areas. However, the volume anticipated is not expected to be more than the existing water supply demand rate for the Site and therefore the effect on water supply and demand is considered to be **negligible** .

Completed and Operational Development

Tidal and Fluvial Flood Risk

11.73 The Development has been designed to ensure the protection of the users of the buildings even in the unlikely event of a breach of the flood defences, where the Site would be impacted by a maximum breach level of 4.75m AOD. To this aim, there are only servicing, storage and plant uses at ground floor and basement levels and the building users could safely evacuate to a 1st floor level (or above) and safely remain inside the building in the event of a breach of the flood defences.

11.74 In order to prevent flood water entering the ground and basement levels of the Development, the design includes a series of inherent mitigations:

- Entrances along St Thomas Street would have temporary flood barriers capable of resisting the head of water up to maximum level of 4.75m AOD;
- Facades capable of resisting the head of water up to maximum level of 4.75m AOD (breach level); and
- Any openings to be set above the breach level of 4.75m AOD; and
- Raised walls of the existing lightwells above the level of 4.72m AOD (applicable to Keats House only).

11.75 Further details on the mitigations are provided within Appendix F of **Appendix 11.1**.

11.76 The Development is likely to result in minor local-scale changes to the flood risk of the Site, the Development would include flood mitigations measures as part of the Design and would introduce non-residential receptors to the Site (which are considered to have a 'Medium' sensitivity) and would generally result in **negligible** effect in respect of flood risk from tidal and fluvial sources.

11.77 In the event of a breach of the flood barriers effects are anticipated to be **long-term, local adverse** effect of **minor significance.**

Flooding from Sewers

11.78 The Development would result in an increase in flow rate of approximately 20 l/s into the public sewer, which would need to be agreed with Thames Water by a way of submitting a pre-

development enquiry and secured under Section 106 of the Water Industry Act 1991[16]. A pre-development enquiry was submitted in March 2021.

11.79 Given the requirement for an agreement with the Thames Water is required for the discharge to foul, considering that there no recorded history of sewer flooding at the Site and that the sewers are expected to continue to be adequately maintained and regularly cleaned, it is anticipated that the Development would have a **negligible** effect on sewer surcharging flooding.

Surface Water (Pluvial) Flooding

11.80 There are three main areas within the Site identified as at risk from surface water flooding.

- An area in the south east portion of the Site, having a small patch of slow moving water on King's Head Yard at the lowest point of the Site and an additional small patch of water in the east corner;
- The existing courtyard area (to be New Yard), however this would be remodelled and adequate drainage provision proposed as part of the proposed design;
- The area in the eastern portion of the Site, which it is believed to be associated with existing lightwell of Keats House. However, the lightwell is planned to be removed as part of the Development.

11.81 Without mitigation, there remains a residual risk of surface water flooding at the low point in levels on King's Head Yard.

11.82 Buildings users could safely remain in the buildings during any flood in the surrounding area without endangering themselves.

11.83 The Site is located within a Flood Warning / Flood Alert area; therefore, in the event potential flood events, it is anticipated that advance warning will be given to the building's users by the building management team to enable the building to be evacuated in a timely manner.

11.84 A combination of tanked permeable surface would be provided at podium level and along with a blue roof system, in order to achieve a total attenuation volume of approximately 190 m^3 (based upon a greenfield run-off rate of 3.49 l/s for a range of discharge rates plus 40% climate change).

11.85 In addition, further consideration is to be given as the design progresses with regard to the possibility of incorporating a rainwater harvesting system where roof water could be collected for re-use to flush toilets or irrigate planted areas. This option would be investigated further at the next design stages, to determine its suitability in terms of the plant space requirements, the need for a secondary water distribution network, the available yield and demands.

11.86 It is proposed to re-use the existing drainage connections to discharge surface water to the public sewers, subject to the findings of the CCTV survey. The inclusion of the blue roof system and tanked permeable surface would result in a reduction in the volume and peak rate of surface water runoff from the Site. This is also likely to have beneficial effects on flood risk elsewhere compared to the current situation. Escape routes are in place in the event of a surface water flooding event would ensure that the buildings users of the Development would be safer areas.

11.87 The risk of surface water flooding from the low point in levels on King's Head Yard is to be mitigated with the use of permanent flood resilient doors included within the design of the building

entrances, in order to prevent flood water entering the property. Further details on the mitigation measures are provided within Appendix F of **Appendix 11.1.**

11.88 Given that surface water flooding is not easily predicted and occurs rapidly and in a short time frame from short peak rainfall events, flood protection to Kings Head Yard is to be provided by flood resilient doors. These shall be closed when the buildings in not in use/overnight and could be closed quickly in the event of intense periods of heavy rainfall, where there is evidence of water level rising in the external carriageway areas.

11.89 New vehicular access from St. Thomas Street into the loading bay would retain the existing ground levels at the back of footpath which would ensure that the Development is suitably protected from surface water flooding.

11.90 Based on the measures above it is considered that the likely residual effect would be **negligible** in respect of surface water flooding.

Groundwater Flooding

11.91 As described previously, groundwater at the Site is expected to be relatively shallow and the proposed basement would sit within and below the groundwater level. As such, the basement would be designed to be suitably waterproofed for the lifetime of the Development. Therefore, the effect of the Development on groundwater flooding is considered to be **negligible**.

Change in Foul Water Drainage Capacity

11.92 As set out in **Appendix 11.2**, the overall peak foul water rate of the Development has been calculated as 28.8 l/s (of which 25.6 l/s for the office space, 0.3 l/s for the retail space and 2.9 l/s for the retail space). This would result in an increase in flow rate of approximately 20 l/s into the public sewer, which would need to be agreed with Thames Water by a way of submitting a pre-development enquiry and secured under Section 106 of the Water Industry Act 1991[17].

11.93 Subject to detailed design, it is anticipated that any foul water drainage from ground floor level and above will be drained by gravity in order to minimise the amount of pumping required. It is recommended that an allowance is made at this stage for pumping foul water from below the basement level slab up to high level in the basement to allow it to discharge by gravity to the public sewer. As with the surface water drainage, due to the depth of the public sewers it is recommended that, if possible, the existing drainage connection(s) should be reused, subject to the findings of the CCTV survey.

11.94 The proposed foul drainage would be designed in accordance with British Standards BS EN 752 - Drain and Sewer Systems Outside Buildings[18] and BS EN 12056 - Gravity Drainage Systems Inside Buildings[19], as well as Approved Document H of Building Regulations[20]. If new connections are required, these would be secured under Section 106 of the Water Industry Act 1991 (separate from a planning S106 agreement).

11.95 Accordingly, it is considered likely that the Development would have a **negligible** effect upon the capacity of foul water drainage infrastructure and sewage treatment works, provided that Thames water confirms there is sufficient capacity within the network.

Change in Potable Water Demand

11.96 The proposed building mains water demand rate of the Development has been calculated by Chapman BDSP as 159m^3 daily with a peak flow of 4.1l/s. This represents an increase in potable water demand on the Site than existing, which was estimated to be 50m^3 daily. It was not possible to accurately measure the existing peak flow, however based on daily water usage volume of 50m^3 and size of the incoming main (80mm Ø), the existing peak flow would be no greater than the proposed 4.1l/s.

11.97 Water use can be minimised by installing water efficient fittings and appliances. The Development would seek an improvement over building regulations, and this would be achieved with reference to the BREEAM 'Wat 01' water credits requirement, measures would include (but not be limited to) the following:

- A water meter with a pulsed output would be provided for the water supply of the building and for each tenancy;
- Flow control devices would be installed in high water use areas of the Development, to shut off water supplies when there is no usage;
- A major leak detection system would be installed; and
- The proposed landscape design and associated irrigation strategy would be designed to be water efficient.

11.98 Considering the water efficiency measures to be implemented and that the additional demand on potable water is anticipated to be adequately accommodated, the likely effect of the Development on potable water demand has been assessed to be **negligible**.

Mitigation Measures and Likely Residual Effects

The Works

Tidal and Fluvial Flood Risk

11.99 The likely effect of flood risk from tidal and fluvial sources during the Works would be negligible. As such, no mitigation measures are required and the residual effect would remain **negligible**.

Groundwater Flooding

11.100 The extension and construction of the basement would involve excavation to below likely groundwater levels. Groundwater management measures would be set out within the Site-specific Environmental Management Plan (SEMP). The SEMP would include measures for the appropriate dewatering and disposal, using standard techniques such as sumps and pumps. This would mitigate the risk of groundwater flooding during excavation works and result in a **negligible** likely residual effect.

Surface Water (Pluvial) Flood Risk

11.101 The SEMP developed for the Works 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 would be designed and managed to comply with BS 6031:2009 'The British Standard Code of Practice for Earthworks'[21], 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.

11.102 Following the implementation of these measures, the anticipated likely residual effect of surface water flooding during the Works would be **negligible**.

Effects to Controlled Waters from Ground Contamination

11.103 The Works would be undertaken in accordance with the SEMP to limit the potential adverse effects on Controlled Waters. Protective measures to be included within the SEMP would include:

- Handling and storing any potential hazardous liquids/materials in accordance with relevant legislation and Environment Agency (EA) pollution prevention guidance;
- The use of appropriately tanked and bunded storage areas for fuels, oils and other chemicals;
- Procedures for the management of materials, spillage and spill clean-up, use of best practice construction methods and monitoring;
- Surface drainage would pass via settlement and oil interception facilities, where required, and discharge arrangements would be agreed with the EA and Thames Water Utilities Limited;
- The provision of adequate drainage to manage surface water run-off and minimise contaminated water reaching the groundwater;
- The stockpiling of contaminated materials would be avoided, wherever possible. Stockpiles would be located on areas of hard standing or on plastic sheeting to prevent mobile contaminants infiltrating into the underlying ground; 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.

11.104 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 **negligible**.

Foul and Potable Water Infrastructure Capacity

11.105 The likely effects of the Works upon wastewater were identified as being negligible. Therefore, no mitigation measures are considered necessary and the likely residual effect would remain as per the likely effect (**negligible**).

11.106 To reduce the water demand of the Development during the Works, the SEMP would need to ensure that all relevant contractors are required to investigate opportunities to minimise and reduce the use of water. These measures should include, but not be limited to:

- 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; and
- Where possible, water from excavation would be used for dust suppression during construction.

11.107 Water consumption throughout the Works would be monitored with meters fitted on all temporary supplies and the usage recorded at least daily, to allow a comparison against best practice benchmarks, identify excessive use or leaks. With these control measures in place, the likely residual effects of the Work upon potable water supply would be **negligible**.

Completed and Operational Development

Tidal and Fluvial Flood Risk

In the event of a breach of the flood barriers effects are anticipated to be long-term, local adverse effect of minor significance.

11.108 The building managers would be registered with the EA Flood Warning System and a Flood Warning and Evacuation Plan (which can be secured through an appropriately worded planning condition), would be developed to ensure the Development is operated safely and that people are evacuated in a safe manner in the unlikely event that the defences fail in the River Thames.

As a result, the likely residual effect of tidal and fluvial flooding on the users of the Development would be **negligible**.

Flooding from Sewers

11.109 The risk of flooding from surcharging sewers would be negligible 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 **negligible**.

Surface Water (Pluvial) Flooding

No further mitigation measures are considered necessary over and above the ones already included within the design. Consequently, the likely residual effects of the Development in respect to surface water flooding would remain as per the likely effect, that is **negligible**.

Groundwater Flooding

11.110 Given that the proposed basement would be appropriately waterproofed no further mitigation measures are considered necessary. Consequently, the likely residual effects of the Development in respect of groundwater flooding would remain as per the likely effect, that is **negligible**.

Change in Foul Water Drainage Capacity

11.111 The Development is likely to result in a negligible effect in respect of the capacity of foul water drainage infrastructure and sewage treatment works. As such, no mitigation measures are required and the residual effect would remain as per the likely effect, that is **negligible**.

Change in Potable Water Demand

11.112 The Development is likely to result in a negligible 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 **negligible**.

11.113 In addition to the water efficiency measures detailed in the assessment of the likely effects, future users of the Development would be encouraged to adopt a more responsible attitude to water use. They would be provided with a non-technical guide which details the operation and performance of the building, including information on water efficient fittings, recommendations for their most efficient usage.

11.114 **Table 11.6** summarises the likely significant effects, mitigation measures and likely residual effects identified within this Chapter.

Table 11.6: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Tidal and fluvial flood risk	**Negligible**	None required	**Negligible**
Groundwater flooding	**Temporary**, **short** to **medium-term**, **local**, **adverse effect** of **minor significance**	Appropriate dewatering and disposal, using standard techniques such as sumps and pumps	**Negligible**
Surface water (pluvial) flooding	**Temporary**, **short to medium term**, **local**, **adverse effect** of **minor significance**	Implementation of SEMP including adequate temporary drainage	**Negligible**
Effects to Controlled Waters from ground contamination	**Temporary**, **short to medium term**, **local**, **adverse effect** of **minor significance**	Implementation of SEMP detailing protective measures	**Negligible**
Foul and potable water infrastructure	**Negligible (foul);** **Negligible (potable water)**	None required (foul) Implementation of SEMP including measures to minimise and reduce water use (potable water)	**Negligible**
Completed and Operational Development			
Tidal and fluvial flood risk	**Negligible** (non-breach scenario of flood defence) **Long-term, local adverse** effect of **minor significance** (breach scenario of the flood defence)	Registration with EA Flood Warning System and a Flood Warning and Evacuation Plan	**Negligible**
Flooding from sewers	**Negligible**	None required	**Negligible**
Surface water (pluvial) flooding	**Negligible**	None required	**Negligible**
Groundwater flooding	**Negligible**	None required	**Negligible**
Change in foul Water drainage capacity	**Negligible**	None required	**Negligible**
Change in potable water demand	**Negligible**	None required. However, a non-technical guide would be prepared for the building, detailing the operation and performance of the building, including information on water efficient fittings, recommendations for their most efficient usage.	**Negligible**

Monitoring

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

References

1 London Borough Of Southwark (2017); 'London Borough of Southwark Strategic Flood Risk Assessment', January 2017, Conway AECOM, Southwark Council.

2 Environment Agency (2017); 'Thames Tidal Upriver Breach Inundation Modelling Study 2017, Atkins Ltd, May 2017.

3 Waterman IE (2018); 'Preliminary Environmental Risk Assessment', ref: WIE11375-103-R-3-1-3-RJM.

4 Southwark Council (2010); 'CDB8. Strategic Flood Risk Sequential Test', March 2010.

5 Ministry of Housing, Communities & Local Government (2019); 'National Planning Policy Framework'.

6 Ministry of Housing, Communities & Local Government (2014): 'Planning Practice Guidance – Flood Risk and Coastal Change'.

7 Greater London Authority (2021); 'The London Plan. Spatial Development Strategy for Greater London'.

8 London Borough of Southwark (2009); Sustainable design and construction. Supplementary planning document.

9 London Borough of Southwark (2020); New Southwark Plan – Draft for Consultation, August 2020.

10 Southwark Council (2017); Developers' Guide for Surface Water Management.

11 Greater London Authority (2021); 'The London Plan. Spatial Development Strategy for Greater London'.

12 Her Majesty's Stationery Office (2017); The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

13 Environment Agency (2018); 'Flood Risk from Rivers or the Sea' (accessible online: https://flood-map-for-planning.service.gov.uk/).

14 Thames Water (2013); 'Water Resources Management Plan 2015-2040, December 2013.

15 Control of Substances Hazardous to Health Regulations 2002, The Stationery Office.

16 Her Majesty's Stationery Office (1991); Water Industry Act 1991, ch 56/1991.

17 Her Majesty's Stationery Office (1991); Water Industry Act 1991, ch 56/1991.

18 British Standards (2008); BS EN 752:2008 'Drain and Sewer Systems Outside Buildings'.

19 British Standards (2000); BS EN 12056-4:2000 'Gravity Drainage Systems Inside Buildings'.

20 Department for Communities and Local Government (2010); 'Drainage and waste disposal: approved Document H', Approved Documents and Building regulation.

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

12. Wind Microclimate

Introduction

12.1 This chapter, which was prepared by Wirth Research, presents an assessment of the likely wind microclimate effects of the Development. In particular, consideration is given to the likely significant effects of wind upon pedestrian comfort and safety.

12.2 A description of the assessment methodology; a description of the relevant baseline conditions of the Site and surrounding area; and an assessment of the likely significant effects of the Development, that could arise during demolition, deconstruction, refurbishment and construction (the 'Works'), and once the Development is completed and operational is presented in this chapter. Where appropriate, mitigation measures are identified to avoid, reduce or offset adverse effects and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described.

12.3 This chapter is accompanied by **Appendix 12.1**: New City Court Wind Technical Appendix presented in **ES Part 4**.

Assessment Methodology and Significance Criteria

Assessment Methodology

12.4 The assessment was performed using Wirth Research's high-resolution Computational Fluid Dynamics (CFD) modelling. Appendix 12.1 details the methodology used in this assessment.

12.5 CFD is a computer based modelling technique, which simulates the effect of wind on the built environment. The air is divided into hundreds of millions of "cells", within which the equations of motion are solved. Wirth Research use a high-performance supercomputer, 500 times faster than a standard desktop, to achieve market leading accuracy. The CFD modelling delivers a detailed assessment of wind conditions in and around a site for all wind directions in terms of pedestrian comfort and strong winds.

12.6 Wirth Research use an in-house method to account for gusts, which has been correlated against world leading wind tunnels, which ensures that the effect of gusts is accurately predicted.

Consultation

12.7 The EIA Scoping Opinion issued on 4 October 2018 for the 2018 Scheme states that the radius of the CFD model should be at least 300m, that the long term meteorological data should include over 20 years' worth of data, that the wind comfort is assessed using the Lawson Comfort Criteria and that wind effects during the works are assessed. The Scoping Opinion also states that a qualitative assessment of the works, using CFD results of the baseline and completed and operational Development is acceptable. The points above have been addressed within the assessment reported in this chapter.

12.8 A further informal scoping request was submitted in February 2021. As set out in **Chapter 2**, the London Borough of Southwark (LBS) response requested the scope of the EIA was amended as follows:

- Updated legislation, guidance, industry best practice and policy context;
- Updated baseline information;
- Further and updated surveys undertaken since the 2018 ES Scope was agreed;
- Additional assessment and information, as is relevant, that was identified as being required within the detailed ES reviews undertaken by LUC on behalf of LBS of the 2018 ES;
- Current data availability and representativeness due to the Covid-19 restrictions; and
- Revised scheme proposals.

12.9 This amended scope has been accounted for in this chapter.

12.10 During the public consultation event held between April to August 2018 of the 2018 Scheme, concerns were also raised about the effect of the Development on the wind microclimate around Southwark Cathedral, so this is also considered within the assessment.

Establishing Baseline Conditions

12.11 Baseline conditions were established using a high resolution CFD model, encompassing a 500m radius of the Site and surrounding area. The extent of the model is shown in **Figure 12.1**.

12.12 The on-site model was constructed from 3D Computer Aided Drawing (CAD) planning application drawings provided by the Applicant's architect, AHMM.

12.13 The surrounding context model was constructed from 3D CAD provided by Zmapping on 26 May 2017, and updated in December 2020 to reflect the latest developments, namely Shard Place and 1 Bank End, when the CFD studies commenced. This model is anticipated to match the surrounding context once the Works commence, with the exception of the cumulative schemes outlined in **Chapter 14 – Cumulative Effects**, models of which were added.

12.14 Models of Shard Place, 1 Bank End and the cumulative schemes were constructed from drawings sourced from the LBS planning portal or from within the Wirth Research CAD library if available.

12.15 Additional detail was added to the Shard and London Bridge Place in accordance with 3D CAD provided by Miller Hare.

12.16 A model of the Development was included within the CFD model and tested to determine the conditions at and around the Site. This model includes the external terraces of the Development (at Podium Level 3, on the Roof at Level 24 and on the Upper Roof at Level 26).

12.17 The model included the street level space within the London Bridge Underground station, including the Borough High Street ticket office. The proposed Development provides an additional on-site entrance to the Borough High Street ticket office.

12.18 The model was run at full scale from 18 wind angles, spaced using 10° or 30° increments such that no sector contributes more than 10% of the annual wind. The wind angles which were run are indicated in **Figure 12.2**. The method described in this chapter gives a maximum sectoral contribution of 8.9% of the annual wind, compared to 10.2% if equally spaced angles were used. This further reduces the level of risk with regards to providing appropriate coverage of the full range of wind angles.

12.19 Wind speeds were measured at 1.5m above any surfaces expected to be used for pedestrian activity, across the entire extent of the model.

12.20 On-site and local wind speeds were combined with 30 years-worth of weather data obtained from the UK Meteorological Office for a “superstation” (consisting of Heathrow airport, Gatwick airport and Stansted airport), corrected for terrain local to the airport and the Site, to obtain annual and seasonal frequency and magnitude of wind speeds across the model. This allows the ‘grading’ of the pedestrian level winds according to the Lawson Comfort Criteria, which are explained later in this chapter.

12.21 A wind rose for the airports showing how wind speed and direction are typically distributed is shown in **Figure 12.2**.

12.22 The correction factors between the airport ‘superstation’ (measured 10m above ground) and the Site (at a reference height of 120m) are shown in Table 12.1. It should be noted that the terrain analysis has been performed using sectors of 30°, which is presented here.

Table 12.1: Site Wind Correction Factors

Direction (°N)	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°
Corr. Factor	1.45	1.42	1.40	1.54	1.46	1.43	1.38	1.37	1.38	1.36	1.43	1.45

12.23 The wind microclimate effects are assessed annually, for the summer months (June, July, August) and for the ‘windiest season’ (winter in this case, consisting of December, January and February).

Assessment of Likely Significant Wind Microclimate Effects

Lawson Comfort Criteria

12.24 Likely significant wind microclimate effects were assessed using the Lawson Comfort Criteria. This is a long-established criteria, which predicts the reaction of an average pedestrian to a given wind speed, depending on their level of activity.

12.25 There are numerous variants of the Lawson Criteria which can be used; this assessment uses the LDDC (London Docklands Development Corporation) variant.

12.26 The Lawson criteria also accounts for the potential impact of very strong winds on pedestrian safety; these are winds that are rarer than those which cause discomfort, but strong enough to potentially cause accidents which could endanger pedestrians.

12.27 The classifications of the Lawson comfort criteria, along with the colour key corresponding to the presentation of the results of the CFD analysis (presented later in this chapter) are shown in

12.28 **Table** 12.2. The comfort criteria categorises according to which wind speed is exceeded for 5% of the year or season.

Table 12.2: Lawson Comfort Criteria

Key	Comfort Category	Mean Wind Speed (5% exceedance)	Description
	Sitting	4 m/s	Acceptable for outdoor sitting use (e.g. cafes, benches, balconies)
	Standing	6 m/s	Acceptable for main building entrances, pick-up / drop-off points and bus stops
	Walking (leisure)	8 m/s	Acceptable for strolling
	Walking (business)	10 m/s	Acceptable for external pavements, walking purposefully without lingering
	Uncomfortable	>10 m/s	Not comfortable for regular pedestrian access

12.29 The classifications of the Lawson safety criteria, along with the colour key corresponding to the presentation of the results of the CFD analysis (presented later in this chapter) are shown in **Table 12.3**. The safety criteria restricts strong winds to occurrences of less than 2 hours per year (0.022%).

Table 12.3: Lawson Safety Criteria

Key	Safety Category	Mean Wind Speed (0.022% exceedance)	Description
	Unsafe	15 m/s	Presents a safety risk, especially to more vulnerable members of the public and cyclists.

Target Wind Conditions

12.30 For a mixed-use urban area within which the Site is located, the desired wind microclimate would typically need to have areas acceptable for sitting, standing (including at entrances of buildings) and leisure walking use. A description of the comfort categories to classify wind conditions in accordance with is given below.

12.31 Any areas which show up as either unsafe (annually) or uncomfortable (for the windiest season) would require mitigation, unless they are in locations where pedestrian access can be controlled in the event of strong winds. This applies to all thoroughfares (for pedestrians) and roads (for cyclists) around the Development.

12.32 The target for the London Bridge Underground station is to be suitable for standing (entrance use) during the windiest season. The Lawson criteria does not specifically set targets for railway ticket offices, but both bus stops and covered walkways are classified as standing, and it could reasonably be expected that the London Bridge Underground station would be subject to similar expectations as either of these activities.

12.33 Contrary to public realm areas, which are assessed for comfort in the windiest season, the target for the roof level, podium terraces and northern balconies is to be suitable for a mixture of sitting

and standing during the summer months. This would allow user to choose to sit in “calmer” areas of the terrace and engage in more active pursuits in “windier” areas.

12.34 There are areas of the public realm around the Site which would be required to be suitable for sitting during the summer months, these are highlighted in **Figure 12.3** and are;

- Two seating areas at St. Thomas Street entrance to the undercut passage;
- A seating area to the western end of the undercut passage from Kings Head Yard to St Thomas Street.

12.35 The areas immediately outside any building entrances should be suitable for standing use during the windiest season to provide a “buffer” between the still conditions in interior spaces and the general thoroughfare. If an entrance is within a recess, then this can reasonably be assumed to provide the buffer, and walking is acceptable (unless the recess is explicitly modelled in the CFD analysis).

12.36 In relation to the effect of the Development on the wind microclimate around Southwark Cathedral, the target for this area is for conditions to be suitable for standing in the grounds of the Cathedral during the windiest season (and suitable for walking on local thoroughfares).

The Works

12.37 The wind microclimate assessment of the Works phase has not been assessed using CFD simulations, as the massing would progressively change throughout this stage of the Development. The microclimate conditions could reasonably be expected to progressively change from the Site (as existing) baseline conditions to those of the completed and operational Development. Therefore, the CFD results for these phases have been used, in conjunction with professional judgement, to provide a qualitative assessment of the Works wind microclimate conditions during the Works.

Completed and Operational Development

12.38 The conditions for the completed and operational Development were assessed using the same high resolution CFD model as the baseline conditions. Overall, the following configurations were tested:

- Configuration 1: The Site (as existing) with the baseline conditions surrounding the Site;
- Configuration 2: The completed and operational Development with the baseline conditions surrounding the Site;
- Configuration 3: The completed and operational Development with the baseline and cumulative schemes;

12.39 As noted above, configurations were tested to assess the cumulative effects of the Development in combination with other developments. The results of this cumulative assessment are reported separately within **Chapter 14: Cumulative Effects** although the effectiveness of the mitigation measures are reported within this chapter in order to demonstrate that the adverse effects have been appropriately mitigated.

12.40 It should be noted that Shard Place has been included in the baseline surrounds (and hence all configurations) as the scheme is under construction and is progressing to completion in 2021. The

1 Bank End development is also included in baseline surrounds as the scheme is also currently under construction.

12.41 The results of the proposed Development tested in Configurations 2 and 3 include mitigation measures developed through an iterative consultative process between Wirth Research and AHMM.

12.42 The proposed soft landscaping scheme for the completed and operational Development was not included in Configurations 1, 2 and 3 to ensure a conservative result, in line with established methodology for this type of assessment.

Significance Criteria

12.43 Wind effects can be considered significant if they change the classification of any pedestrian area either to or from the desired target wind conditions (see paragraphs 12.30 to 12.36).

12.44 A location only requires mitigation if conditions are deemed **adverse** (**negligible** or **beneficial** effects do not require mitigation).

12.45 Effects that change conditions so that they meet the target conditions are considered **beneficial**.

12.46 Effects that change conditions so that they no longer meet the target conditions are considered **adverse**.

12.47 The wind microclimate assessment significance criteria are shown in **Table 12.4** scaling in accordance with the grades of the Lawson Comfort Criteria.

Table 12.4: Wind Microclimate Assessment Significance Criteria

Modelled Wind Microclimate Criteria	Effect Classification and Significance
Wind Conditions are 3-grades ‘calmer’ / ‘windier’ than desired.	Major beneficial / adverse
Wind Conditions are 2-grades ‘calmer’ / ‘windier’ than desired	Moderate beneficial / adverse
Wind Conditions are 1-grade ‘calmer’ / ‘windier’ than desired	Minor beneficial / adverse
Wind Conditions are the same or similar to those desired.	Negligible

12.48 All effects for the completed and operational Development are considered long term and local.

12.49 All effects for the Works phase are considered either short or medium term and local.

Limitations and Assumptions

12.50 The accuracy of the results is dependent upon the accuracy of the CAD used to construct the model.

12.51 There is an inherent assumption that on-site wind speeds will scale linearly with the measured wind speeds at the airport ‘superstation’.

12.52 There is an inherent assumption that the wind speed statistics for the past 30 years remain applicable for the foreseeable future.

12.53 It should be noted that the above assumptions would also be true of a wind tunnel based assessment.

Baseline Conditions

General Meteorological Conditions

12.54 The meteorological data obtained for London (**Figure 12.2**) indicates that the prevailing wind throughout the year is from the south-west (i.e. 210 to 240 degrees on the compass). This is typical for many areas of southern England. There is a secondary peak from the north-east during the late spring and early summer. The winds from the north-east are not as strong as the prevailing winds from the south-west.

The Existing Site with Surrounding Buildings

12.55 Summer Comfort, Winter Comfort and Annual Safety for the Site, London Bridge Underground station and immediate local area, for Configuration 1 (under baseline conditions), are shown in **Figures 12.4**, **12.5** and **12.6**. A wider view of the surrounding area is shown in **Figures 12.7**, **12.8** and **12.9**. Regions of interest are marked with lettered regions.

12.56 The wind microclimate conditions throughout and surrounding the Site are generally as would be expected within an urban environment, ranging from acceptable for sitting to walking use during the windiest season. There are, however, some localised regions (described in paragraph 12.59) where wind speeds exceed what would usually be expected.

On-Site Ground Level Conditions

12.57 Conditions for the Site (as existing) are suitable for sitting in summer and sitting in winter.

London Bridge Underground Station Conditions

12.58 Conditions within the London Bridge Underground station ticket office are suitable for sitting in both summer and winter. This is suitable for the intended use of the space.

Local Area Ground Level Conditions

12.59 Across the wider local area there are less favourable conditions in some areas. Of particular significance is in the region between the Shard and Guys Hospital along St Thomas Street, the south-east corner of the News UK building along London Bridge Street and the corner of Borough High Street and Duke Street Hill. There are areas where winds are classified as unsafe (marked A, B and C on **Figures 12.7** and **12.9**, with the News UK corner marked as B in **Figure 12.6**). In the windiest season these areas are all suitable for business walking. There is an additional area of business walking between the Shard and Fielden House (marked D in **Figure 12.7**).

12.60 Winter conditions in the grounds of Southwark Cathedral are classified as suitable for sitting or standing.

Assessment of Likely Significant Effects

The Works

12.61 During the Works, it could reasonably be expected that on-site wind conditions will be calm for the demolition phase, given the relatively calm conditions of the existing Site and the relative low

height of the existing buildings on Site (meaning they will not be providing shelter for any leeward buildings).

12.62 During the construction phase of the Works there is the potential for short term **adverse effect of minor significance** along Kings Head Yard passage. The screening off of the Site with hoardings may narrow the available space along this region and this would potentially result in increased wind levels. This effect will be due to downwash from the southern face of the Development, which is intrinsically linked to the building height. Therefore, this effect will only become significant during the final stages of construction, once a certain height has been exceeded (50% of the total height could be considered a conservative estimate). The removal of any site hoardings would revert the Site to wind conditions as seen in the completed and operational Development assessment. In order to ensure a comfortable and safe wind environment for the intended usage, the SEMP would consider the removal of any hoarding in sensitive areas as soon as is practicable in the programme, subject to ensuring that the Works are undertaken in a safe and secure manner.

Completed and Operational Development

12.63 Summer Comfort, Winter Comfort and Annual Safety for the Site, roof level terraces at levels 24 and 26, podium terrace at level 3, London Bridge Underground station and local area, for Configuration 2 (completed and operational Development with baseline conditions surrounding the Site), are shown in **Figures 12.10**, **12.11** and **12.12**. A wider view of the surrounding area is shown in **Figures 12.13**, **12.14** and **12.15**. The level 3 podium terrace conditions are shown in **Figures 12.16**, **12.17** and **12.18**. The conditions on the balconies along the Northern facade are shown in **Figures 12.19**, **12.20** and **12.21**. The level 24 roof terrace conditions are shown in **Figures 12.22**, **12.23** and **12.24**. The level 26 upper roof terrace conditions are shown in **Figures 12.25, 12.26 and 12.27**. Areas of interest are marked with lettered regions. This Configuration includes the wind mitigation measures developed, as referenced in paragraph 12.41.

12.64 These wind mitigation measures consist primarily of porous screens, which dissipate wind energy of crosswinds generated by high level wind speeds detailed in **Figure 12.28** and **12.29**, include:

- 4 x 50% porous screens at the south-west corner undercut. These screens stretch from the inside of the pillars to the main office space.
- 2 x 50% porous screens extending from the building either side of the corner on the podium terrace
- 14 combination porous screens at roof terrace level. The lower section of the screens are 50% porous, with the upper section 80% porous screens with the capability to grow plants within these frames. These screens are located along the southern and eastern edges of the plant room massing above terrace level.
- 3 x 50% porous screens located along the north-western corner of the restaurant massing.

On-Site Ground Level Conditions

12.65 Winter conditions for the on-site region vary between sitting, standing and leisure walking across the region. Summer conditions also vary between sitting, standing and leisure walking. The level of leisure walking in summer is reduced relative to winter conditions.

12.66 The south-west and south-east corners of the Development is classified as having leisure walking winter winds which is the maximum category desired. This represents a **negligible** wind effect.

12.67 Each of the proposed entrances to the Development are located within areas which are classified as suitable for standing or calmer. Conditions are appropriate for their intended use and the likely effects are **negligible**.

12.68 For summer conditions, there is a small region of leisure walking to the south of one of the columns between the proposed Development and the Old Kings Head pub. It has been noted that the area outside the Old Kings Head pub doesn't have formal seating, but patrons may stand outside in summer, although this is unlikely during winter months. The leisure walking region would exceed comfort if patrons stood outside. However, this leisure walking region is small, and marginal exceedance of 5% such that it can be considered a **negligible** residual effect.

12.69 The seating areas within the undercut passage at both the western Kings Head Yard end, as well as the northern St Thomas St region are both acceptable for sitting in winter and summer conditions, and as such meets the target conditions for this area and the effect is **negligible**.

London Bridge Underground Station Conditions

12.70 Winter and summer conditions for the London Bridge Underground station ticket office are suitable for sitting. The conditions are appropriate for their intended use and the likely effects are **minor beneficial**.

Local Area Ground Level Conditions

12.71 There is a **beneficial effect of minor significance** to the south-east of the News UK building on London Bridge Street (marked B in **Figure 12.12**), where an area of business walking winter winds has been reclassified as suitable for leisure walking. The region classified as unsafe is also now suitable for use.

12.72 There are regions around the surrounds that have become winder as a result of the proposed Development. There is a region on St Thomas Street to the north-east of the Development (marked E in **Figure 12.10** and **12.13**), which is shown to have leisure walking winter winds. This is in line with the maximum category desired but represents winder conditions than before the Development. Along Borough High St and St Thomas Street there is also an increase in regions suitable for standing that were previously suitable for sitting. Whilst these impacts represent worse conditions to before, the same Development is considered beneficial to the safety critical region along London Bridge Street, the overall combination of these effects can be considered a net benefit. Overall, wind effects are **negligible**.

12.73 Winter conditions in the grounds of Southwark Cathedral are classified as suitable for sitting or standing. This effect is **negligible** as it is appropriate for the intended use and represents no change in comfort categorisation relative to the baseline conditions.

Podium Terrace Conditions (Level 3)

12.74 Summer conditions on the podium terrace show an area that is suitable for leisure walking rather than being suitable for standing and therefore one category windier than desired, representing an

adverse effect of minor significance. These regions are marked F in **Figure 12.17**. Mitigation is therefore required, which is considered in paragraph 12.113 and renders this effect **negligible**.

Northern Façade Balconies Conditions

12.75 Summer conditions on the balconies on the northern façade of the Tower show areas suitable for sitting and standing. This effect is **negligible** as it is appropriate for the intended use.

12.76 It should be noted that the amount and location of standing conditions on the northern balconies changes at each different floor level. In general, there is a greater amount of sitting space on lower terraces.

Roof Level Terrace Conditions (Level 24)

12.77 Summer conditions on the roof level terrace show areas suitable for leisure walking rather than being suitable for standing and therefore are one category windier than desired, representing an **adverse effect of minor significance** (marked G, H and I in **Figure 12.23**). Mitigation is therefore required, which is considered in paragraph 12.115 and renders this effect **negligible**.

12.78 A region on the roof level terrace (marked I in **Figure 12.24**) also carries a risk with regards to annual wind safety. There is a region of approximately 2.5 square metres with a peak of 10 hours per year exceeding 15m/s. This is considerably above the 2 hours per year limit, and mitigation is therefore required, which is considered in paragraph 12.115 and renders this effect negligible.

Upper Roof Level Terrace Conditions (Level 26)

12.79 Summer conditions on the upper roof level terrace show areas to the west of the terrace suitable for business walking (marked J in **Figure 12.26**) and leisure walking rather than being suitable for standing and therefore are one category windier than desired, representing an **adverse effect of minor significance**. Mitigation is therefore required, which is considered in paragraph 12.116.

12.80 A region on the upper roof level terrace also carries a risk with regards to annual wind safety (refer to **Figure 12.27**). There is a region of approximately 6 square metres with a peak of 11 hours in the south-west corner of the terrace, and a perimeter strip of maximum width of 0.5m with a peak over 20 hours in the north-west corner per year exceeding 15m/s. This is considerably above the 2 hours per year limit, and mitigation is therefore required, which is considered in paragraph 12.116.

Completed and Operational Development with Cumulative Schemes

12.81 Summer Comfort, Winter Comfort and Annual Safety for the Site, roof level terraces, podium terrace, London Bridge Underground station and local area, for Configuration 3 (completed and operational Development with baseline conditions surrounding the Site), are shown in **Figures 12.30**, **12.31** and **12.32**. A wider view of the surrounding area is shown in **Figures 12.33**, **12.34** and **12.35**. The level 3 podium terrace conditions are shown in **Figures 12.36**, **12.37** and **12.38**. The conditions on the balconies along the Northern facade are shown in **Figures 12.39**, **12.40** and **12.41**. The level 24 roof terrace conditions are shown in **Figures 12.42**, **12.43** and **12.44**. The level 26 upper roof terrace conditions are shown in **Figures 12.45, 12.46 and 12.47**. Areas of

interest are marked with lettered regions. This Configuration includes the wind mitigation measures developed, as referenced in paragraph 12.41.

On-Site Ground Level Conditions

12.82 Winter conditions for the on-site region vary between sitting, standing and leisure walking across the region. Summer conditions also vary between sitting, standing and leisure walking. The level of leisure walking in summer is reduced relative to winter conditions.

12.83 The south-west and south-east corners of the Development are classified as having leisure walking winter winds which is the maximum category desired. This represents a **negligible** wind effect.

12.84 Each of the proposed entrances to the Development are located within areas which are classified as suitable for standing or calmer. Conditions are appropriate for their intended use and the likely effects are **negligible**.

12.85 For summer conditions, there is a small region of leisure walking to the south of one of the columns between the proposed Development and the Old King's Head pub. It has been noted that the area outside the Old King's Head pub doesn't have formal seating, but patrons may stand outside in summer. The leisure walking region would exceed comfort if patrons stood outside. However, this region is small, and the marginal exceedance of 5% is such that it can be considered a **negligible** effect.

12.86 The seating areas within the undercut passage at both the western Kings Head Yard end, as well as the northern St Thomas Street region are both acceptable for sitting in winter and summer conditions, and as such meets the target conditions for this area and the effect is **negligible**.

12.87 Relative to the Configuration 2 case, there has been a small reduction in the walking region to the south-east corner of the Development. Otherwise, all conditions remain very similar.

London Bridge Underground Station Conditions

12.88 Winter and summer conditions for the London Bridge Underground station ticket office are suitable for sitting. The conditions are appropriate for their intended use and the likely effects are **minor beneficial**.

12.89 The cumulative schemes do not change the categorisation of this region, with this area remaining in the most beneficial comfort category (sitting).

Local Area Ground Level Conditions

12.90 There is a **beneficial effect of minor significance** to the south-east of the News UK building on London Bridge Street (marked B in **Figure 12.32**), where an area of business walking winter winds has been reclassified as suitable for leisure walking. The region classified as unsafe is also now suitable for use.

12.91 There are regions around the surrounds that have become windier as a result of the Proposed Development. There is a region on St Thomas Street to the north-east of the Development (marked E in **Figure 12.30**), which is shown to have leisure walking winter winds. This is in line with the maximum category desired but represents windier conditions than before the

Development. Along Borough High Street and St Thomas Street there is also an increase in regions suitable for standing that were previously suitable for sitting. Whilst these impacts represent worse conditions to before, the same Development is considered beneficial to the safety critical region along London Bridge Street, the overall combination of these effects can be considered a net benefit.

12.92 Winter conditions in the grounds of Southwark Cathedral are classified as suitable for sitting or standing. This effect is **negligible** as it is appropriate for the intended use and represents no change in comfort categorisation relative to the baseline conditions.

12.93 The cumulative schemes result in a smaller region of leisure walking to the north-east of the Development on St Thomas' Street. There are other changes further afield of the Development with a region of business walking moved (marked K in **Figure 12.33**), but these changes are some distance from the Development, and the result of cumulative schemes.

Podium Terrace Conditions (Level 3)

12.94 Summer conditions on the podium terrace show an area that is suitable for leisure walking rather than being suitable for standing and therefore one category windier than desired, representing an **adverse effect of minor significance**. These regions are marked in **Figure 12.37**. Mitigation is therefore required, which is considered below and renders this effect negligible.

12.95 The relative size of the leisure walking region within the cumulative surrounds is smaller than the equivalent region for Configuration 2.

Northern Façade Balconies Conditions

12.96 Summer conditions on the northern balconies show areas suitable for sitting and standing. This effect is **negligible** as it is appropriate for the intended use.

12.97 It should be noted that the amount and location of standing conditions on the northern balconies changes at each different floor level. In general, there is a greater amount of sitting space on lower terraces.

12.98 There is no significant change in the extent of the comfort regions resulting from the presence of the cumulative surrounds.

Roof Level Terrace Conditions (Level 24)

12.99 Summer conditions on the roof level terrace show areas suitable for leisure walking rather than being suitable for standing and therefore are one category windier than desired, representing an **adverse effect of minor significance** (marked G, H and I in **Figure 12.43**). Mitigation is therefore required, which is considered in 12.115 and renders this effect negligible.

12.100 A region on the roof level terrace (marked I in **Figure 12.44**) also carries a risk with regards to annual wind safety. There is a region of approximately 1.5 square metres with a peak of 4.7 hours per year exceeding 15m/s. This is above the 2 hours per year limit, and mitigation is therefore required, which is considered in 12.115 and renders this effect negligible.

12.101 The effects of the cumulative schemes result in a decrease in total area of safety exceedance and peak exceedance value. There is also a localised reduction in the total area of leisure walking at the north-east of the terrace.

Upper Roof Level Terrace Conditions (Level 26)

12.102 Summer conditions on the upper roof level terrace show areas suitable for leisure walking rather than being suitable for standing and therefore are one category windier than desired, representing an **adverse effect of minor significance**. Mitigation is therefore required, which is considered in 12.116.

12.103 A region on the upper roof level terrace also carries a risk with regards to annual wind safety (refer to **Figure 12.47**). There is a region of approximately 6 square metres with a peak of 10.5 hours in the south-west corner of the terrace, and a perimeter strip of maximum width of 0.5m with a peak over 20 hours in the north-west corner per year exceeding 15m/s. This is above the 2 hours per year limit, and mitigation is therefore required, which is considered in 12.116.

12.104 The effects of the cumulative schemes result in a marginal decrease in total area of safety exceedance and peak exceedance value. The total area of safety exceedance is not significantly reduced given the large area covered. The cumulative schemes do remove the small region of business walking conditions in summer, before the effects of mitigation are considered.

Likely Residual Effects

12.105 Mitigation measures are included as part of the massing design (as detailed in) within Configuration 2 and 3. These measures have resulted in improvements across key areas of focus. Whilst the mitigation measures have improved conditions, there remain some minor areas of exceedance over target conditions.

12.106 The CFD simulations did not assess the impact of landscaping mitigation measures as the design at this stage was still evolving, but the proposed measures have been designed to resolve any residual impacts. Where necessary planting is located in regions of interest or upwind at critical wind angles to prevent access by office workers or the public to these spaces. The inclusion of planting will also itself reduce the impacts of wind.

12.107 These measures include and are not limited to:

- Planting of trees within both the public realm as well as private amenity space in accordance with the plans included within the landscaping proposals applied for; and
- Inclusion of raised landscaping planting measures. These raised regions will restrict access to areas identified as exceeding relevant criteria. These measures are included within the landscaping proposal and are designed to maintain the functionality of all terrace regions.

The Works

12.108 All of the mitigation measures proposed are likely to be implemented towards the end of the Works phase. As such, they cannot reasonably be expected to impact significantly upon the wind microclimate during the Works.

12.109 The potential short-term adverse effect of minor significance, described in paragraph 12.62, requires careful site organisation to avoid a potential adverse wind effect resulting from constricting the available space between the proposed Site and the Old Kings Head pub along Kings Head Yard. Given there is no issue within the completed Development, this may not be an issue, but sufficient management and monitoring should be in place to ensure this situation does not arise.

Completed and Operational Development

12.110 Within Configuration 2 and 3, there remain some significant wind effects observed during testing. These are commented on below where appropriate.

On-Site Ground Level Conditions

12.111 Wind effects observed from testing at ground level were **negligible** and will not require any further mitigation.

12.112 It is noted that ground level planting within the courtyard to the west of the proposed Site is being considered. Given the testing did not include any planting measures as mitigation, any planting measures could contribute to calmer conditions with the presence of planting.

Podium Terrace Conditions

12.113 The conditions at the podium terrace level were tested without any landscaping measures, with the porous screening measures included to remove safety critical regions. The addition of landscaping measures on the terrace includes raised planters as well as tree planting measures. These measures will result in both a restriction of access to regions of the terrace, with the planting measures providing additional wind mitigation. The latest landscaping plan locates planting measures in regions of interest. These measures can be reasonably expected to mitigate adverse wind conditions, and residual effects are therefore **negligible**.

Northern Balconies Conditions

12.114 Wind effects observed from testing across the northern balconies were **negligible** and will not require any further mitigation.

Roof Level Terrace Conditions

12.115 At roof level, there are plans to add a significant amount of planting and landscaping measures across the terrace region, aside from the porous screening measures included. The addition of raised planters will prevent access to regions of potential exceedance. The additional impact of planting will provide further wind calming across the terrace. These measures can be reasonably expected to mitigate adverse wind conditions, and residual effects are therefore **negligible**.

Upper Roof Level Terrace Conditions

12.116 At upper roof level, planting to the west of the terrace is planned. To mitigate against the wind conditions that may exceed safety levels for up to 20 hours per year, access by tenants to the upper roof level terrace would be restricted by the building management team when wind conditions are unsuitable. Furthermore, additional mitigation testing would be undertaken to test

proposed landscaping options and incorporation of any other mitigation methods, which could be secured by planning condition.

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			
Wind effects on and around the Site during the Works	**Short-term, local, adverse effect of minor significance**	The effect is entirely within the site boundary and not publicly accessible during the works. Mitigation developed for the completed Development should be provided around buildings as they are occupied.	**Negligible**
Completed and Operational Development			
Wind effects on off-site local thoroughfares	**Negligible** (London Bridge Underground station entrance, Southwark Cathedral) **to Long-term, local, beneficial effect of minor significance** (on London Bridge St)	None required as there is a significant benefit in the area near London Bridge Place.	**Negligible**
Wind effects on on-site public realm	**Negligible** (Main Courtyard, undercut passage, St Thomas St entrances)	None required as conditions at ground level are suitable for intended use.	**Negligible**
Wind effects on on-site amenity spaces	**Long-term, local, adverse effect of moderate significance** (on podium terrace)	Inclusion of planned planting and landscaping measures both restricting access to extremities in addition to mitigation from tree planting.	**Negligible**
	Negligible (Northern Balconies)	None required as conditions on the northern balconies are considered suitable for intended use	**Negligible**
	Long-term, local, adverse effect of moderate significance (on roof terrace)	Inclusion of planned planting and landscaping measures both restricting access to extremities in addition to mitigation from tree planting.	**Negligible**
	Long-term, local, adverse effect of moderate significance (on upper roof terrace)	Inclusion of mitigation measures, including changes to the balustrade, localised planting and restriction of access (pending development and	**Negligible**

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
		testing of further potential mitigation measures).	

Monitoring

12.117 No specific wind monitoring requirements have been identified.

13. Daylight, Sunlight, Overshadowing, Solar Glare and Light Pollution

Introduction

13.1 This chapter, prepared by GIA, presents an assessment of the likely effects of the Development on the daylight and sunlight amenity to the occupiers of neighbouring sensitive properties and overshadowing to existing amenity areas in the vicinity of the Site.

13.2 A solar glare assessment has also been undertaken due to the Development's proximity to multiple road junctions and rail tracks to and from London Bridge mainline station. In addition, a light pollution assessment has been carried out to identify any potential effects to surrounding sensitive receptors.

13.3 This chapter contains a description of the methods used to assess the effects and a description of the relevant baseline conditions of the Site and its surrounding area. This is followed by an assessment of the likely significant effects of the Development during the demolition and construction works and once the Development is complete and operational. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any adverse effects identified, and a description is provided of the nature and significance of likely residual effects.

13.4 This chapter is supplemented by the following documents:

- **Appendix 13.1**: Drawings of the existing Site and the Development;
- **Appendix 13.2**: Daylight and Sunlight Results to surrounding sensitive receptors;
- **Appendix 13.3**: Overshadowing Results;
- **Appendix 13.4**: Solar Glare Results; and
- **Appendix 13.5**: Light Pollution Results.

13.5 Please note that for the purposes of this ES chapter, the demolition, deconstruction, refurbishment and construction works will be referred to as 'the Works'.

Assessment Methodology and Significance Criteria

13.6 The non-mandatory Building Research Establishment (BRE) Guidelines[1] suggest that residential properties have the highest requirement for daylight and sunlight and state that *"the guidelines are intended for use for rooms in adjoining dwellings where light is required, including living rooms, kitchens and bedrooms"*. Therefore, this chapter focuses on those residential buildings and other sensitive receptors such as hospitals surrounding the Site which would have the potential to be affected by the Development. The uses of nearby buildings, in terms of commercial and residential, were established using external observations and Valuation Office Agency (VOA) checks. The BRE Guidelines are the industry recognised standard for assessing all matters related to daylight, sunlight and overshadowing, and the primary reference within all national and local policy.

13.7 When determining whether changes in light condition are in line with policy and guidance, it is important to give consideration to other contextual matters, such as instances where the existing light levels within neighbouring properties are already low, or where the proposed residual values are commensurate with that which one would expect to find in surrounding urban areas of similar density. Furthermore, daylight and sunlight impacts of a development should be balanced against the improvements and benefits which the scheme will bring to the area.

Baseline characterisation

13.8 Baseline characterisation was completed by firstly undertaking a review of the surrounding land uses using information and data sourced from the VOA website[2]. This review was undertaken for all surrounding properties in close enough proximity to the Site to be affected by the Development, to identify any residential or other sensitive properties (such as hospital facilities) to be assessed as potential sensitive receptors.

13.9 It should be noted that buildings with transient use such as classrooms, hospitals and student accommodation have a lower requirement for daylight and sunlight, and are therefore given a lower sensitivity than permanent residential properties.

13.10 This review was followed by a Site visit during the month of submission to confirm the existing conditions around the Site remain accurate to those modelled. The conditions recorded are not considered to have changed from the day of the Site visit to the time of writing this ES chapter.

13.11 Based on the above, a three-dimensional (3D) AutoCAD model was developed for the existing surrounding properties and existing buildings on-Site using a full topographical survey, photogrammetric survey and site photographs.

Scenarios assessed

13.12 The following scenarios have been considered and are reported within this chapter of the ES:

- Baseline;
- Demolition and Construction ('the Works'); and
- Complete and Operational Development;

Baseline

13.13 This scenario has considered the current baseline condition (as at the time of writing) at identified sensitive receptors. It is depicted on drawings 8684-REL12-IS01-01-03 (**Appendix 13.1**).

13.14 As noted in paragraph 13.6, the BRE Guidelines state that residential properties have the highest requirement for daylight and sunlight. In addition, the BRE Guidelines state that other uses such as hospitals and schools may also have a requirement for daylight and sunlight.

13.15 Accordingly, existing residential and hospital receptors adjoining or in proximity to the Site have been considered within this assessment. In addition, classrooms associated with the London School of Commerce have been included.

13.16 Shard Place has been included in the baseline scenario as construction is well underway, and the superstructure is very likely to be completed before work starts on the proposed Development; the scheme is due to be completed in 2021.

13.17 With regard to Sun Hours on Ground, as sun exposure is predominantly within southern facing aspects of the Site due to the path of the sun, only the neighbouring amenity areas located to the north of the Site have been considered within this assessment. For transient overshadowing, all neighbouring amenity areas to the north of the Site in close enough proximity to experience overshadowing from the Development have been considered.

Complete and Operational Development

13.18 The complete and operational Development scenario consists of the detailed Development in the context of the surrounding existing environment. This scenario assesses the potential daylight,

sunlight, overshadowing, solar glare and light pollution effects of the Development on the surrounding receptors and amenity spaces as well as sensitive road junctions and train lines.

13.19 This scenario is illustrated on drawing number 8684-REL12-IS01-04-06 within **Appendix 13.1**.

Sensitive Receptors

Daylight and Sunlight

13.20 As set out in the assessment methodology, existing residential, medical, religious and educational receptors are considered to be sensitive receptors that may be affected by the Development.

13.21 Hotels, student accommodation, hospitals and classrooms have been included in the assessment however these are considered to have a lower requirement for daylight owing to the transient occupancy.

13.22 In addition, future residential receptors within Shard Place have been included in the assessment as they are in very close proximity to the Site and construction of Shard Place is expected to be complete prior to the Works commencing on New City Court.

Table 13.1: Daylight and Sunlight Receptor Locations

Receptor Location
10-18 London Bridge Street
6 London Bridge Street
St Thomas Church
Guy’s Hospital (Chapel)
Guy’s Campus (Southwark Wing)
Guy’s Campus (Tower Wing)
Iris Brook House Talbot Yard
Shepherds House – Talbot Yard
Chaucer House – White Hart Yard
Orchard Lisle House - Talbot Yard
63a Borough High Street
Guy’s Campus
The Old Kings Head Public house
3 Kings Head Yard
57 Borough High Street
53-55 Borough High Street
51 Borough High Street
2 St Thomas Street
8 Bedale Street
59-61 Borough High Street

Receptor Location
22 Southwark Street
24 Southwark Street
Southwark Cathedral Annex
Southwark Cathedral
Shard Place
43 Borough High Street

Overshadowing

13.23 Owing to the southerly location of the sun path, only the amenity areas located to the north of the Site have the potential to have experience alteration is sunlight with the Proposed Development implemented. Therefore, only amenity areas located from northward of the Site from due east to due west have been considered. Due to the scale of the Development and the nature of the surrounding area, the amenity area in proximity to the Site that is considered sensitive in terms of overshadowing is shown on **Figure 13.2**.

Solar Glare

13.24 Solar glare is not a comparative assessment; the fact it may occur in the baseline does not necessarily justify its occurrence as a result of a Development. Therefore, the assessment considers the effect of the Development in absolute terms and not against the baseline.

13.25 Nearby railway lines and roads have also been assessed for solar glare, and the locations assessed can be seen in **Figure 13.5**.

Light Pollution

13.26 The following properties were considered sensitive in regard to light pollution due to their close proximity to the Site:

- 2 St Thomas Street;
- 3 Kings Head Yard;
- 45 Borough High Street (The Old King's Head);
- 43, 51, 53, 55, 57, 59, 63 and 63a Borough High Street;
- Orchard Lisle House;
- Shard Place; and
- 9 St Thomas Street.

13.27 An assessment has been undertaken on the effects on these properties caused by the proposed Development.

13.28 All other sensitive receptors are considered too far from the Site to be affected by the Development in terms of light pollution.

Methodology for Determining Effects During the Works

13.29 Owing to the evolving and changing nature of the Works, the assessment of potential effects during demolition and construction of the Development on daylight, sunlight, overshadowing, solar

glare and light pollution to surrounding receptors has not been modelled. Instead, a qualitative assessment has been undertaken using professional judgement and experience.

13.30 The potential daylight, sunlight, overshadowing, solar glare and light pollution effects relating to demolition and construction works would vary throughout the construction programme and gradually increase to the potential effects identified for the completed Development. It is considered that the completed Development represents the worst-case assessment in terms of likely effects on levels of daylight, sunlight, overshadowing, solar glare and light pollution received by sensitive receptors.

Methodology for Determining Complete and Operational Effects

13.31 The methodologies set out below have been used to determine the effects of the complete and operational Development.

Approach for Daylight, Sunlight, Overshadowing and Solar Glare Assessments

13.32 The technical analyses carried out to inform the assessments have been undertaken by creating a digital 3D model of the existing Site, and the complete and operational Development, based on measured survey data.

Daylight

13.33 The BRE Guidelines specify two primary methods for assessing daylight within an existing sensitive receptor:

- Vertical Sky Component (VSC); and
- No Sky Line (NSL) Method.

13.34 These are presented in further detail as follows.

Vertical Sky Component (VSC) Method

13.35 The VSC method of assessment is defined in the BRE Guidelines as the:

"ratio of that part of illuminance at a point on a given vertical plane that is received directly from a CIE standard overcast sky, to illuminate on a horizontal plane due to an unobstructed hemisphere of this sky".

13.36 The 3D model uses a Waldram Diagram to establish the VSC and 3D geometric calculations for daylight distribution. This model (which is orientated to north by the use of Ordnance Survey (OS) information) enables the path of the sun to be tracked throughout the year to establish the shadow cast by existing and proposed buildings, and thus calculate the sun hours on ground in each scenario and how the Development would affect the amount of daylight being received at surrounding sensitive receptors.

13.37 Only those surrounding properties which have windows facing towards the Site were included in the assessment. If a nearby property has no windows facing the Site, these properties would not be affected by the Development in terms of light.

13.38 The assessment is calculated from the centre of a window on the outward face and measures the amount of light available on a vertical wall or window following the introduction of visible barriers, such as buildings.

13.39 Regarding existing trees, these may be ignored unless they form dense continuous belts. As stated within the BRE Guidelines:

13.40 "*where the effect of a new building on existing building is being analysed, it is usual to ignore the effect of existing trees. This is because daylight is at its scarcest and most valuable in winter when most trees will not be in leaf*." There are no "*dense continuous belts*" of trees within the Site, and as such, trees are excluded from the assessment as per the BRE Guidelines.

13.41 The maximum VSC value is 39.9% for a completely unobstructed vertical wall or window. In terms of assessment criteria, the BRE Guidelines state that:

"If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected. This will be the case if either:

- *the VSC measured at the centre of an existing main window is less than 27%, and less than 0.8 times its former value; or*
- *the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value."*

13.42 It is acknowledged that the values in the BRE Guidelines are predicated against a 2-3 storey suburban model, therefore the application of its guidelines in inner urban environments should be treated flexibly. This form of assessment does not take account of context or detailed matters such as window size, room use, room size, window number or dual aspect rooms. This assessment also assumes that all obstructions to the sky are 100% non-reflective. It should be noted that the BRE Guidelines acknowledge this and state, in paragraph 2.2.3;

'*The numerical values given here are purely advisory. Different criteria may be used based on the requirements for daylighting in an area viewed against other site layout constraints*.'

13.43 Clearly in more urban environments, if a development is to meet the scale and proportion of neighbouring buildings, large factor reductions are very difficult to avoid. GIAs experience in daylight and sunlight matters in dense urban environments suggest that weight should also be given to the retained values rather than just the percentage change. Our experience in the field would suggest that a more realistic VSC level in a dense urban environment would be considered to be around 15%.

13.44 GIA's view on retained VSC levels is supported by the Greater London Authority's hearing report for the Monmouth House and Featherstone Street development (application reference: P2015/3136/FUL) where it was considered in Para 120, Page 31:

'For general guidance, whilst the BRE guidelines recommend a target value of 27% VSC when measured on an absolute scale, that value is derived from a low density suburban housing model. In an inner city urban environment, VSC values in excess of 20% should be considered as reasonably good, and VSC in the mid-teens should be acceptable.'

No Sky Line (NSL) Method

13.45 The NSL method is a measure of the distribution of daylight at the 'working plane' within a room. The 'working plane' is a horizontal plane 0.85m above finished floor level for residential properties. The NSL divides those areas of the working plane which can receive direct sky light from those which cannot. If a significant area of the working plane lies beyond the NSL (i.e. it receives no direct sky light), then the distribution of daylight in the room may be poor and supplementary electric lighting may be required.

13.46 Where actual room layouts were available, these have been considered in the modelling of the internal layouts within the surrounding properties. Obtaining these room layouts enables precise

evaluation of the diffuse levels of daylight within each of the rooms via the NSL. Where layout information was not available assumptions have been made as to the use and internal configuration of the rooms (from external observations) behind the fenestration observed. In such cases a standard 4.2m (14 ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where access to buildings for surveying is unavailable.

13.47 The potential effects of daylighting distribution in an existing building can be found by plotting the NSL in each of the main rooms. For houses, this would include living rooms, dining rooms and kitchens. Bedrooms should also be analysed, although they are less important. The BRE Guidelines identify that if the area of a room that does receive direct sky light is reduced to less than 0.8 times its former value, then this would be noticeable to its occupants.

13.48 In relation to deep rooms lit by windows on one side, the BRE Guidelines state in paragraph 2.2.20:

"If an existing building contains rooms lit from one side only and greater than 5m deep, then a greater movement of the no sky line may be unavoidable."

Sunlight

Annual Probable Sunlight Hours (APSH)

13.49 The APSH is a measure of sunlight that a given window may expect over the period of a year, and where there is no obstruction, equates to a maximum of 1,486 hours. Sunlight is measured using a sun indicator which contains 100 spots, each representing 1% of APSH (i.e. 14.86 hours of the total APSH).

13.50 The number of spots is calculated for all scenarios during the year and also during the winter period, and a comparison made between the two. This provides a percentage of APSH for each of the time periods for each window assessed.

13.51 The BRE Guidelines note on page 14 that:

- *"In housing, the main requirement for sunlight is in living rooms, where it is valued at any time of day, but especially in the afternoon."*
- *"all main living rooms of dwellings…should be checked if they have a window facing within 90° of due south. Kitchens and bedrooms are less important, although care should be taken not to block too much sun".*
- *"If the main living room to a dwelling has a main window facing within 90° of due north, but a secondary window facing within 90° of due south, sunlight to the secondary window should be checked."*
- *"…a south facing window will, in general, receive most sunlight, while a north facing one will receive it only on a handful of occasions. East and west facing windows will receive sunlight only at certain times of day".*

13.52 In regard to existing surrounding receptors, the BRE Guidelines provide that a window may be adversely affected if a point at the centre of the window receives for the whole year, less than 25% of the APSH, including at least 5% of the APSH during the winter months (21 September to 21 March) and less than 0.8 times its former sunlight hours during either period, and if there is a reduction in total APSH which is greater than 4%.

13.53 Summary of Criteria for Daylight and Sunlight. **Table 13.2** provides a summary of the criteria set out within the BRE Guidelines for daylight and sunlight.

Table 13.2: Summary of Daylight and Sunlight Assessment Criteria

Method	BRE Criteria
VSC	A window may be adversely affected if its VSC measured at the centre of the window is less than 27% and less than 0.8 times is former value.
NSL	A room may be adversely affected if the daylight distribution (NSL) is reduced beyond 0.8 times its existing area.
APSH	A window may be adversely affected if a point at the centre of the window received for the whole year: – less than 25% of the APSH including at least 5% of the APSH during the winter months (21 September to 21 March); and – less than 0.8 times its former sunlight hours during either period; and – for existing neighbouring buildings, if there is a reduction in total APSH which is greater than 4%.

Overshadowing

Transient overshadowing

13.54 The BRE Guidelines suggests that where large buildings are proposed that may affect a number of gardens or open spaces, it is useful to plot a shadow plan to illustrate the location of shadows at different times of the day and year. For the purpose of this assessment the hourly shadows were mapped for the following three key dates in the year:

- 21 March (Spring Equinox);
- 21 June (Summer Solstice); and
- 21 December (Winter Solstice).

13.55 21 September (Autumn Equinox) provides the same overshadowing images as 21 March (Spring Equinox) as the sun follows the same path at these corresponding times of year. Therefore, 21 March is used within the overshadowing assessment.

13.56 The transient overshadowing has been calculated at hourly intervals throughout the day from 08:00 to 19:00, and visual representations are provided in **Appendix 13.3**. Where there are gaps in timings in **Appendix 13.3**, this is because the sun would not be present during these times (for example. from approximately 16:00 onwards on 21 December) and thus no shadow can be cast. On December 21, the sun is at its lowest point causing long shadows to be cast and represents the worst-case scenario in terms of overshadowing.

Sun Hours on Ground

13.57 The BRE Guidelines suggest that Sun Hours on Ground assessments should be undertaken on the equinox (21 March or 21 September). Using specialist software, the path of the sun is tracked to determine where the sun would reach the ground and where it would not.

13.58 It is recommended that at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March or the area which receives 2 hours of direct sunlight should not be reduced to less than 0.8 times its former value (i.e. there should be no more than a 20% reduction).

Solar Glare

13.59 Solar glare is particularly important at pedestrian crossings, road junctions and train lines, where glare can reduce visibility for drivers or pedestrians. Typically, elements considered to be reflective are either glazed apertures or metal cladding.

13.60 The BRE Guidelines includes the following statement in regard to the potential for reflected solar glare from a new development:

"Glare or solar dazzle can occur when sunlight is reflected from a glazed façade. This can affect road users outside and the occupants of adjoining buildings. The problem can occur either when there are large areas of reflective glass or cladding on the façade, or when there are areas of glass or cladding which slope back so that high altitude sunlight can be reflected along the ground. Thus solar dazzle is only a long term problem only for some heavily glazed (or mirror clad) buildings…"

13.61 Solar glare is not a comparative assessment; the fact it may occur in the baseline does not justify its occurrence as a result of a development. Therefore, the assessment presented in this chapter considers the effect of the Development in absolute terms, by reference to the relevant guidance levels.

Viewpoints for Road Users and Pedestrians

13.62 As indicated previously, the assessment considers potentially sensitive viewpoints for road users and pedestrians surrounding the Site. The viewpoints are generally located at the minimum stopping distance (see paragraph 13.65 of this chapter for further information) and at the driver's eye level. The focal point is a relevant traffic element, such as signals or incoming traffic.

13.63 Identifying the viewpoints based on the stopping distance is calculated as the combination of thinking and braking distances, using the following formula:

$$D_{total} = D_{thinking} + D_{braking} = V*T + V^2/(2\mu*g)$$

13.64 Where each component is:

- V = Relevant vehicle speed, typically the road speed limit;
- T = Thinking time (0.67 seconds);
- μ = Braking effort (considered 0.65 for cars and 0.5 for buses); and
- g = Gravity acceleration.

13.65 The height of the viewpoint is considered to be 1.5m for cars and 2.0m for buses. **Figure 13.3** identifies the typical stopping distance range for a car travelling at different speeds. Therefore, a viewpoint for a car driving at 20mph (32km/h) (i.e. speed limit for a dense urban location) would be placed at 12m from a traffic light and 1.5m above the ground.

13.66 The assessment also considers a driver's / pedestrian's field of vision which takes the angular extent seen at any given time, which for humans facing forwards is approximately 180 degrees.

Railway lines

13.67 In addition to road users, instances of solar reflection also have the potential to effect train drivers and their view of traffic signals. Due to the proximity of the Site to the railway line running to and from London Bridge Mainline Station, an assessment has been undertaken from these viewpoints.

Solar Glare Technical Assessment

13.68 The potential for reflected solar glare or dazzle from glazed or reflective façades from the Development has been assessed using specialist lighting software. The assessment shows the path of the sun for the entire year around the Development. From this, two computer generated angular images have been produced for each selected viewpoint, indicating the area which sees the reflection of the sunpath at any point during the year. A modified diagram portraying a standardised extent of human vision is then overlaid onto the image.

13.69 The assessment has been undertaken on the basis that the fovea centralis (also generally known as the fovea) is a part of the eye, located in the centre of the macula region of the retina[3]. The fovea is responsible for sharp central vision (also called foveal vision), which is necessary in humans for reading, watching television, driving, and any activity where visual detail is of primary importance. The macula corresponds to the central 13° of the visual field[4]; the fovea to the central 3°.

13.70 **Figure 13.4** highlights the degrees of vision corresponding to the foveal view, with a red circle of 3° of angle in order to identify the area most sensitive to reflected solar glare. Another red circle represents the incidence of the 30° radius of our typical field of view in order to identify a secondary area of sensitivity to potential reflected glare instances.

13.71 The degrees of vision provide a reference from which significant effects can be identified. At 3°, the potential for the reflected glare to cause a hazard is high and mitigation would be required. Between 3° and 30°, there is the potential that there could be an issue and mitigation may be necessary.

13.72 As stated in the Commission Internationale de L'Eclairage guidance CIE 146:2002[5], occurrences at angles beyond 30° would be of little significance in most situations, but may be relevant in exceptional circumstances. When seated in a driving seat of a typical car, for example, the limits of the windscreen would generally obstruct the driver's view at angles beyond 30° from the line of sight. Therefore, the risk of reflective solar glare causing a hazard is reduced and, as such, mitigation would make only a minor difference.

13.73 The methodology for solar glare is not aimed at addressing the intensity of an instance of reflected solar glare, but rather its occurrence, duration throughout the year and the location of this occurrence in respect of an individual's line of sight. It is also to be noted that the hours presented reflect solar time and therefore do not take Daylight Saving Hours into account.

Light Pollution

13.74 Light pollution is defined as any light emitting from artificial sources into spaces where it is unwanted, such as spillage of light from office or commercial buildings onto residential accommodation, where this would cause nuisance to the occupants. The ILP Guidance Notes[6] provide suggested lighting level values to ascertain the acceptability of lighting levels of light pollution.

13.75 It should be noted that artificial light is not always perceived as being negative, particularly in areas of high crime where good street lighting and light into street environments is seen as a positive attribute. Adverse effects caused as a result of electric lighting include the intrusion of light into sensitive locations such as adjacent residential accommodation, areas of special night-time interest, or needless spillage into the night sky.

13.76 It should also be noted that the ILP Guidance relates and refers to external luminaires. However, commercial buildings with large areas of glazing and possible night-time usage can sometimes

cause light intrusion from their internal luminaires. For this reason, quantitative light pollution assessments can be undertaken in relation to these internal luminaires.

13.77 Potential light pollution effects of a new development are typically assessed in relation to four specific criteria:

- Sky Glow is the brightening of the night sky over our towns, cities and countryside. It can be quantified by measuring the Upward Light Ratio (ULR), which is the maximum permitted percentage (%) of luminaire flux for the total installation that goes directly into the sky;
- Light Intrusion is the spilling of light beyond the boundary of a proposed development. It is assessed as vertical illuminance in lux (Ev) measured flat at the centre of the sensitive receptor;
- Luminaire Intensity is the uncomfortable brightness of a light source when viewed against a dark background. It is applied to each source visible from a sensitive receptor and is measured as source intensity (I) (kcd); and
- Building Luminance can cause an increase in the brightness of a general area and is measured in cd per metre squared (L) as an average over the building facade caused only by external lighting.

Light Intrusion Methodology

13.78 Light pollution is not a comparative assessment; the fact it may occur in the baseline does not necessarily justify its occurrence as a result of the Development. Therefore, the assessment considers the effect of the Development in absolute terms, by reference to the relevant guidance levels.

13.79 The assessment has been undertaken by preparing a computer generated 3D model of the Development and using specialist lighting simulation software. The light fittings used for this lighting simulation represent typical recessed office luminaires regularly spaced on the proposed office ceilings within the proposed commercial building in order to achieve an average illuminance of 500 lux across the working plane as a standard. It is understood that the lighting strategy proposes a lower lighting output which would seek to mitigate any potential risks identified in this chapter. The assessment within this chapter assumes that all luminaires are switched on at once and no blinds or shading devices are deployed for the purpose of the light pollution assessment. For this reason, it should be considered a worst-case scenario.

13.80 **Table 13.3** below sets out the environmental zones as per the ILP Guidance which have been applied in this assessment.

Table 13.3 ILP Light Pollution Criteria for Environmental Zones

Environmental Zone	Sky Glow ULR (Max %) (1)	Light Intrusion (into windows) Ev (Lux) (2)		Luminaire Intensity (candelas) (3)		Building Luminance Pre-curfew (4)
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average L[cd/m^2]
E0 – Dark areas (e.g. UNESCO Starlight Reserves, IDA Dark Sky Parks)	0	0	0	0	0	0
E1- Intrinsically dark areas (e.g. National Parks, areas of outstanding natural beauty)	0	2	0 (1*)	2,500	0	0
E2- Low district brightness (e.g. rural or small village locations)	2.5	5	1	7,500	500	5
E3- Medium district brightness (e.g. small town centres or urban locations)	5.0	10	2	10,000	1,000	10
E4- High district brightness (e.g. town/city centres with high levels of night time activity)	15.0	25	5	25,000	2,500	25

Notes:

ULR = Upward Light Ratio of the Installation is the maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky

Ev = Vertical Illuminance in Lux and is measure flat on the glazing at the centre of the window

I = Light Intensity in Cd

L = Luminance in Cd/m^2

Curfew = The time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of use of lighting applied by the planning authority. If not otherwise stated – 23.00 hrs is suggested.

* = From Public road lighting installations only.

13.81 With reference to criteria set out in

13.82 Table 13.3, as per ILP guidance, the Site is classified as environmental zone E4. This zone allows for a maximum pre-curfew light intrusion level of 25 lux and a maximum post-curfew light intrusion level of 5 lux.

Significance Criteria

Effect Significance Terminology Overview

13.83 In terms of sensitivity, surrounding properties are considered highly sensitive to daylight and sunlight levels, and specifically habitable rooms within the properties such as living rooms, kitchens and bedrooms, in accordance with the BRE Guidelines. All existing residential receptors, assessed within this chapter are considered highly sensitive due to the expectation of natural light and are given equal weighting, and therefore each individual receptor is not assigned a level of sensitivity as per the usual EIA methodology i.e. high, medium, low or very low. However, buildings with transient occupants such as student accommodation, educational facilities and hospitals are considered lower sensitivity as they are not permanent residences and are transient in nature.

13.84 For transient overshadowing, all public areas of open space such as parks, squares and private gardens in proximity to the Site are considered highly sensitive and are considered within the assessment.

13.85 The key terminology to be used to describe the magnitude of effects is as follows and is further described in the below sections of this chapter:

- Major;
- Moderate;
- Minor; and
- Negligible.

13.86 The nature of the effects may be either adverse (negative) or beneficial (positive).

13.87 Following the classification of an effect using this methodology, a clear statement is then made as to whether the effect is significant or not significant. As a general rule, in relation to sunlight, daylight, overshadowing and solar glare the following criteria is applied:

- ‘Minor’, ‘Moderate’ or ‘Major’ effects are deemed to be ‘significant’;
- ‘Negligible’ effects are considered to be ‘not significant’.

Evaluating Effects and Significance – Daylight, Sunlight and Overshadowing

Daylight and Sunlight

13.88 For daylight and sunlight, the BRE Guidelines outline the approach within the accompanying Appendix I, in terms of assigning criteria to assess the effects:

- Section 3 of Appendix I states: “Adverse impacts occur when there is a significant decrease in the amount of skylight and sunlight reaching an existing building where it is required, or in the amount of sunlight reaching an open space… The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied.”
- Paragraph 5 of Appendix I states: “*Where the loss of skylight or sunlight fully meets the guidelines, the impact is assessed as negligible or minor adverse. Where the loss of light is well within the guidelines, or only a small number of windows or limited area of open space*

lose light (within the guidelines), a classification of negligible impact is more appropriate. Where the loss of light is only just within the guidelines and a larger number of windows or open space are affected, a minor adverse impact would be more appropriate, especially if there is a particularly strong requirement for daylight and sunlight in the affected building or open space."

- Paragraph 6 of Appendix I states: "*Where the loss of skylight or sunlight does not meet the guidelines in this book, the impact is assessed as minor, moderate or long-term, local, adverse of major significance. Factors tending towards a minor adverse impact include*:
  - Only a small number of windows or limited area of open space are affected;
  - The loss of light is only marginally outside the guidelines;
  - An affected room has other sources of skylight or sunlight; and
  - The affected building or open space only has a low level of requirement for skylight or sunlight."

13.89 The classification of major adverse is documented within Paragraph 7 of the BRE Guidelines:

"Factors tending towards a major adverse impact include:

- *a large number of windows or large area of open space are affected;*
- *the loss of light is substantially outside the guidelines;*
- *all the windows in a particular property are affected; and*
- *the affected indoor or outdoor spaces have a particular strong requirement for skylight or sunlight, e.g. a living room in a dwelling or a children's playground".*

13.90 Where the BRE Guidelines are met, the effects would be considered Negligible.

13.91 With regard to the BRE Guidelines, professional judgement has been used to determine whether the potential effects would result in adverse or beneficial effects. The initial numerical criteria for determining the category of effect is based on percentage alterations, as follows:

- 0 – 19.9% alteration = Negligible;
- 20 - 29.9% alteration = Minor;
- 30 - 39.9% alteration = Moderate; and
- Greater than 40% alteration = Major.

13.92 For instances where existing VSC, NSL and APSH levels within a property are low, any alteration may result in a disproportionate percentage change, whereby the actual change in daylight or sunlight within the property experienced by the occupant may not be as noticeable as the percentage change would suggest. This is one example of when professional judgement is taken into account.

13.93 Therefore, when assigning an overall significance per property, consideration has been given to the proportion of rooms / windows affected, as well as the percentage alterations, absolute changes, and any other relevant factors, including mitigating factors such as balconies, overhangs or design features which may also affect the determination of assigning the criteria.

13.94 Where room uses are unknown, all rooms assessed within the property or building are considered habitable to give the worst-case scenario for potential daylight and sunlight effects caused by the Development.

13.95 Where the scale of VSC levels and NSL levels within a property differ, professional judgement has also been used to determine an overall significance. In addition, if the scale of total APSH and Winter PSH differ greatly, professional judgement has also been used to determine the significance of the effect. This has been based on the factors stated in paragraph 13.92.

Overshadowing

Transient Overshadowing

13.96 The BRE Guidelines do not include criteria for the significance of transitory overshadowing other than to identify the different times of the day and year when shadow would be cast over a surrounding area.

13.97 The assessment of potential effects as a result of transient overshadowing is therefore based on professional judgement, taking into consideration the conditions of the existing Site and surrounding area, and comparing these conditions against the effect of the transient overshadowing arising from the Development.

Sun Hours on Ground

13.98 It is suggested in the BRE Guidelines that for an area to appear adequately sunlit throughout the year, at least half (50%) of any assessment area should see direct sunlight for at least two hours on the 21st March. If, as a result of new development, an existing assessment area will not meet BRE Guidelines and the area which can receive two hours of direct sunlight on the 21st March is reduced to less than 0.8 times its former area, then the loss of sunlight is likely to be noticeable.

13.99 Where the results show compliance with the BRE Guidelines criteria, the occupants are unlikely to experience any noticeable change to their sunlight amenity levels. For the purposes of this assessment, such an effect would be considered Negligible. Should the relevant criteria not be achieved, a judgment has to be made as to the significance of the effect based on the level of loss, retained sunlight levels and the relevant baseline scenario.

13.100 The table below sets out the numerical criteria adopted in relation to the sun on ground assessment.

Table 13.4 Sun on ground Significance Criteria

Significance	Numerical criteria on 21st March
Negligible	Over 50% of the amenity area will receive 2 hours of sunlight or less than 20% alteration in area which receives 2 hours of direct sunlight.
Minor adverse	20-29.9% reduction in the area which receives 2 hours of direct sunlight (and below 50% retained area).
Moderate adverse	30-39.9% reduction in the area which receives 2 hours of direct sunlight (and below 50% retained area).
Major adverse	40%+ reduction in the area which receives 2 hours of direct sunlight (and below 50% retained area).

Solar Glare

13.101 There are no quantitative criteria within the BRE Guidelines or elsewhere regarding acceptable levels of solar glare. Generally, however, solar reflections at high altitudes are less likely to cause nuisance or distraction as one has to look upwards to see it.

13.102 Professional judgement has therefore been applied to assign the significance of solar glare arising from the proposed Development and to determine the criteria for assessing the significance of solar glare set out in **Table 13.5**.

13.103 Multiple viewpoints may be chosen for each of the traffic lanes, train line or signals affected. In terms of significance criteria however, professional judgement has been used to determine the effect at the location rather than the individual perspectives at a signal traffic junction. Factors that could influence the significance of effect may include:

- sunlight availability probability;
- area of façade off which reflections are visible;
- period of time reflections are visible;
- angle at which reflections are visible from line of sight;
- views of the development being obscured for example by trees; and
- the time of day at which the solar reflection will occur for example during peak traffic times.

13.104 Initially, the following guide will be used to ascertain the possible significance for each view and the factors listed above will then be taken into consideration to determine the overall significance for the designated viewpoint.

Table 13.5 Criteria Used for Determining the Effect of Solar Glare

Significance guidance	Possible factors
Negligible	No reflections are visible or if visible all occur at angles greater than 30° from the driver's line of sight and so, as stated by the CIE, will be of "little significance"
Minor	Solar reflections are visible within 30° to 10° or between 10° to 5° of the driver's line of sight for a short period of time
Moderate	Solar reflections are visible within 10° and 5° of the driver's line of sight occurring for a long period of time.
Major	Solar reflections are visible within 5° of a driver's line of sight.

Note – mitigating factors such as alternative and unaffected signals/traffic lights and car visor angle may result in the assignment of significance which differs from the above.

Light Pollution

13.105 The ILP Guidance Notes do not provide details on assigning of significance of effects for light pollution, therefore this is based on professional judgement considering the extent of the residential façade adversely affected as well as the extent to which the thresholds set out in the guidance are exceeded. **Table 13.6** highlights the criteria used to assign a specific significance.

Table 13.6 Criteria Used for Determining the Effect of Light Pollution

Significance	Description
Negligible	A small alteration from the existing scenario which is unlikely to be noticeable to the receptor. This may involve a small number of technical infringements of the numerical level suggested in the appropriate guidelines which should also be viewed in the context of the urban character of the area.

Significance	Description
Minor	An alteration from the existing scenario which may be marginally noticeable to the sensitive receptor. This may include a number of marginal infringements of the numerical level suggested in the appropriate guidelines which should be viewed in the context of the urban character of the area.
Moderate	An alteration from the existing scenario which may cause a moderate noticeable change to the sensitive receptor. This may consist of a large proportion of marginal infringements of the numerical values suggested in the relevant guidelines and/or a small percentage of significant infringements.
Major	An alteration from the existing scenario which may cause a major noticeable change to the sensitive receptor. This may consist of a large proportion of significant infringements of the numerical values suggested within the relevant guidelines.

Assumptions and Limitations

13.106 Where actual room layouts were available, these have been considered when modelling the internal layouts of surrounding properties. Where layout information was not available assumptions have been made as to the use and internal configuration of the rooms (from external observations) behind the fenestration observed. In such cases a standard 4.2m (14ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where access to buildings for surveying is unavailable. Obtaining these room layouts enables precise evaluation of the diffuse levels of daylight within each of the rooms via the NSL.

13.107 Floor levels have been assumed for surrounding properties where access has not been obtained. With the working plane located 850mm above the finished floor level, this has the potential to affect the assessment of NSL.

13.108 For solar glare, although great care is taken in identifying the most likely sensitive viewpoints, this does not guarantee that there are no additional sensitive locations where reflected solar glare could present a particular risk. This assessment is based on the assumption that in an urban environment moving traffic represents the biggest risk factor and so viewpoints and focus points are selected accordingly. For practical reasons the area of assessment is limited to the area surrounding the proposed Development as viewpoints within this area are the most sensitive in terms of Solar Glare. At greater distances, the view of the Development in a driver's line of sight would likely be partially obscured by surrounding schemes and only the upper portion of the building would be visible, which would typically be located above the driver's visor cut-off line. As such, the occurrence of reflected solar glare at greater distances is not the subject of this assessment

13.109 In addition, the methodology for solar glare is not aimed at addressing the intensity of an instance of reflected solar glare, but rather its occurrence, duration throughout the year, and the location of this occurrence in respect of an individual's line of sight. As previously mentioned, the hours presented reflect solar time and therefore do not take Daylight Saving Hours into account.

13.110 Owing to reasons of practicality in gaining access to surrounding residential properties, the light pollution assessments undertaken at neighbouring windows show the levels of lux emitted from the Development only. Light sources, such as streetlamps or spillage from other buildings are therefore not considered accounted for within the assessment. This is industry standard practice for proposals within high district brightness areas in central London where no external lighting is proposed, and effects can be mitigated by measures such as occupancy sensors.

Baseline Conditions

Existing Baseline

13.111 The study area comprises an urban area with buildings of multiple tenures and scales ranging from three storey buildings to the larger buildings of the News Building, The Shard and Guy's Hospital in close proximity to the Site to the north, north-east and east respectively.

13.112 The existing baseline is shown in Drawings 8684-REL12-IS01-04-06 in **Appendix 13.1**.

Existing Daylight and Sunlight to Surrounding Sensitive Receptors

13.113 The baseline daylight and sunlight conditions for the 26 identified surrounding sensitive receptors have been assessed, as summarised in **Table 13.7**.

Table 13.7 Summary of Baseline Daylight and Sunlight Levels

Address	Total No. Windows that meet VSC criteria (>27%)		Total No. of Rooms that receive NSL in excess of 80%		Total No. of Rooms that meet APSH criteria	
	Total Assessed	Total that meet criteria	Total Assessed	Total that meet criteria	Total Assessed	Total that meet criteria
10-18 London Bridge Street	102	58	86	76	82	71
6 London Bridge Street	12	0	12	3	12	3
St Thomas Church	8	4	4	4	4	4
Guy's Hospital (Chapel)	31	1	6	2	3	3
Guy's Campus (Southwark Wing)	103	24	29	20	5	5
Guy's Campus (Tower Wing)	1083	78	240	235	23	0
Iris Brook House Talbot Yard	61	11	54	36	18	6
Shepherds House - Talbot Yard	136	27	64	54	8	0
Chaucer House - White Hart Yard	82	44	20	20	-	-
Orchard Lisle House - Talbot Yard	107	38	97	64	-	-
63a Borough High Street	20	1	15	6	5	2
Guy's Campus	48	20	38	32	-	
The Old Kings Head Ph	23	0	8	3	2	1
3 Kings Head Yard	8	0	3	3	1	1
57 Borough High Street	3	0	3	3	3	2
53-55 Borough High Street	5	2	4	4	4	4
51 Borough High Street	2	1	2	2	2	2

Address	Total No. Windows that meet VSC criteria (>27%)		Total No. of Rooms that receive NSL in excess of 80%		Total No. of Rooms that meet APSH criteria	
	Total Assessed	Total that meet criteria	Total Assessed	Total that meet criteria	Total Assessed	Total that meet criteria
2 St Thomas Street	3	3	3	0	3	3
8 Bedale St	10	10	5	4	5	5
59-61 Borough High Street	17	11	8	8	8	6
22 Southwark St	28	14	24	18	12	12
24 Southwark St	30	15	26	26	25	25
Southwark Cathedral Annex	246	21	19	14	13	4
Southwark Cathedral	102	54	6	3	3	3
Shard Place	988	434	471	395	284	192
43 Borough High Street	9	3	8	7	8	7
Total	3267	874	1255	1042	533	361

13.114 Of the 26 properties considered as sensitive receptors, a total of 3,267 windows serving 1255 rooms were assessed for daylight and 533 rooms were assessed for sunlight.

13.115 For daylight in the baseline condition, 874 of the 3267 (27%) windows assessed for VSC and 1042 of the 1255 (83%) rooms assessed for NSL meet BRE criteria for daylight of 27% VSC and 80% NSL respectively. For sunlight, 361 of the 533 (68%%) rooms assessed meet BRE criteria of 25% Total APSH and 5% Winter APSH.

13.116 Low existing daylight and sunlight levels can be attributed to the dense urban location and architectural features such as balconies, large roof overhangs and recessed windows. These reasons may reduce a property's daylight availability, resulting in low existing daylight and sunlight levels. Owing to these low existing levels, any development on the Site would lead to disproportionate adverse effects.

Existing Overshadowing to Sensitive Surrounding Amenity Areas

13.117 The existing Overshadowing assessments can be seen within **Appendix 13.4**.

13.118 Due to the relative low-rise building on the Site, the existing overshadowing is considered low. The relevant amenity areas are minimally affected in the baseline scenario.

Assessment of Likely Significant Effects

The Works

13.119 The likely effects in relation to the daylight and sunlight amenity, overshadowing, solar glare and light pollution for the surrounding properties and amenity areas would vary throughout the demolition and construction works, depending on the level of obstruction caused. The effects would almost certainly be less than that of the completed Development, given that the extent of permanent massing would increase throughout the construction stage, until the buildings are complete.

13.120 The effects to daylight, sunlight and overshadowing during demolition would be **beneficial** until the point of construction. As construction works progress, effects steadily increase in magnitude as the superstructure is built and then clad. Those effects that are perceptible (i.e.are beyond a 20% alteration as set out in BRE Guidelines), as the superstructure and cladding progress, would have similar effects to surrounding receptors to those once the Development is complete and operational, as presented below. It is therefore considered that the completed Development represents the worst-case assessment in terms of likely daylight, sunlight, overshadowing, solar glare and light pollution effects.

13.121 During the Works, a number of tall cranes are likely to be present on-site, however their size and temporary presence would lead to generally imperceptible effects of a temporary nature. As such, the overall effect would range from being **negligible** at the start of the works to effects ranging from **negligible** to **long-term, permanent**, **adverse of major significance**, once the Development is complete, as set out in the assessment of the complete and operational Development below.

Completed and Operational Development

Daylight

13.122 The full daylight assessment for the Development can be found within **Appendix 13.2** and is summarised in **Table 13.8**.

13.123 In terms of daylight, measures including massing alterations were implemented during the design process to minimise the impacts on daylight to surrounding sensitive receptors as much as possible while still ensuring the provision of a viable scheme. These design interventions are included within the assessment and constitute iterative design as opposed to mitigation measures.

13.124 Overall, of the 3267 windows assessed for VSC 2698 (83%) would meet BRE criteria. Of the 1255 rooms assessed for NSL, 1031 (82%) would meet BRE criteria.

13.125 The four buildings highlighted in grey in **Table 13.8** would experience no or little alteration in relation to VSC and NSL (below 20%), and the effect on daylight to these properties would therefore be **negligible**.

13.126 The remaining affected 22 buildings are discussed in detail in the following paragraphs.

Table 13.8 Effects to VSC and NSL to Surrounding Sensitive Receptors

Address	Total No. Of Windows	No. Windows That Meet BRE Criteria	Below BRE Guidelines				Total No. Of Rooms	No. Rooms That Meet The 0.8 Times Former Value Criteria	Below BRE Guidelines			
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total
10-18 London Bridge Street	102	10	3	28	61	92	86	5	3	22	56	81
6 London Bridge Street	12	4	5	2	1	8	12	4	5	2	1	8
St Thomas Church	8	4	2	0	2	4	4	0	0	4	0	4
Guy’s Hospital (Chapel)	31	16	0	0	15	15	6	1	0	0	5	5
Guy’s Campus (Southwark Wing)	103	102	1	0	0	1	29	29	0	0	0	0
Guy’s Campus (Tower Wing)	1083	1063	19	0	1	20	240	235	4	1	0	5
Iris Brook House Talbot Yard	61	18	6	29	8	43	54	18	4	24	8	36
Shepherds House - Talbot Yard	136	46	34	48	8	90	64	18	18	24	4	46
Chaucer House - White Hart Yard	82	23	12	10	37	59	20	5	3	3	9	15
Orchard Lisle House - Talbot Yard	107	2	15	13	77	105	97	1	12	13	71	96
63a Borough High Street	20	11	5	2	2	9	15	7	6	1	1	8
Guy’s Campus	48	46	0	0	2	2	38	38	0	0	0	0
The Old Kings Head Ph	23	2	6	3	12	21	8	0	2	3	3	8
3 Kings Head Yard	8	4	4	0	0	4	3	1	2	0	0	2

Address	Total No. Of Windows	No. Windows That Meet BRE Criteria	Below BRE Guidelines				Total No. Of Rooms	No. Rooms That Meet The 0.8 Times Former Value Criteria	Below BRE Guidelines			
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total
57 Borough High Street	3	0	3	0	0	3	3	0	3	0	0	3
53-55 Borough High Street	5	1	4	0	0	4	4	1	3	0	0	3
51 Borough High Street	2	0	2	0	0	2	2	0	2	0	0	2
2 St Thomas Street	3	0	0	2	1	3	3	0	0	2	1	3
8 Bedale St	10	10	0	0	0	0	5	5	0	0	0	0
59-61 Borough High Street	17	17	0	0	0	0	8	8	0	0	0	0
22 Southwark St	28	28	0	0	0	0	24	24	0	0	0	0
24 Southwark St	30	30	0	0	0	0	26	26	0	0	0	0
Southwark Cathedral Annex	246	246	0	0	0	0	19	19	0	0	0	0
Southwark Cathedral	102	102	0	0	0	0	6	6	0	0	0	0
Shard Place	988	912	26	32	18	76	471	438	11	13	9	33
43 Borough High Street	9	1	0	8	0	8	8	1	0	7	0	7
Total	3267	2698	147	177	245	569	1255	890	78	119	168	365

10-18 London Bridge Street (Hotel)

13.127 A total of 102 windows serving 86 rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have, therefore, made reasonable assumptions as to their dimensions (as outlined in the Assumptions and Limitations section), which is relevant when considering the NSL methodology.

13.128 For VSC, 10 of the 102 (10%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

13.129 Of the affected windows, three would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect and 28 windows would experience an alteration in VSC levels of 30-39.9% which is considered a Moderate Adverse effect. The remaining 61 windows would experience an alteration in VSC levels in excess of 40% which is considered a major adverse effect.

13.130 For NSL, five of the 86 rooms assessed would meet BRE Guideline criteria which would represent a negligible effect.

13.131 Of the affected rooms, three would experience an alteration in NSL levels of 20-29.9% which is considered a Minor Adverse effect and 22 rooms would experience an alteration in NSL levels of 30-39.9% which is considered a Moderate Adverse effect. The remaining 56 rooms would experience an alteration in NSL levels in excess of 40% which is considered a Major adverse effect. It is important to note that the impacted hotel rooms are considered to be of transient use, generally occupied on a temporary basis and primarily used during night-time hours, these hotel rooms are therefore considered to be less sensitive to the effect of the Development on VSC and NSL levels respectively.

13.132 Overall and based on professional judgement and due to the temporary nature and resulting lower sensitivity of hotel accommodation, the effect to daylight within this building would be **long term, local, adverse of moderate significance.**

6 London Bridge Street (Residential)

13.133 A total of 12 windows serving 12 rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.134 For VSC, four of the 12 (33%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

13.135 Of the affected windows, five would experience an alteration in VSC levels of 20-29.9 % which is considered a Minor Adverse effect. Two windows would experience an alteration in VSC between 30-39.9% which is considered a Moderate Adverse effect. The one remaining window (W1/F03) would experience an alteration in VSC of 40.5% which is considered a Major Adverse effect. This window has a low existing VSC value of 11.1% (against a BRE target value of 27%) meaning the percentage loss is disproportionate, with the absolute loss in VSC being 6.6%.

13.136 For NSL, all 12 rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

13.137 Overall and based on professional judgement, the effect to daylight within this building would be **long-term, local, adverse** of **moderate significance**.

St Thomas Church (Religious)

13.138 A total of eight windows serving four rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.139 For VSC, four of the eight windows assessed (50%) would meet BRE criteria which would represent a negligible effect.

13.140 Of the affected windows, two would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect. The remaining two windows would experience an alteration in VSC in excess of 40% which is considered a Major Adverse effect.

13.141 For NSL, all four rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

13.142 Overall and based on professional judgement, the effect to daylight within this building would be **long-term, local, adverse** of **minor significance**.

Guy's Hospital – Chapel (Religious)

13.143 A total of 31 windows serving six rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.144 For VSC, 16 of the 31 (52%) windows assessed would meet BRE criteria which would represent a negligible effect.

13.145 Of the affected windows, 15 windows would experience an alteration in VSC in excess of 40% which is considered a Major Adverse effect. It is important to note that four of the windows located on the ground floor (W8-W11/F00) experience VSC alterations between 65.5% and 70%, however, this is considered disproportionate to the actual impacts, as the windows have extremely low existing values between 2.9%-3% that are further reduced to between 0.9%-1% in the proposed scenario, with an absolute VSC change between 1.9%-2.1%.

13.146 For NSL, three of the six (50%) rooms assessed would meet BRE criteria which would represent a negligible effect.

13.147 Of the affected rooms, three would experience an alteration in NSL in excess of 40% which is considered a Major Adverse effect. It is important to note that the three rooms (R4-R6/F00) that experience NSL alterations above 70%, however, this is considered disproportionate to the actual impact, as the rooms have low existing NSL values of 5.8%, 6.1% and 7.4% which are reduced to 0.9%, 1.1% and 1.5% respectively in the proposed scenario. The absolute NSL loss to the identified rooms range between 0.9% and 1.5%.

13.148 Overall and based on professional judgement and due to the temporary nature of the building, the effect to daylight within this building would be **long term, local, adverse of moderate significance.**

Guy's Campus – Southwark Wing (Hospital)

13.149 A total of 103 windows serving 29 rooms were assessed for daylight within this hospital building. GIA were unable to obtain floor plans for this property and have, therefore, made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.150 For VSC, 102 of the 103 (99%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

13.151 The one affected window (W9/F04) experiences an alteration in VSC levels of 22.6% which is considered a Minor Adverse effect.

13.152 For NSL, all 29 of the rooms fully comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

13.153 Overall, based on professional judgement, and due to the temporary nature and resulting lower sensitivity of the healthcare facility, the effect to daylight within these buildings would be **negligible.**

Guy's Campus – Tower Wing (Hospital)

13.154 A total of 1,083 windows serving 240 rooms were assessed for daylight within this hospital building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.155 For VSC, 1,063 of the 1,083 (98%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

13.156 Of the affected windows, 19 would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect. The remaining window (W8/F00) would experience a VSC alteration in excess of 40% which is considered a Major Adverse effect.

13.157 It should be noted that the window experiencing a Major Adverse effect has an extremely low existing VSC value of 0.2%. Therefore, any alteration would result in a disproportionate percentage change, that in reality, is unlikely to be noticeable.

13.158 For NSL, all 240 of the rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

13.159 Overall, based on professional judgement, and due to the temporary nature and resulting lower sensitive of a hospital, the effect to daylight within these buildings would be **negligible**.

Iris Brook House - Talbot Yard (Student Accommodation)

13.160 A total of 51 windows serving 49 rooms were assessed for daylight within this building. GIA were able to obtain floor plans for this property and have incorporated them within the 3D model to allow for more accurate results.

13.161 For VSC, 18 of the 51 (35%) windows assessed would meet BRE criteria which would represent a negligible effect.

13.162 Of the affected windows, four would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect and 21 windows would experience an alteration in VSC levels of 30-39.9% which is considered a Moderate Adverse effect. The remaining eight windows would experience an alteration in VSC levels in excess of 40% which is considered a Major Adverse effect.

13.163 For NSL, 18 of the 49 (37%) rooms assessed would meet BRE criteria which would represent a negligible effect.

13.164 Of the affected rooms, four would experience an alteration in NSL levels of 20-29.9% which is considered a Minor Adverse effect and five rooms would experience an alteration in NSL levels of 30-39.9% which is considered a Moderate Adverse effect. The remaining 22 rooms would experience an alteration in excess of 40% which is considered a Major Adverse effect.

13.165 Overall, based on professional judgement and due to the temporary nature of student accommodation, the effect to daylight within this building would be **long-term, local, adverse** of **moderate significance**.

Shepherds House – Talbot Yard (Kings College - Educational)

13.166 A total of 136 windows serving 64 rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.167 For VSC, 46 of the 136 (34%) windows assessed would meet BRE criteria which would represent a negligible effect.

13.168 Of the affected windows, 34 would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect and 48 windows would experience an alteration in VSC levels of 30-39.9% which is considered a Moderate Adverse effect. The remaining eight windows would experience an alteration in VSC levels in excess of 40% which is considered a Major Adverse effect.

13.169 For NSL, 52 of the 64 (81%) room assessed would meet BRE criteria which would represent a negligible effect.

13.170 Of the affected rooms, three would experience an alteration in NSL levels of 20-29.9% which is considered a Minor Adverse effect and six rooms would experience an alteration in NSL levels of 30-39.9% which is considered a Moderate Adverse effect. The remaining three rooms would experience an alteration in NSL levels in excess of 40% which is considered a Major Adverse effect.

13.171 It is important to note Shepherds House forms part of the Guy's Campus (Kings College London) and that the windows and rooms within this building are not residential. The use of the rooms would be transient and likely to rely on artificial lighting as is the case with most educational buildings and would have a lower requirement for daylight. Therefore, due to the educational use, this building has a lower sensitivity to daylight.

13.172 Overall, based on professional judgement and the lower sensitivity to daylight, the effect to daylight within these buildings would be **long-term, local, adverse of minor significance.**

Chaucer House (London School of Commerce - Educational)

13.173 A total of 82 windows serving 20 rooms were assessed for daylight within this student accommodation building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.174 For VSC, 23 of the 82 (28%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

13.175 Of the affected windows, 12 would experience a VSC alteration between 20-29.9% which is considered a Minor Adverse effect and 10 would experience an alteration between 30-39.9% which is considered a Moderate Adverse effect. The remaining 37 windows would experience an alteration in excess of 40% which is considered a Major Adverse effect.

13.176 For NSL, 15 of the 20 (75%) rooms assessed would meet BRE criteria which would represent a negligible effect.

13.177 The five affected rooms would experience an alteration in NSL levels between 20-29.9% which is considered a Minor Adverse effect

13.178 It is important to note that these are windows and rooms associated with the London School of Commerce and are not residential. The use of the rooms would be transient and likely to rely on artificial lighting as is the case with most educational buildings and would have a lower requirement for daylight. Therefore, due to the educational use, this building has a lower sensitivity to daylight.

13.179 Overall, based on professional judgement and the lower sensitivity to daylight, the effect to daylight within these buildings would be **long-term, local, adverse of minor significance**.

Orchard Lisle House – Talbot Yard (Student Accommodation)

13.180 A total of 107 windows serving 97 rooms were assessed for daylight within this student accommodation building. GIA were able to obtain floor plans for this property and have incorporated them within the 3D model to allow for more accurate results.

13.181 For VSC, two of the 107 (2%) windows assessed would meet BRE criteria which would represent a negligible effect.

13.182 Of the affected windows, 15 would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect and 13 would experience an alteration between 30-39.9% which is considered a Moderate Adverse effect. The remaining 77 windows would experience an alteration in excess of 40% which is considered a Major Adverse effect.

13.183 For NSL, 26 of the 97 (27%) rooms assessed would meet BRE criteria which would represent a negligible effect.

13.184 Of the affected rooms, two would experience an alteration in NSL between 30-39.9% which is considered a Moderate Adverse effect. The remaining 69 rooms would experience an alteration in excess of 40% which is considered a Major Adverse effect.

13.185 It is important to note that Orchard Lisle House provides student accommodation which is deemed to be less sensitive in daylight terms (when compared to residential use) given the transient nature of its occupation. We therefore consider this building to have a lower sensitivity to daylight.

13.186 Overall, based on professional judgement, and due to the temporary nature and resulting lower sensitivity of student accommodation, the effect of daylight within these buildings would be **long-term, local, adverse of moderate to major significance**.

63a Borough High Street (Residential)

13.187 A total of 20 windows serving 15 rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.188 For VSC, 11 of the 20 (55%) windows assessed would meet BRE criteria which would represent a negligible effect.

13.189 Of the nine affected windows, five would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect and two windows would experience an alteration between 30-39.9% which is considered a Moderate Adverse effect. The two windows experiencing a Moderate Adverse effect (W1/F02 and W2/F02) have low existing VSC values of 12.8% and 6.9% which are further reduced to 7.8% and 4.2% respectively. The remaining two windows on the ground floor (W1/F01 and W2/F01) experience an alteration in VSC levels in excess of 40% which is considered a Major Adverse effect. Both windows have low existing VSC levels of 10.8% and 5.4%, meaning the actual change has the ability to become exaggerated in percentage terms. The absolute VSC loss to the identified windows is 5% and 2.5% respectively.

13.190 For NSL, 12 of the 15 (80%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

13.191 The three affected rooms experience an alteration in NSL in excess of 40% which is considered a Major Adverse effect. The rooms have low existing NSL values, therefore, the percentage change is disproportionate to the actual impact.

13.192 It should also be noted that this building is heavily obstructed by 59-61 Borough High Street, which largely results in low existing levels of light.

13.193 Overall and based on professional judgement, the effect to daylight within this building would be **long-term, local, adverse** of **moderate significance**.

Guy's Campus – Kings College London (Educational)

13.194 A total of 48 windows serving 38 rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.195 For VSC, 46 of the 48 (96%) windows assessed would be BRE criteria which would represent a negligible effect.

13.196 The two affected windows (W3/F01 and W4, F01) experience a VSC alteration of 66.7% and 40% respectively, which is considered a Major Adverse effect. It is important to note that the VSC alterations are considered disproportionate to the actual impact as the windows have extremely

low existing VSC values of 1.2% and 1% which are further reduced to 0.4% and 0.8% respectively in the proposed scenario, with the absolute change in VSC being less than 1%.

13.197 For NSL, 31 for the 38 (82%) rooms assessed would meet BRE criteria which would represent a negligible effect.

13.198 Of the affected rooms, three would experience an alteration in NSL levels of 20-29.9% which is considered a Minor Adverse effect. The remaining four rooms would experience an alteration between 30-39.9% which is considered a Moderate Adverse effect. One room on the second floor (F02/R2) would retain a NSL value of 38.5%, whereas the remaining three rooms would retain NSL values in excess of 47%.

13.199 It is important to note that Guy's Campus building (Kings College London) has windows and rooms that are not residential. The use of the rooms would be transient and likely to rely on artificial lighting as is the case with most educational buildings and would have a lower requirement for daylight. Therefore, due to the educational use, this building has a lower sensitivity to daylight.

13.200 Overall, based on professional judgement and the lower sensitivity to daylight, the effect to daylight within these buildings would be **long-term, local, adverse of minor significance**.

The Old King's Head (Residential Element)

13.201 A total of 23 windows serving eight rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology. Whilst this is a mainly commercial building, it has not been possible to determine precisely where the residential element is located, therefore, all windows/ rooms within the building, from first floor up, have been assessed.

13.202 For VSC, two of the 23 (9%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

13.203 Of the affected windows, six would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect and three would experience an alteration in VSC levels of 30-39.9% which is considered a Moderate adverse effect. The remaining 12 windows experience an alteration in VSC levels in excess of 40% which is considered a Major Adverse effect.

13.204 For NSL, all eight rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect. It should be noted that three of the rooms experience an improvement in NSL values in the proposed scenario.

13.205 Overall and based on professional judgement, the effect to daylight within this building would be **long-term, local, adverse** of **moderate significance**.

3 King's Head Yard (Residential Element)

13.206 A total of eight windows serving three rooms were assessed for daylight within the 2nd and 3rd floor of this building. GIA were able to obtain floor plans for this property and have incorporated them within the 3D model to allow for more accurate results. The lower levels of the building serve commercial space and therefore have not been assessed.

13.207 For VSC, four of the eight (50%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

13.208 The four affected windows would experience alteration in VSC levels between 20-29.9% which is considered a Minor Adverse effect.

13.209 For NSL, all three rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

13.210 Overall and based on professional judgement, the effect to daylight within the residential element of this building would be **long-term, local, adverse** of **minor significance**.

57 Borough High Street (Residential)

13.211 A total of three windows serving three rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.212 For VSC, the three windows assessed would fall short of BRE Guideline criteria for VSC. The three windows would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect.

13.213 For NSL, two of the three (67%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

13.214 The one affected room (F02/R1) would experience an alteration in NSL value of 24.7% which is considered a Minor Adverse effect.

13.215 Overall and based on professional judgement, the effect to daylight within this residential building would be **long-term, local, adverse of minor significance**.

53-55 Borough High Street (Residential)

13.216 A total of five windows serving four rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.217 For VSC, one of the five windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

13.218 The four affected windows would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect.

13.219 For NSL, three of the four (75%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

13.220 The one affected room (F02/R1) would experience an alteration in NSL of 25.1% which is considered a Minor Adverse effect.

13.221 Overall and based on professional judgement, the effect to daylight within this residential building would be **long-term, local, adverse of minor significance**.

51 Borough High Street (Residential Element)

13.222 A total of two windows serving two rooms were assessed for daylight within the 4th floor the building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.223 For VSC, the two windows assessed (W1/F04 and W2/F04) will fall short of BRE Guideline criteria for VSC. The two windows would experience an alteration in VSC levels of 27.3% and 26% respectively which is considered a Minor Adverse effect.

13.224 For NSL, one of the two (50%) rooms comply with BRE Guideline criteria and is therefore considered to experience a negligible effect.

13.225 The one affected room (F04/R1) would experience an alteration in NSL of 24.2% which is considered a Minor Adverse effect. The identified room will also retain a good NSL value of 61.4%.

13.226 Overall and based on professional judgement, the effect to daylight within the residential element of this building would be **long-term, local, adverse of minor significance**.

2 St Thomas Street – Bunch of Grapes Pub (Residential Element)

13.227 A total of three windows serving three rooms were assessed for daylight within the 3rd floor the building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.228 For VSC, the three windows assessed (W1-W3/F03) would fall short of BRE Guideline criteria. Two of the windows would experience an alteration in VSC levels of 30-39.9% which is considered a Moderate Adverse effect and the one remaining window would experience an alteration of 43% VSC which is considered a Major adverse effect. All three windows will retain VSC values above 15%, against a BRE target value of 27%.

13.229 For NSL, one of the two (50%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

13.230 The one affected room (F03/R3) would experience an alteration in NSL of 23.4% which is considered a Minor Adverse effect.

13.231 Overall and based on professional judgement, the effect to daylight within the residential element of this building would be **long-term, local, adverse of minor significance**.

8 Bedale Street (Residential)

13.232 A total of 10 windows serving 10 rooms were assessed for daylight within these buildings. GIA were able to obtain floor plans for this property and have incorporated them within the 3D model to allow for more accurate results.

13.233 For VSC, all 10 windows assessed would fully meet BRE Guideline criteria which would represent a negligible effect.

13.234 For NSL, one of the two (50%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

13.235 The one affected room (F03/R3) would experience an alteration in NSL of 28.9% which is considered a Minor Adverse effect.

13.236 Overall and based on professional judgement, the effect to daylight within these buildings would be **negligible**.

22 Southwark Street (Residential)

13.237 A total of 28 windows serving 24 rooms were assessed for daylight within these buildings. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

13.238 For VSC, all 28 windows assessed would fully meet BRE Guideline criteria which would represent a negligible effect.

13.239 For NSL, 23 of the 24 (96%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

13.240 The one affected room (F01/R2) would experience an alteration in NSL of 25.4% which is considered a Minor Adverse effect.

13.241 Overall and based on professional judgement, the effect to daylight within these buildings would be **negligible**.

Shard Place (Residential Element)

13.242 A total of 988 windows serving 471 rooms were assessed for daylight within this part retail part residential building. Given the recent consent for this building, the floor plans for this property have been obtained from the Southwark planning portal.

13.243 For VSC, 912 of 988 (92%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

13.244 Of the affected windows, 26 would experience an alteration between 20-29.9% which is considered a Minor Adverse effect and 32 would experience alterations between 30-39.9% which is considered a Moderate Adverse effect. The remaining 18 windows would experience an alteration in excess of 40% which is considered a Major Adverse effect.

13.245 Of the 18 major adverse impacts recorded, nine will be localised to bedrooms, which are considered to be less sensitive by virtue of their use. The remaining nine major adverse impacts will all be recorded within LKDs (living rooms, kitchens, and dining rooms) which pass the NSL methodology, due to the presence of multiple additional windows serving the same room.

13.246 For NSL, 463 of 471 (98%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

13.247 Of the affected rooms, three would experience an alteration between 20-29.9% which is considered a Minor Adverse effect. The remaining five rooms would experience an alteration in NSL between 30-39.9% which is considered a Moderate Adverse effect. It is important to note that the eight affected rooms are bedrooms which are considered to be less sensitive.

13.248 Overall, based on professional judgement, the effect to daylight within these buildings would be **long-term, local, adverse of moderate significance**.

43 Borough High Street (Residential)

13.249 A total of nine windows serving eight rooms were assessed for daylight within this residential building. GIA were able to obtain floor plans for this property and have incorporated them within the 3D model to allow for more accurate results.

13.250 For VSC, one of the nine (11%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

13.251 The eight affected windows would experience an alteration between 30-39.9% which is considered a Moderate Adverse effect. The affected windows will retain VSC values between 11% and 20%, against a BRE target value of 27%.

13.252 For NSL, five of the eight (63%) rooms fully comply with BRE Guideline criteria which would represent a negligible effect.

13.253 The three affected rooms would experience an alteration between 20-29.9% which is considered a Minor Adverse effect. Furthermore, all three rooms will retain good NSL values above 66% in the proposed scenario.

13.254 It is important to note that this property is recessed between two buildings on either side, creating flank walls which would limit the amount of daylight available from oblique angles. Therefore, these windows rely on daylight from directly across the Site.

13.255 Overall, based on professional judgement, the effect to daylight within these buildings would be **long-term, local, adverse of moderate significance**.

Sunlight

13.256 The full sunlight assessment can be found in Appendix 13.2 of this ES and the summary results are presented in **Table 13.9**.

13.257 Of the 533 rooms assessed for sunlight, 483 (90.6%) would meet the BRE criteria for both total Annual and Winter PSH and are therefore considered a Negligible effect.

13.258 A total of 23 buildings are assessed in relation to sunlight. Three buildings, Chaucer House - White Hart Yard, Orchard Lisle House - Talbot Yard and Guy's Campus are located south of the site would not be affected by the Development in relation to sunlight and are therefore not assessed.

13.259 The 19 buildings highlighted in grey in **Table 13.9** experience little or no change (below 20% alteration) in sunlight levels with the completed Development in place and are therefore considered a **negligible** effect.

13.260 The remaining four affected properties are discussed in detail following **Table 13.9**.

Table 13.9 Effects to APSH to Surrounding Sensitive Receptors

Address	Total No. of Rooms	No. Rooms that meet BRE criteria	Total APSH			Winter APSH		
			Below BRE Guidelines			Below BRE Guidelines		
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction
10-18 London Bridge Street	82	64	0	2	13	0	1	7
6 London Bridge Street	12	4	2	0	2	0	1	4
St Thomas Church	4	4	0	0	0	0	0	0
Guy's Hospital (Chapel)	3	3	0	0	0	0	0	0
Guy's Campus (Southwark Wing)	5	5	0	0	0	0	0	0
Guy's Campus (Tower Wing)	23	23	0	0	0	0	0	0
Iris Brook House Talbot Yard	18	18	0	0	0	0	0	0
Shepherds House - Talbot Yard	8	8	0	0	0	0	0	0
Chaucer House - White Hart Yard	-	-	-	-	-	-	-	-
Orchard Lisle House - Talbot Yard	-	-	-	-	-	-	-	-
63a Borough High Street	5	5	0	0	0	0	0	0
Guy's Campus	-	-	-	-	-	-	-	-
The Old Kings Head Ph	2	2	0	0	0	0	0	0
3 Kings Head Yard	1	1	0	0	0	0	0	0
57 Borough High Street	3	3	0	0	0	0	0	0
53-55 Borough High Street	4	4	0	0	0	0	0	0

Address	Total No. of Rooms	No. Rooms that meet BRE criteria	Total APSH			Winter APSH		
			Below BRE Guidelines			Below BRE Guidelines		
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction
51 Borough High Street	2	2	0	0	0	0	0	0
2 St Thomas Street	3	2	0	0	0	0	0	1
8 Bedale St	5	5	0	0	0	0	0	0
59-61 Borough High Street	8	8	0	0	0	0	0	0
22 Southwark St	12	12	0	0	0	0	0	0
24 Southwark St	25	25	0	0	0	0	0	0
Southwark Cathedral Annex	13	13	0	0	0	0	0	0
Southwark Cathedral	3	3	0	0	0	0	0	0
Shard Place	284	261	3	8	11	0	10	12
43 Borough High Street	8	8	0	0	0	0	0	0
Total	533	483	5	10	26	0	12	24

10-18 London Bridge Street (Hotel)

13.261 A total of 82 hotel rooms were assessed for sunlight within this building.

13.262 64 (78%) of the 82 rooms assessed would meet BRE criteria for both total and winter PSH, which is therefore considered to equate to a Negligible effect.

13.263 Of the affected rooms for winter PSH, one would experience alterations between 30-39.9% which is considered a Moderate Adverse effect and seven would experience an alteration in excess of 40% which is considered a Major Adverse effect.

13.264 For total APSH, two rooms would experience alterations between 30-39.9% which is considered a Moderate Adverse effect, and 13 would experience an alteration in excess of 40% which is considered a Major Adverse effect.

13.265 It is important to note that the impacted hotel rooms are considered to be of transient use as these are generally occupied on a temporary basis and primarily used during night-time hours, therefore, are considered to be less sensitive.

13.266 Overall, based on professional judgement and due to the temporary nature and lower sensitivity of hotel accommodations, the effect to sunlight within this building is considered to be **long term, local, adverse of moderate significance**.

6 London Bridge Street (Residential)

13.267 A total of 12 rooms were assessed for sunlight within this building.

13.268 Four (33%) of the 12 rooms assessed would meet BRE criteria for both total and winter PSH, which is therefore considered to equate to a Negligible effect.

13.269 Of the affected rooms for winter PSH, four would experience an alteration in excess of 40% which is considered a Major Adverse effect.

13.270 For APSH, two rooms would experience alterations between 20-29.9% which is considered a Minor Adverse effect, and the other two would experience an alteration in excess of 40% which is considered a Major Adverse effect.

13.271 Overall, based on professional judgment, the effect to these buildings is considered to be **long-term, local, adverse of moderate significance**.

2 St Thomas Street (Residential Element)

13.272 A total of three rooms were assessed for sunlight within this building.

13.273 Two of the three (67%) rooms assessed would meet BRE criteria for both annual and winter PSH.

13.274 The one affected room for winter PSH would experience an alteration in excess of 40% which is considered a Major Adverse effect. However, the room (F03/R3) will retain a winter PSH value of 4%, against a BRE target value of 5%.

13.275 Overall, based on professional judgment, the effect to these buildings is considered to be **long-term, local, adverse of minor significance**.

Shard Place (Residential Element)

13.276 A total of 284 rooms were assessed for sunlight within this building.

13.277 261 of the 284 (92%) rooms assessed would meet BRE criteria for both annual and winter PSH.

13.278 Of the affected rooms for winter PSH, 10 rooms would experience an alteration of 30-39.9% which is considered a Moderate Adverse effect and 12 rooms would experience an alteration in excess of 40% which is considered a Major Adverse effect.

13.279 For total APSH, three rooms would experience alterations between 20-29.9% which is considered a Minor Adverse effect and eight would experience an alteration between 30-39.9% which is considered a Moderate Adverse effect. The remaining 11 rooms would experience an alteration in excess of 40% which is considered a Major Adverse effect.

13.280 Overall, based on professional judgment, the effect to these buildings is considered to be **long-term, local, adverse of moderate significance**.

Overshadowing

13.281 Full details of the Transient Overshadowing assessment can be found within **Appendix 13.3** and the results are summarised below.

13.282 The commentary below should be read in conjunction with the Transient Overshadowing and Sun Hours on Ground images presented within the full assessment provided in **Appendix 13.3**.

13.283 The Transient Overshadowing assessment has been used to identify any area of public or private amenity space which may be significantly affected by the Development. The relevant areas identified are also assessed in more detail with the use of the Sun Hours on Ground methodology and are discussed below.

Transient Overshadowing to Existing Sensitive Receptors

21 March (equinox)

13.284 On this day, shadow would be cast from 08:00 GMT in a north-westerly direction, which would move clockwise throughout the day. From this time, shadow is cast in the direction of the Borough Market, alongside shadow from existing structures. Throughout the morning the shadow from the proposed Development would move across the Southwark Cathedral late in the morning, clearing by 13:00 GMT. Throughout the afternoon shadow is cast eastward and reach The News Building, Shard Place, St Thomas Street, The News Building Plaza and the open space in front of London Bridge station.

21st June (summer solstice)

13.285 On this day, shadow would be cast from 06:00 BST in a south-westerly direction, which would move clockwise throughout the day. For a short period in the morning the shadows will reach the Borough Market. From 13:00 BST and throughout the afternoon additional shadow would be cast upon St Thomas Street and Shard Place.

21 December (winter solstice)

13.286 On this day, shadow would be cast from the proposed development from 09:00 GMT in a north-westerly direction, which would move clockwise throughout the day.

13.287 Given the lower position of the sun in the sky, shadows would spread beyond the vicinity of the Site and reach the Thames River and London Bridge for short period of times. Additional shadow is cast upon the Borough Market from 9:00 GMT until 10:00 GMT. At this time until 14:00 GMT shadow from the proposed development is cast over St Thomas Street. For the rest of the day the proposed Development does not affect any other relevant amenity areas.

Conclusion

13.288 Accordingly, based on professional judgement, the effects overshadowing would be **permanent, long-term** ranging from **negligible** to **moderate adverse** (**significant**). Therefore, the relevant amenity areas are assessed quantitatively within the following sun hours on ground section.

Sun Hours on Ground

Southwark Cathedral

13.289 For Southwark Cathedral, the open area of amenity sees no alterations in sun hours on ground on the 21 March and are fully in line with BRE Guidelines. The effect of overshadowing is considered **negligible**.

Guy's Hospital Courtyard

13.290 The Guy's Hospital Courtyard experience no alterations in sun exposure on the 21 March as a result of the proposed development and are fully in line with BRE Guidelines. The effect of overshadowing is considered **negligible**.

London Bridge Station Public Plaza

13.291 The London Bridge Station Public Plaza amenity area would not experience any reduction in sun hours on ground on the 21 March and the effect is therefore considered **negligible**.

The News Building Public Plaza

13.292 The News Building Public Plaza would experience a reduction of 1%. A total of 58% of the area still receives at least 2 hours of sunlight on 21 March. Therefore, the effect of the Proposed Development is considered **negligible**.

Communal areas within Shard Place - Ground Floor, 16th Floor and Roof Level.

13.293 The communal areas associated with Shard Place are both not affected by the Proposed Development on the 21 March and therefore the overshadowing effects are considered **negligible**.

Front Open Spaces at 9 and 20 St Thomas Street

13.294 The area to the front of 9 Thomas Street experience a reduction in sunlight with the proposed Development in place. This effect is considered to be **long-term, local, adverse of moderate significance**.

13.295 It is worth noting that the area at the front of 9 St Thomas Street is not known to be currently used as an amenity space and therefore should be considered of lower sensitivity.

13.296 The area to the front of 20 Thomas Street would experience a reduction from 100% to 68% of the area receiving at least 2 hours of sunlight on 21 March . Given that at least half of this area still meet the BRE guideline, the effect is considered acceptable and **negligible**.

Solar Glare

13.297 The full solar glare assessment is provided at **Appendix 13.4**.

13.298 The assessment has been undertaken from signalised road junctions, pedestrian crossings and railway tracks near to the Site which are considered sensitive in terms of solar glare (noted by the road name reference BH_1, ST_1, etc.). The receptor locations are shown in **Figure 13.5**. A total of 26 locations have been assessed in terms of solar glare.

13.299 All solar glare assessments consider a worst-case scenario, assuming clear sky conditions.

13.300 In accordance with the solar glare significance criteria presented in paragraphs 13.68 - 13.73, solar reflections occurring at angles greater than 30° from the driver's line of sight will not affect the driver's responsiveness and therefore can be considered Negligible. In addition, viewpoints where the portion of the façade of the Development visible is very small and the distance is greater than 15° of a driver's line of sight are also considered Negligible. The list of the locations from where this applies, and therefore the Development is considered to have an **Negligible** effect are the 12 listed below:

- BH_1;
- BH_2;
- BH_3;
- BH_4;
- BH_5;
- BH_6;
- US;
- ST_3;
- ST_4;
- CR;
- TLB_E_1; and
- TLB_E_2

13.301 The number of locations to be considered further is therefore reduced to 14 locations.

13.302 All remaining 14 locations are considered to have a **long term, local, adverse effect of minor significance**. This is because solar reflections occur within 30° to 10° or between 10° to 5° of the driver's line of sight for a short period of time. In addition, the minor adverse significance is due to mitigating factors such as reflections occurring from a small section of façade, potential reflections occurring over a limited period of time, unaffected traffic signals and being able to deploy a car visor which would shield the majority of reflections. The junctions considered Minor Adverse are listed below:

- SW_1;
- SW_2;
- SW_3;
- SS;
- LB_1;
- LB_2;
- LB_3;
- ST_1;
- TLB_N_1;
- TLB_N_2;
- TLB_N_3;
- TLB_W_1;
- TLB_W_2; and
- TLB_W_3.

Light Pollution

13.303 The light pollution assessments can be found in **Appendix 13.5** and is discussed in detail below.

Light Intrusion

13.304 The most sensitive receptors for light intrusion are considered to be residential buildings, highlighted in the map presented in **Figure 13.6**.

13.305 The residential receptors assessed due to their close proximity to the proposed Development are as follows:

- 2 St Thomas Street (Bunch of Grapes Pub);
- 9 St Thomas Street (St Thomas Church);
- 3 Kings Head Yard;
- The Old King's Head Pub (Residential element);
- 43, 51, 53-55, 57, 59-61 and 63a Borough High Street;
- Orchard Lisle House; and
- Fielden House - Shard Place.

13.306 The results of the assessment indicate that pre-curfew (before 11pm), the levels of light trespass would be very limited and well within the 25 lux level suggested by the ILP for a city centre location for the residential buildings assessed.

13.307 The assessment also indicates that post-curfew (after 11pm), the levels of light trespass would be below the 5 lux level suggested by the ILP for the vast majority of the assessed properties. As such, the effect of light pollution for all but one of the sensitive receptors assessed (pre and post curfew) is considered **negligible**.

13.308 The exception to the above is for 9 St Thomas Street (St Thomas Church), which meets the ILP Guidance pre-curfew, but breaches post-curfew. However, the assessment uses the worst-case scenario of 500 lux. This effect is therefore considered **long term, local, adverse effect of moderate significance.**

Mitigation Measures and Likely Residual Effects

13.309 Overall, likely residual effects would remain as reported above with no mitigation, with the exception of light pollution where a lower lighting output is proposed for the Development, whereby measures such as occupancy sensors would be implemented thereby reducing the post-curfew illuminance lux levels and mitigate the light pollution effect to **negligible** (not significant).

13.310 As part of the design process, the massing and façade details of the Development were informed by the potential daylight and sunlight effects. However, owing to the scale of the Development in comparison to the existing buildings, its close proximity and low existing daylight and sunlight levels, changes in conditions would be unavoidable.

13.311 **Table 13.10** summarises the likely significant effects, mitigation measures and likely residual effects identified within this chapter.

Table 13.10 Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Daylight, sunlight and overshadowing effects during demolition.	**Temporary, beneficial effects considered likely during demolition.**	None proposed	**Temporary, beneficial effects considered likely during demolition.**
Solar glare effects during demolition.	**Temporary, beneficial effects considered likely during demolition.**	None proposed	**Temporary, beneficial effects considered likely during demolition.**
Daylight, sunlight and overshadowing during construction.	**Effects would gradually change from beneficial to those expected once the Development is**	None proposed	**Effects would gradually change from beneficial to those expected once the Development is complete and operational.**

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	complete and operational.		
Solar glare during construction.	**Effects would gradually change from beneficial to those expected once the Development is complete and operational.**	None proposed	**Effects would gradually change from beneficial to those expected once the Development is complete and operational.**
Light pollution during demolition.	**Temporary, beneficial effects considered likely during demolition.**	None proposed	**Temporary, beneficial effects considered likely during demolition.**
Completed and Operational Development			
Daylight	**Long term, local, Negligible** to 8 properties**, minor adverse** to 9 properties, **moderate adverse** to 8 properties and **moderate to major adverse** to 1 property.	None proposed	**Long term, local, Negligible** to 8 properties**, minor adverse** to 9 properties, **moderate adverse** to 8 properties and **moderate to major adverse** to 1 ***property***.
Sunlight	**Long term, local, Negligible** to 19 properties**, minor adverse** to 1 property**, moderate adverse** to 3 properties.	None proposed	**Long term, local, Negligible** to 19 properties**, minor adverse** to 1 property**, moderate adverse** to 3 properties.
Overshadowing	**Negligible** to most amenity areas. **Long term, local, moderate adverse** to 1 property.	None proposed	**Negligible** to most amenity areas. **Long term, local, moderate adverse** to 1 property.
Solar Glare	**Long term, local, Negligible** to 12 locations, **minor adverse** to the remaining 14 ***locations***.	None proposed	**Long term, local, Negligible** to 12 locations, **minor adverse** to the remaining 14 locations
Light Pollution	**Negligible** to ***most*** properties. **Long term, local, moderate adverse** to 1 property.	Occupancy sensors and reduced level of internal illuminance during curfew hours	**Negligible** to all properties.

Monitoring

13.312 No specific daylight, sunlight, overshadowing, solar glare and light pollution monitoring has been identified.

References

1 Building Research Establishment (BRE) Guidelines, 2011. 'Site Layout Planning for Daylight and Sunlight 2011', A Guide to Good Practice, Second Edition (2011).

2 Department for Communities and Local Government [Online]. Available at: https://www.gov.uk/topic/local-government/council-tax.

3 University of Utah: 'Simple Anatomy of the Retina'. Webvision., http://webvision.med.utah.edu/book/part-i-foundations/simple-anatomy-of-the-retina/).

4 Robert H. Spector (1990). 'Clinical Methods: The History, Physical, and Laboratory Examinations', 3rd edition, Chapter 3 - www.ncbi.nlm.nih.gov/books/NBK220/).

5 Commission Internationale de L'Eclairage (CIE), 2002, 146:2002 & CIE 147:2002 Collection on glare, 2002.

6 Institute of Lighting Practitioners (ILP), 2020: 'The Guidance Notes for the Reduction of Obtrusive Light'.

14. Cumulative Effects

Introduction

14.1. This chapter presents an assessment of the likely significant cumulative effects of the Development in relation to interactions between the various environmental effects of the Development and the likely significant environmental effects of the Development in combination with those arising from consented and 'reasonably foreseeable' schemes near the Site.

14.2. This chapter has been written by Waterman Infrastructure & Environment (Waterman IE) with input from all other consultants and specialists who have contributed to the ES. The chapter has been informed by all preceding technical chapters of the ES (**Chapter 7** to **Chapter 13**) including **Part 3: Townscape, Visual Impact and Built Heritage Assessment**.

14.3. Please note that for the purposes of this ES chapter, the demolition, deconstruction, refurbishment and construction works will be referred to as 'the Works'.

14.4. As noted in **Chapter 2: EIA Methodology** of the ES, for the purposes of this ES, minor, moderate and major are all considered as significant effects. The exception to this is in the Townscape, Visual Impact and Built Heritage Assessment where minor or minor/moderate effects are considered to be not significant; moderate and major effects are considered as significant effects.

Assessment Methodology

14.5. The chapter considers two types of cumulative effects:

- **Type 1 Cumulative Effects:** the combination of individual likely significant environmental effects resulting from the Development in isolation upon sensitive receptors, e.g. combination of noise, dust and visual effects on a particular receptor such as residents; and
- **Type 2 Cumulative Effects:** the combined effects arising from consented and 'reasonably foreseeable' schemes (collectively known as 'cumulative schemes'), which individually might be insignificant, but when considered together, could create a significant cumulative effect.

Type 1 Effects

14.6. Likely significant Type 1 cumulative effects have been identified and qualitatively assessed using the findings of all technical assessments reported within this ES, together with professional judgement.

14.7. Type 1 cumulative effects likely to arise from the Development have been considered in the context of both the Works and the completed and operational Development.

14.8. In consideration of the comprehensive range of environmental management controls and other mitigation measures committed to by the Applicant, as reported in this ES, Type 1 cumulative effects have only been considered in relation to the likely residual effects of the Development, as identified in **Chapter 7** to **Chapter 13** of this ES and within **Part 3: Townscape, Visual Impact and Built Heritage Assessment**. The Type 1 cumulative effects for the Works were therefore assessed qualitatively using professional judgement based on the findings of the assessments of this ES.

Type 2 Effects

14.9. Although there is no formal guidance as to what should be considered a cumulative scheme, criteria for defining a scope of assessment for Type 2 cumulative effects was developed using professional experience and expert judgement and was stated in the EIA Scoping Report (Annex 1 of **Appendix 2.1**). To determine which cumulative schemes are likely to give rise to significant cumulative effects in combination with the Development, consideration was given to the following criteria:

- Schemes within 1km of the Site and with a valid planning permission which have a floorspace uplift of greater than 10,000 sqm Gross External Area (GEA); and
- Schemes within 1km of the Site and with a valid planning permission, which have a floorspace uplift in GEA of less than 10,000 sqm but would introduce sensitive receptors near to the Site.

14.10. Likely significant Type 2 cumulative effects have been assessed for each of the environmental topics scoped into the EIA. The likely significance of Type 2 cumulative effects has been assessed through a combination of quantitative and qualitative means, as appropriate. Where likely significant Type 2 cumulative effects are not anticipated, justification is provided. As for Type 1 cumulative effects, only the likely residual effects are considered within this assessment since it is a reasonable assumption that all mitigation and enhancement measures recommended for the Development such as the Site-specific Environmental Management Plan (as set out in this ES) and cumulative schemes would be implemented.

14.11. **Table 14.1** provides the details of all the cumulative schemes which have been considered in this assessment. A plan showing the location of the cumulative schemes in relation to the Site is presented as **Figure 14.1**. The cumulative schemes to be included in the assessment were set out in the Informal EIA Scoping Letter (**Appendix 2.1**) and agreed through consultation with London Borough of Southwark (LBS) as confirmed within their Informal EIA Scoping Opinion (**Appendix 2.2**).

Table 14.1 List of Cumulative Schemes Assessed

Ref. (Figure 14.1)	Cumulative Scheme	Planning Reference Number (Borough)	Summary Description	Status
1	185 Park Street	17/AP/1944 (SC)	Minor material amendment to planning permission 14/AP/3842. Demolition of existing buildings and redevelopment to provide a mixed use development providing three new buildings comprising basement, lower ground and ground floor plus part 8, 14 and 18 storeys (maximum height 19 storeys) containing 163 residential units (Class C3), Office (Class B1), Retail (Class A1/A3/A4), Cultural facility (Class D1/A1/A3/A4); provision of hard and soft landscaping and the provision of parking, servicing and plant areas	Granted June 2018. Under construction. Later NMAs including ref. 18/AP/3045, 19/AP/2338, 19/AP/5478, 20/AP/127

Ref. (Figure 14.1)	Cumulative Scheme	Planning Reference Number (Borough)	Summary Description	Status
2	Capital House	18/AP/0900 (SC)	Redevelopment of the site to include the demolition of Capital House and the erection of a 39-storey building (3 basement levels and ground with mezzanine and 38 storeys) of a maximum height of 137.9m (AOD) to provide up to 905 student accommodation units (Sui Generis use), flexible retail/café/office floorspace (Class A1/A3/B1), cycle parking, servicing, refuse and plant areas, public realm improvements and other associated works incidental to the development. The application is accompanied by an Environmental Statement.	Resolution to grant May 2019, pending legal agreement.
3	Shard Place (Fielden House) 28-42 St Thomas Street	17/AP/4008 (SC)	Minor material amendment to planning permission 14-AP-1302. Demolition of existing buildings and erection of part 26 and part 16 storeys to provide 176 apartments (141 Use Class C3 and 35 flexible use C1/C3), with 1,800sqm (gross) of flexible retail space (Classes A1, A2, A3 and A4) at St. Thomas Street and London Bridge Street (Concourse) levels, service area, one level of basement including car parking (4 spaces) and associated hard and soft landscaping, amenity spaces and alterations to existing highways adjoining.	Granted Sep 2018. NMA granted 20/AP/1473. Built-out, to be occupied.
4	133 Park Street	16/AP/4569 (SC)	Demolition of existing buildings and redevelopment to provide two Class B1 office buildings of nine storeys and ten storeys plus plant (41m AOD on Sumner Street and 42.85m AOD on Park Street). The development will include the creation of a new basement; new public realm; provision of a retail (Class A1/A3/A5) kiosk; hard and soft	Granted Oct 2017. Under construction.

Ref. (Figure 14.1)	Cumulative Scheme	Planning Reference Number (Borough)	Summary Description	Status
			landscaping and other associated works.	
		19/AP/5664 (SC)	Minor material amendment to above planning permission including: Reduction in the size of the basement; Consolidation of basement to Block A; relocation of plant; Provision of a cycle ramp; Minor amendments to the massing of Block A and B; Minor repositioning of Block B; Façade and design amendments to both Block A and B Increase of above ground floorspace of 1,130sqm (GIA).	S73 approved May 2020.
5	Southwark Fire Station, 94 Southwark Bridge Road;	17/AP/0367 (SC)	Redevelopment of the site including alterations and extensions to listed buildings for a mixed use scheme to provide a new secondary school with 6th form (up to 1150 pupils), 199 residential units in buildings up the 10 storeys in height, 234 sqm of flexible commercial or community use (Class A1, A3, B1, D1, D2), a 139 sqm Gym, associated landscape and public realm works, cycle parking, disabled parking and servicing access; and the redevelopment of land at Grotto Place for the provision of a new sports hall (1,452sqm) and external multi use games facility and landscaping.	Granted Nov 2018. Under construction. Temporary school building in place until September 2021 (18/AP/2863).
6	1 Bank End	15/AP/3066 (SC)	Redevelopment of 1 Bank End, including reuse of railway arches and rebuilding and extension of the rear of Thames House, Park Street (behind retained facade); remodelling of Wine Wharf building on Stoney Street and development of a two storey building at 16 Park Street, all to provide a development reaching a maximum height of 6 storeys (maximum building height 27.419m AOD) comprising retail units (flexible class A1	Granted March 2017. Under construction.

Ref. (Figure 14.1)	Cumulative Scheme	Planning Reference Number (Borough)	Summary Description	Status
			shops, A3 cafes/restaurants and A4 drinking establishments use) at ground and first floor levels, a gallery (Class D1 use) at ground floor level, office floorspace (Class B1 use) at ground up to fifth floor level, a cinema (Class D2 use) at ground floor and basement level, associated cycle parking spaces at basement, associated refuse and recycling with new public access routes and public open space.	
		20/AP/2333 (SC)	Variation to above permission to make the following minor-material amendments: • Alterations to internal retail layouts dictated by an updated Fire Strategy, • Alterations to the west elevation of Building 02, • Alterations to the east elevation of Building 02 dictated by change of first floor use; and • Alterations to elevations of Building 04.	Pending decision.
7	Becket House / 60 St Thomas Street (Edge London Bridge)	20/AP/0944	Redevelopment of the site to include demolition of Becket House and the erection of a 27 storey building with additional level of plant and basement levels in order to provide office use (Class B1), retail (flexible Class A1/A3), cycle parking, servicing, refuse and plant areas, public realm improvements and other associated works incidental to the development. The application is accompanied by an Environmental Statement.	Pending decision.
8	40-44 Bermondsey Street, Vinegar Yard Warehouse, 9-17 Vinegar Yard and land adjacent to 1-7 Snowsfields	19/AP/0404 (SC)	Demolition of existing buildings at 40-44 Bermondsey Street including partial demolition, rebuilding and refurbishment of existing Vinegar Yard Warehouse and erection of three new	Pending decision.

Ref. (Figure 14.1)	Cumulative Scheme	Planning Reference Number (Borough)	Summary Description	Status
			buildings (two linked) with up to two levels of basement and heights ranging from five storeys (24.2m AOD) to 17 storeys (67m AOD) to provide office space (Class B1); flexible retail space (Classes A1/A2/A3/A4/A5); new landscaping and public realm; reconfigured pedestrian and vehicular access; associated works to public highway; ancillary servicing; plant; storage and associated works. The application is accompanied by an Environmental Statement.	
9	2-4 Melior Place	18/AP/3229 (SC)	Redevelopment of the site involving the construction of a 6-storey plus basement building, comprising a retail art gallery (Class A1) on the ground floor and 3 x 2 bed, 2 x 3 bed and 2 x 4 bed residential units on the upper floors.	Granted July 2019.
10	151-157 Tower Bridge Road	16/AP/3222 (SC)	Alterations to and the refurbishment of the existing buildings, including: change of use from 106 residential units (40 x studios, 36 x 1bed and 30 x 2bed), 41 aparthotel units/partially vacant aparthotel floorspace and flexible retail/commercial floorspace, to 69 residential units (8 x 1bed, 56 x 2bed and 5 x 3bed), 137 aparthotel units and flexible retail/commercial floorspace (A1/A2/A3/B1a); installation of balconies; alterations to elevations; minor alterations to increase the height of the buildings (max. 32.3 metres); landscaping; alterations to vehicle access; and associated works.	Granted Nov 2017. Under construction.
11	Guinness Court, Snowsfields Street	16/AP/3819 (SC)	Erection an external lift core to Block C from ground to 4th floor level and double mansard roof extension over Blocks A, B and C to provide 30	Granted June 2019. Not commenced on site.

Ref. (Figure 14.1)	Cumulative Scheme	Planning Reference Number (Borough)	Summary Description	Status
			residential units (2x 1bed, 24x 2bed, 4x 3bed) together with associated ancillary works.	
12	Royal Mint Court	PA/16/00479/A1 (LBTH)	Full planning permission for comprehensive redevelopment of the site to provide an employment-led mixed use development of up to 81,000sq.m of B1, A1, A3 and D2 floor space, involving the refurbishment and restoration of the Johnson Smirke Building (Grade II*), remodelling and refurbishment of the Grade II façade of The Registry, with alterations and extensions to the remainder of the building, the retention, part demolition, alterations and extensions to Murray and Dexter House , the erection of a standalone four storey building within the south west corner of the site, alterations to existing boundary wall to create new access points to the site and associated public realm and landscaping and all ancillary and associated works.	Granted February 2017
13	130 Fenchurch Street, City of London	16/00809/FULMAJ (CoL)	Demolition of existing building and erection of a building over two basement levels, ground, mezzanine and 18 upper storeys and a triple height plant storey [106.35m AOD] for uses comprising office (Class B1) [45,128sq.m GEA], retail (Class A1) and flexible retail space (Class A1/A3) [486sq.m GEA] with associated cycle parking, servicing, storage and plant. [Total 45,614sq.m GEA]	Granted March 2019. Not commenced on site.
14	Site Bounded by King William Street, Cannon Street, Abchurch Lane & Nicholas Lane. Incorporating 10 King William Street, 12 Nicholas	14/00178/FULEIA (CoL)	Demolition of the existing buildings and redevelopment with a new office (Class B1) building at part basement, ground floor and six upper floors (17,250sq.m total GIA) with retail (Class A1/A2/A3/A4/A5) uses at part ground and mezzanine	Granted June 2014. Under construction.

Ref. (Figure 14.1)	Cumulative Scheme	Planning Reference Number (Borough)	Summary Description	Status
	Lane, 14 Nicholas Lane, 135-141 Cannon Street, 143-149 Cannon Street & 20 Abchurch Lane, City of London		levels (1,091sq.m GIA) incorporating reconstruction of the existing historic facade at 20 Abchurch Lane. Passive provision for a new Bank Station Entrance Hall on Cannon Street and associated infrastructure at ground floor level.	
15	Seal House 1 Swan Lane, City of London	18/01178/FULMAJ (CoL)	Demolition of the existing building and construction of a basement, ground plus 11 storey building for office use (Class B1) (16,084sq.m GIA), retail use (Class A1/A3) at ground (314sq.m GIA), restaurant use (Class A3) at 11th floor level (708sq.m GIA), a publicly accessible terrace at 12thfloor roof level (744sq.m) and public realm improvement works together with ancillary parking, servicing and plant and all necessary enabling works.	Resolution to grant March 2019, subject to Section 106 agreement.
16	Colechurch House, London Bridge Walk	20/AP/3013	Redevelopment of the site to include demolition of Colechurch House, pedestrian footbridge and walkway and erection of an elevated 22-storey building (+ 4-storey basement) above a public park and providing office floorspace, retail floorspace, restaurant/café floorspace, leisure floorspace (all Use Class E), theatre and a bar (Sui Generis), delivered alongside public realm improvements, roof gardens, cycle parking, servicing, refuse, plant areas and other associated works incidental to the development. The application is accompanied by an Environmental Statement.	Pending decision.
17	Land bounded by St Thomas Street, Fenning Street, Vinegar Yard and Snowfields including no. 1-7 & 9 Fenning Street	18/AP/4171 (SC)	Redevelopment of the site to include the demolition of the existing buildings and the erection of a 5 to 19 storey building (plus ground and mezzanine) with a maximum height of 86.675m (AOD)	Committee resolved to refuse permission at 29/06/20 meeting. Called-in for

Ref. (Figure 14.1)	Cumulative Scheme	Planning Reference Number (Borough)	Summary Description	Status
			and a 2 storey pavilion building (plus ground) with a maximum height of 16.680m (AOD) with 3 basement levels across the site providing a total of 30,292 sqm (GIA) of commercial floorspace comprising of use classes B1, A1, A2, A3, A4, D2 and sui generis (performance venue), cycle parking, servicing, refuse and plant areas, public realm (including soft and hard landscaping) and highway improvements and all other associated works.	determination by Mayor.
18	King's College London, Land rear of 89-111 Borough High Street	19/AP/0405	Demolition of six existing buildings, and development of a new student residential environment (Student Village) to provide 520 sqm of commercial space at ground floor and 370 new single occupancy student bedrooms and communal kitchens and common rooms, community and commercial uses at ground floor, and new public realm and landscaping. The scheme involves the construction of four blocks consisting of a four storey block adjacent to The George Inn, with additional blocks being part four part seven, part five part eight and rising to a maximum height of nine stories.	Pending decision
19	Landmark Court, land bounded by Southwark Street, Redcross Way and Cross Bones Graveyard	19/AP/0830	Mixed-use development involving the demolition of 25-33 Southwark Street, the restoration of 15 Southwark Street for residential use and the erection of new buildings comprising: a part 6/8/9-storey office (Class B1) building incorporating a single-storey basement, flexible ground floor uses (Classes A1/A2/A3/A4 and D2) and workspace units (Class B1); a 3-storey workshop building (Class B1); a marketplace with up	Resolution to approve by Committee June 2020, pending legal agreement

Ref. (Figure 14.1)	Cumulative Scheme	Planning Reference Number (Borough)	Summary Description	Status
			to 9 permanent stalls (Class A1); 36 residential units in the refurbished 15 Southwark Street building and a new 8-storey block; associated areas of new public realm; hard and soft landscaping; enhancements to Crossbones Burial Ground; means of access and enclosure, and; ancillary plant and equipment.	

14.12. It should be noted that Shard Place (reference 4 in **Table 14.1**) forms part of the baseline for the assessments. This is because the physical mass of Shard Place is already built and the scheme is due for completion in 2021, prior to the commencement of the Works on Site. This was agreed with LBS. Shard Place is in close proximity to the Site and therefore has the potential to affect the baseline situation for these disciplines. Shard Place along with five other cumulative schemes are part of the 'future baseline' traffic model (as outlined in paragraph 14.21) and so are 'baseline' schemes for transport and the associated air quality, noise and vibration effects.

14.13. As Shard Place will be completed before the Works start there are no demolition or construction cumulative effects between the Development and Shard Place. Shard Place is a Sensitive Receptor (SR) for baseline and cumulative assessments as it will be present by the time the Works on New City Court commence.

14.14. The visual impact assessment includes some cumulative developments outside of the criteria stated above, principally that they are further away from the Site than 1km. The reason for this is that long distance views are included in the visual impact assessment and therefore these other schemes are relevant to the assessment. These schemes are identified in **Part 3: Townscape, Visual Impact and Built Heritage Assessment** and were discussed and agreed with LBS.

14.15. The above cumulative schemes comprise a combination of consented and 'reasonably foreseeable' schemes which have yet to be determined.

14.16. Design information for the cumulative schemes have been based upon readily available public information at the time of undertaking the assessment. Where construction programmes and completion dates for the cumulative schemes are not known, for the purposes of the assessment, it is assumed that some may overlap with the Development as a worst case.

Assessment of Type 1 Cumulative Effects

The Works

14.17. The likely Type 1 cumulative effects for various sensitive receptors and land uses (identified in **Chapter 7 to Chapter 13**) in the vicinity of the Site are listed in **Table 14.2**. **Table 14.2** also identifies the anticipated effect interactions during each of the key stages of the Works. In accordance with **Chapter 6: Development Programme, Demolition, Deconstruction, Refurbishment and Construction**, the Works activities have been outlined, some of which would overlap in terms of programme and timescales.

14.18. In view of the assessment methodology and the findings of the technical assessments reported within this ES, the most significant Type 1 cumulative effects interactions during the Works phase of the Development are likely to result from:

- **Short** to **medium term**, **local, adverse effects** of **minor to major significance** on heritage receptors (such as the Grade II Georgian Terrace, Guy's Hospital, The George Inn, Grade I No.77 Borough High Street and Borough High Street Conservation Area) and a **short** to **medium** term, **local** to **regional, adverse effect** of **minor** to **major significance** on Townscape Character Areas and views (refer to **Part 3: Townscape, Visual Impact and Built Heritage Assessment**);
- **Temporary**, **local**, **adverse effects** of **minor** to **moderate significance** on nearby residents in relation to noise generated from activities such as demolition, earth works, piling and concreting (refer to **Chapter 8: Noise and Vibration**);
- **Temporary, local, beneficial effects to local**, **adverse effects** of **minor** to **moderate significance** in relation to daylight, sunlight, overshadowing and solar glare reflecting the gradual change from demolition (beneficial) to a situation where the effects will be as per the completed Development (see **Chapter 13: Daylight, Sunlight, Overshadowing, Solar Glare and Light Pollution**).

14.19. Within **Table 14.2**, the likely sensitive receptors have been grouped together according to land use and / or key receptors.

Table 14.2 Type 1 Effect Interactions During the Works of the Development

Sensitive Receptor / Land Use	Demolition	Excavation/ Piling	Substructure	Superstructure and Envelope	Fitting-Out	Landscaping and External Works
Future and existing surrounding residential and commercial occupants to the south of the Development including Nos. 51-55 Borough High Street, 22 Southwark Street, Iris Brook House and Orchard Lisle House	L, LP, N	L, LP, N	L, LP	TH, TC, D, N	TH, TC, D	D
Future and existing surrounding residential and commercial occupants to the west, north and east of the Development including Bunch of Grapes Public House, 43 Borough High Street, Shard Place and 6 London Bridge Street.	L, LP, N	L, LP	L, LP	TH, TC, D, N	TH, TC, D	D
Existing and future pedestrians, cyclists and road / rail users.	TH, TC, N, L, SG	TH, TC, N, L, SG	TH, TC, N, L, SG	TH, TC, N, D, SGB	TH, TC, N, D, SGB	N, D, SGB
Guy's Hospital patients	L, LP, N	L, LP	L, LP	N	✗	
Heritage assets	TH, TC	TH, TC	TH, TC	TH, TC	TH, TC	✗

Notes: *TH - temporary, local, adverse effects of minor to major significance on heritage receptors.*
TC - short to medium term, local to regional, adverse effect of minor to moderate to major significance on Townscape Character Areas and views
N - temporary, local, adverse effects of minor to moderate significance in relation to noise generated from activities.
D - local, adverse effects of minor to moderate significance in relation to daylight, sunlight and overshadowing
L – temporary, local, beneficial effects of minor to moderate significance in relation to daylight, sunlight and overshadowing
LP – temporary, local, beneficial effect of minor significance due to reduced light pollution
SG – temporary, beneficial effect from reduced solar glare
SGB - local, adverse effects of minor significance from solar glare
✗ - No interactive effects

Type 2 Effects

Transportation and Access

14.20. In order to assess the cumulative effects of the Development and other committed developments on users of the road network, public transport users, pedestrians and cyclists surrounding the Site, a cumulative assessment has been undertaken. A full list of the relevant cumulative developments is included in **Table 14.1**.

The Works

14.21. Should construction works of the Development and the cumulative schemes overlap, there would be an increase in construction vehicle movements on the surrounding road network, compared to the Development in isolation. However, given that there is an uncertainty over when the various cumulative schemes would come forward in the area, the methods of construction that would be employed; the management measures that would be adopted at each site and the periods of peak construction vehicle movement, it is difficult to predict the cumulative impacts of construction activities, particularly where the intensive operations are of short duration. Capital House construction vehicles could be expected to use St. Thomas Street to access the site, as the Development does. Information provided within the ES chapter for Capital House indicates that there would be potentially 6 construction vehicle movements per hour on St Thomas Street. Similarly, for cumulative schemes Bermondsey Street/Snowfields and the Vinegar Yard, construction vehicles will also use St Thomas Street with 11 movements predicted as part of the redevelopment. It is noted that these figures are peak construction estimates during the most intense phase of construction activities and that due to differing schedules these peak periods are unlikely to coincide.

14.22. Beyond this, the remaining cumulative schemes may use the A2 and A201 but these are main roads and have large traffic volumes on them already given their strategic importance.

14.23. It is anticipated that each site coming forward would be required to develop their own Site Environmental Management Plan (SEMP) and construction logistics plan (CLP) and therefore agree vehicular numbers and vehicular routes with LBS and TfL. It is therefore considered that on this basis and subject to the implementation of best practice construction traffic management measures, the residual cumulative effects on all users of the local transport network would be **negligible**.

Completed Developments

Effect on Pedestrian Movement, Capacity, Severance, Delay, Fear and Intimidation, Amenity

14.24. Each of the cumulative schemes would generate their individual number of pedestrian trips, but as with the Development, they would be required to deliver schemes that would enable easy pedestrian movement, not restrict capacity, provide high environmental and design quality and improved public realm. Some of the pedestrian links in the vicinity of the Site are forecast to have poor pedestrian comfort as a result of additional developments in the area with Borough High

Street predicted to experience very uncomfortable conditions, (see the 'do nothing 2031 future baseline scenario' set out in Space Syntax report submitted with the planning application).

14.25. The additional permeability and the improved public realm as part of the Development significantly improves the pedestrian comfort around the Site and takes pressure off Borough High Street.

14.26. Therefore, when the cumulative schemes are considered together with the Development, the resultant cumulative effects are assessed as **negligible** to **moderate beneficial** on pedestrians in respect of movement, capacity, severance, delay, fear, intimidation and amenity.

Effect on Cyclists

14.27. Each of the cumulative schemes would establish the individual number of cycling trips generated by the scheme, but in the same manner as the Development, they would be required to deliver schemes of high environmental and design quality, improved public realm and sufficient cycle parking provision for occupants and visitors in accordance with LBS and TfL requirements.

14.28. These would translate as mitigation measures and when considered collectively would be expected to result in a **negligible** effect on cyclists.

Effect on Bus Users

14.29. As part of current TfL guidance, developers are required to assess and report the likely bus trip generation associated with their site. TfL subsequently undertake their own capacity analysis based on their current and proposed level of services to meet predicted demand levels. Therefore, the cumulative effects on bus users would be **negligible.**

Effect on London Underground Services

14.30. As a result of the COVID-19 pandemic, the general demand on the London Underground has decreased. TfL are looking at updating their future demand models to take this into account. The 2019 data used for this assessment therefore represents a robust future scenario, even taking into account the future users of the cumulative schemes within the vicinity of the Site. The numbers of cumulative trips undertaken by London Underground, viewed against the overall reduction in Underground trips, are expected to be very low and will have **negligible** effect on the London Underground infrastructure.

Effect on National Rail Services and Users

14.31. Developers are required to provide the likely rail trip generation associated with their site together with an associated trip purpose and distribution analysis. Rail operators subsequently undertake their own capacity analysis based on their current and proposed level of services to meet predicted demand levels. The additional demand of the cumulative schemes on rail services would be mitigated directly by these schemes through service enhancements secured as planning contributions. Therefore, the residual cumulative effect would be **negligible**.

Effect on Traffic Flows and Road Vehicle Users

14.32. The cumulative baseline traffic flows have been estimated based on the trip generation set out in each of the cumulative schemes Transport Assessments which have been obtained from the

relevant council's planning portal. From the review of the transport reports, it has been found that the cumulative schemes have been designed to exclude general car parking in order to comply with the current transport guidance. Additionally, some of the developments replace sites which currently provide car parking. As a result, the majority of the cumulative schemes are reported not to result in additional traffic on the highway network. For those developments where an increase in traffic is predicted, the increases are **negligible** and these have been added to the baseline flows to generate the cumulative baseline flows.

14.33. **Table 14.3** provides details of the effects of the cumulative schemes in combination with the Development on the local highway network.

Table 14.3 Cumulative Assessments of Traffic Flows

Link	Future Baseline Flows		Cumulative Baseline + Development		Percentage Difference	
	AM	PM	AM	PM	AM	PM
London Bridge to the north of Tooley Street	1,294	1,108	1,313	1,136	1.5%	2.5%
Borough High Street to the south of London Bridge	2,347	2,525	2,360	2,547	0.6%	0.9%
St. Thomas Street	258	213	276	261	7.0%	22.5%
White Hart Yard	4	2	4	2	0.0%	0.0%
Southwark Street to the east of Southwark Bridge Road	413	381	418	393	1.2%	3.1%
Southwark Street to the west of Southwark Bridge Road	890	741	892	750	0.2%	1.2%
Southwark Bridge Road	759	623	784	645	3.3%	3.5%
Marshalsea Road	763	755	788	779	3.3%	3.2%
Borough High Street to the north of Union Street	862	837	871	873	1.0%	4.3%
Long Lane	683	570	714	604	4.5%	6.0%
Tower Bridge Road to the south of Druid Lane	1,392	1,160	1,418	1,194	1.9%	2.9%
Tooley Street	537	460	567	499	5.6%	8.5%

14.34. As can be seen from the above assessment, when the cumulative baseline plus the Development traffic flows are compared with the baseline flows, the increase of traffic on all but one link is less than 10% during both the AM and PM peak. Therefore, the cumulative effect is assessed as being **negligible** across the wider road network.

14.35. The only link with an increase greater than 10% is St Thomas Street during the PM peak when the uplift in traffic results in a 22.5% increase. Therefore, the cumulative effect at this location during this time is expected to be **minor adverse effect**.

Noise and Vibration

The Works

14.36. Potential cumulative noise and vibration effects may be expected where construction sites are within 100m of each other and noisy or vibration-inducing operations occur concurrently. It is

clear that each of the cumulative schemes are located at a distance greater than 100m with the exception of Shard Place which is be completed by the time the Works start on the Site and therefore its construction works will not overlap with the Works. Given the screening between the cumulative sites from intervening buildings it is considered that the potential for Type 2 cumulative noise and vibration effects during the Works is **negligible** with the implementation of a SEMP and CLP by each site.

14.37. Cumulative effects resultant from construction traffic, generated by cumulative schemes within beyond 100m of the Site but which are passing by the Site, would have the potential to cause Type 2 cumulative effects from road traffic noise, should the construction phases of each cumulative scheme and the Development overlap. However, each cumulative scheme (as per the Development) would be required to implement its own CLP including consideration of concurrent construction schemes to minimise the combined effects of construction traffic. A combined management strategy shared by all developers may also be used, as far as reasonably practicable, to minimise cumulative adverse effects. Consequently, the likely Type 2 cumulative residual effects from construction traffic noise are likely to be **negligible**.

Completed and Operational Development

14.38. Noise from fixed plant associated with the Development would be subject to a standard planning condition based upon the guidance provided in BS 4142. Such a planning condition would limit noise generated by fixed mechanical plant and building services to 10 dB (A) below the minimum background noise level. It is expected that other schemes would adhere to the same noise policy. As such, noise from fixed plant from all cumulative schemes and the Development would be **negligible**.

14.39. All other noise and vibration from operation of the Development is insignificant, as is the noise and vibration from Shard Place. All other cumulative schemes are too distant from the sensitive receptors around the Development to cause significant Type 2 cumulative residual impacts in terms of noise and vibration.

14.40. It is considered that noise associated with the cumulative schemes and the Development in relation to deliveries and servicing noise would be **negligible**.

Air Quality

The Works

14.41. The main effects on air quality during the construction phase of the cumulative developments are in relation to dust. Owing to the typical dispersal and deposition rates of dust with distance from their source and assuming that as per the Development, all other cumulative schemes would implement their own SEMPs in order to mitigate dust nuisance effects as far as practicable possible, it is considered that Type 2 cumulative dust effects would likely be an issue for those cumulative schemes within 100m of the Site, and only if they were to be constructed at the same time.

14.42. One of the 19 cumulative schemes is located within 100m of the Site, Shard Place to the north-east of the Site. However, this scheme will be completed by the time the Development starts on Site. Cumulative dust effects are therefore considered to be **negligible**.

14.43. Construction vehicle exhaust emissions from the combined construction traffic of the Development and the cumulative schemes could give rise to cumulative residual effects on local air quality. However, this would depend upon the extent to which the implementation of the Development and the cumulative schemes overlap. In the worst-case scenario, the demolition and construction of the cumulative schemes would overlap with the Works, and use the same construction traffic routes. It is considered that the Works' traffic would add a very small proportion of additional traffic to the local highway network around the Site. In addition, it is considered that appropriate traffic management measures would be implemented to reduce the generation of cumulative construction traffic on the local road network. Based on professional judgement, with the implementation of appropriate CLP for the cumulative schemes, the residual cumulative effect of construction vehicles is considered to have a **short-term**, **local adverse effect** of **minor significance**.

14.44. Exhaust emissions from plant operating on the Site and cumulative scheme sites concurrently would be **negligible**, even in a combined situation, in the context of the existing adjacent road traffic and exhaust emissions.

Completed and Operational Development

14.45. The main effect of the cumulative developments on air quality is linked to associated changes in traffic flows. The traffic data used within the air quality assessment for the future year of 2026 includes traffic related to other relevant cumulative schemes in the surrounding area and, therefore, comprises a cumulative effect assessment in this regard. Therefore, is it considered that the likely Type 2 cumulative residual effects of traffic emissions upon local air quality from the Development and cumulative schemes would be **negligible**.

Archaeology

The Works

14.46. This assessment considers the effect of other developments affecting the same buried heritage assets as the Development. Buried heritage assets (archaeological remains) are generally site-specific, and construction in relation to the two development schemes, Shard Place and King's College London, Land rear of 89-111 Borough High Street located within the study area used for the archaeological assessment of the Site has been used to assess the potential cumulative effects. The development at Shard Place is already complete and therefore considered as part of the baseline. The development at King's College London, Land rear of 89-111 Borough High Street (Scheme 18), is pending a decision. The development at King's College London would affect the shared assets of palaeoenvironmental remains and Roman building and occupation remains. Palaeoenvironmental remains are considered to be widespread and although the construction would contribute to the gradual removal of the asset it is considered to have a **minor adverse cumulative effect**. Although there is no evidence to suggest that the sites share a distinct Roman feature, the construction of the developments would contribute to the gradual removal of the asset within the immediate area and, therefore, is considered to have a **moderate adverse cumulative effect**.

14.47. Since the Works are subject to an appropriate programme of mitigation (reviewed and agreed by the local planning authority and its archaeological advisors, refer to **Chapter 10: Archaeology** for

further details), and given the limited archaeological potential of the Site, it is considered that with the implementation of a successful programme of mitigation at the Site, cumulative effects with regard to buried heritage assets would be no greater than those identified in relation to the Development alone i.e. moderate and minor adverse. From a wider perspective however, and particularly within the archaeological priority areas, any development project that has an impact on archaeology contributes to the cumulative erosion of this resource.

Completed and Operational Development

14.48. As for the Development, none of the cumulative schemes are likely to give rise to any additional intrusive ground works or activities over and above those required for the implementation of the cumulative schemes once completed and operational. It is therefore considered that there would be **no cumulative effects** on archaeology once the Development and all cumulative schemes are completed.

Water Resources and Flood Risk

The Works

14.49. Water resources and flood risk associated with demolition and construction effects of a development are typically site-specific. The only scheme near enough to cause a flood risk during construction is Shard Place (Fielden House), however, it is expected that both the Development and the cumulative schemes would implement their own SEMP to mitigate potential risk from flooding. Accordingly, it is unlikely that there would be any Type 2 cumulative flood risk effects for the Site and surroundings. It is therefore considered that potential Type 2 cumulative residual food risk effects would be **negligible**.

14.50. Demolition and construction works are unlikely to significantly alter or displace groundwater flows and surface water runoff from the sites as the activities would be controlled through the implementation of SEMPs, where required. Should dewatering of perched water be required during the construction of the basements associated with the cumulative schemes and occur simultaneously, it is unlikely that there would be a significant cumulative ‘drawdown’ effect owing to the likely depth of the true groundwater. Given this, the cumulative effect on groundwater and surface water flooding on and immediately surrounding the Site during demolition and construction would be **negligible.**

14.51. Demolition and construction works may introduce new sources of contamination (such as diesel fuel, oils, chemicals and other construction materials) which may potentially affect controlled waters. However, is expected that both the Development and the cumulative schemes would implement their own SEMP to mitigate potential contamination risks. It is therefore considered that potential Type 2 cumulative residual effects on controlled waters would be **negligible.**

14.52. The demolition and construction of cumulative schemes, alongside the Development, is unlikely to increase pressure on potable water demand, and as such, it is considered there would be **negligible** effects.

Completed and Operational Development

14.53. With regard to flood risk, this assessment has assumed that in order for an applicant to submit a planning application and in order to achieve planning consent, all cumulative schemes have been approved by the Environment Agency (EA). This would mean that each cumulative scheme in isolation, and in combination, would not result in an unacceptable increase in flood risk. It is therefore considered that potential Type 2 cumulative residual food risk effects once the Development is completed and operational would be **negligible**.

14.54. Similarly, in line with planning policy requirements, it is assumed that all cumulative schemes would ensure that sufficient surface water attenuation is achieved. Should some or all of the cumulative schemes adhere to the London Plan, then significant reductions to existing surface water run-off have the potential to result in significant beneficial effects. Consequently, the overall likely residual Type 2 cumulative effect in relation to flood risk is considered to range from **negligible** to **permanent, local** and of **minor beneficial significance**.

14.55. Where necessary, the cumulative schemes would include diversion and upgrading of sewers, which would be undertaken in agreement with Thames Water. The upgrade / upsizing of sewers would ensure that there is adequate capacity to accommodate these schemes, together with the Development. The likely residual cumulative effects on foul water drainage capacity and potable water demand are therefore anticipated to be **negligible**.

Wind

14.56. Based on professional judgement, Wirth Research consider it unlikely that there would be cumulative effects during demolition given the relatively calm conditions of the existing Site and the relative low height of the existing buildings to be demolished on Site.

14.57. As construction of the Development and cumulative schemes progress, the likely wind microclimate would gradually adjust to that identified for the Development and cumulative schemes, once completed and operational, as reported below.

14.58. As reported in **Chapter 12: Wind Microclimate**, Computational Fluid Dynamics (CFD) has been used to assess the pedestrian conditions at and around the Site. Configuration 3, as described in **Chapter 12** and **Figures 12.30-12.47** included relevant cumulative schemes that would be reasonably expected to result in potential cumulative effects. These include Capital House, Beckett House (not started yet), King's College London development at 89-111 Borough High Street (not started yet) and Colechurch House (not started yet). Shard Place (Fielden House) is included in the baseline surrounds for wind microclimate assessments as the physical mass that affects wind is already completed for this development.

14.59. Comparison of results for the completed and operational Development with baseline surrounds (Configuration 2) and the completed and operational Development with baseline and cumulative schemes (Configuration 3) shows the same strength and pattern of wind effects at every level analysed. Therefore, the Development with cumulative schemes in place is considered to have a negligible effect on wind microclimate.

14.60. Capital House, Beckett House, Vinegar Yard and 40-44 Bermondsey developments are located 120° (from north) relative to the Development, which is a highly uncommon wind direction, perpendicular to the prevailing winds and, therefore, unlikely to generate additional wind effects,

and is over 200m to the east of the Site, with the Shard and Guy's Hospital between the Development and these schemes.

14.61. 89-111 Borough High Street is upwind from the Development from 210°, which is a dominant wind direction meaning it has a proportionately larger impact on overall wind conditions, and is 9 storeys high and, approximately 50m from the Development. However, at 9 storeys, this is not significantly higher than the surrounding buildings, and might provide some additional shelter at critical angles.

14.62. Colechurch House is positioned 30° (from north) relative to the Development approximately 150m from the Development. 30° is an angle with minor significance on the Site at roof level. This building will have a local effect due to the height change, but with The News Building between this development and the Development the effects at ground level are unlikely to be significant. At roof level there might be some marginal benefit from the additional shelter. It is, therefore, to be expected that the Development with cumulative schemes in place would not have an effect upon wind conditions on or around these cumulative sites.

14.63. It can be concluded that the cumulative effects on wind microclimate are **negligible**.

Daylight, Sunlight, Overshadowing, Solar Glare and Light Pollution

14.64. Shard Place (Fielden House) was included in the baseline assessment as reported within **Chapter 13: Daylight, Sunlight, Overshadowing, Solar Glare and Light Pollution** as the physical mass that affects daylight, sunlight and overshowing measures is already present. The other cumulative schemes are too distant from the Site to result in any cumulative daylight, sunlight, overshadowing effects, therefore a separate cumulative effects assessment has not been undertaken.

14.65. In terms of solar glare and light pollution, cumulative schemes have the potential to obstruct the view of the proposed Development in relation to the relevant receptors, which would reduce the scale of effects occurring as a result of the proposed Development. Therefore, the proposed Development represents the worst-case scenario in terms of solar glare and light pollution effects and a separate cumulative effects assessment is not considered applicable.

Townscape, Visual Impact and Built Heritage

14.66. The full cumulative assessment for townscape, visual and built heritage effects is provided in **Part 3: Townscape, Visual Impact and Built Heritage Assessment** (TVIBHA) and not reproduced within this chapter. This approach enables the reader to view the Accurate Visual Representations (AVRs) of the Development alongside the cumulative schemes together with the resulting cumulative assessment. This approach also restricts this chapter from becoming overly long.

14.67. As for previous topics, Shard Place (Fielden House) was included in the baseline assessment as its physical mass was present in the AVRs. It was also agreed with LBS that further cumulative schemes in addition to those set out in **Table 14.1** would be assessed as part of the TVIBHA owing to a larger spatial scope required and given the scale and nature of the Development. A full list of the cumulative schemes assessed within the TVIBHA is provided in **Part 3** of this ES.

14.68. Cumulative schemes are visible in views 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 40, 42, 43, 44, 45, 46, 47, 49, 54, and 56. Consented development at Capital House (ref: 18/AP/0900) and development submitted for planning approval at Vinegar Yard (ref: 18/AP/4171) and Edge London Bridge (ref: 20/AP/0944) would change the significance of effect in view 7 from 'minor' to 'no effect'. Consented development at Bankside Yards East (ref: 17/AP/2286) and West (ref: 17/AP/2286) would change the significance of effect in view 14 from 'minor/negligible' to 'no effect'. Development submitted for planning approval at Colechurch House (ref: 20/AP/3013) would change the significance of effect in view 19 from 'minor/negligible' to 'no effect'. In all remaining views the significance of effect is unaffected by cumulative development.

14.69. With regard to TCAs, the overall effect of the Development taking into account cumulative schemes would be unchanged compared to that of the Development considered on its own (as set out in Table 3.2 of **Part 3: TVIBHA**), as the visibility, townscape and urban design effects of the Development would not be altered sufficiently by the presence of cumulative schemes to change the overall effect of the Development in respect of each TCA.

14.70. With regard to heritage receptors, the effect of the Development on each asset or group of assets in the context of cumulative schemes would be the same as that set out for the Development considered on its own, that is **long-term**, **local to regional**, **adverse** to **beneficial effects** of **up to major significance**.

15. Residual Effects and Monitoring

Introduction

15.1. The likely significant effects associated to the Development, the anticipated mitigation to be implemented, and the likely residual effects (after mitigation) are described in detail in the technical chapters (**Chapters 7** to **13**) of this ES (Part 1) and **ES Part 3: Townscape, Visual Impact and Built Heritage Assessment**. For ease of reference, a consolidated summary is presented within **Table 15.1** for the effects discussed within the technical assessments **Chapters 7** to **13**.

15.2. As noted in **Chapter 2: EIA Methodology**, for the purposes of this ES, minor, moderate and major are all considered as significant effects. The exception to this is in the Townscape, Visual Impact and Built Heritage Assessment where minor or minor / moderate effects are not considered to be significant; moderate and major effects are considered as significant effects.

Table 15.1: Potential Effects, Mitigation Measures and Likely Residual Effects of the Development

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Transport and Access: The Works			
Effects of traffic flows from construction vehicle movements upon the local highway network users.	Adverse effect of major significance on St. Thomas Street (HGVs only), negligible on all other links.	Site Environmental Management Plan (SEMP) and Construction Logistics Plan (CLP) prior to commencement.	Negligible
Effects of construction activities on pedestrians in terms of movement and capacity, severance, delay, fear and intimidation, amenity.	Adverse effect of moderate significance to negligible.	Management of walkways, any temporary closures and routing would be agreed with the LBS through the CLP and SEMP post-planning and prior to commencement.	Negligible
Dust and dirt	Negligible	Dust and dirt to be prevented and managed as set out in SEMP.	Negligible
Effects of construction on cyclists.	Negligible	Management of road closures and routing would be agreed with the LBS through the CLP and SEMP post-planning	Negligible

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
		and prior to commencement.	
Effects of increased number of public transport trips as a result of construction workers' travel on public transport users.	Negligible	None required	Negligible
Transport and Access: Completed and Operational Development			
Effects of the Development on pedestrians in respect of pedestrian movement and capacity.	Beneficial effect of moderate significance.	New pedestrian connection through the Site and public realm enhancements to encourage diversion of pedestrian movements onto King's Head Yard from White Hart Yard.	Beneficial effect of moderate significance.
Effects of the Development on pedestrian severance.	Beneficial effect of moderate significance.	New pedestrian connection through the Site and public realm enhancements to encourage diversion of pedestrian movements onto King's Head Yard from White Hart Yard.	Beneficial effect of moderate significance.
Effects of the Development on pedestrian delay.	Beneficial effect of moderate significance.	New pedestrian connection through the Site and public realm enhancements to encourage diversion of pedestrian movements onto King's Head Yard from White Hart Yard.	Beneficial effect of moderate significance.
Effects of the Development on pedestrian fear and intimidation.	Beneficial effect of minor significance.	New pedestrian connection through the Site and public realm enhancements to encourage diversion of pedestrian movements onto King's Head Yard	Beneficial effect of minor significance.

Issue		Likely Significant Effect	Mitigation Measures	Likely Residual Effect
			from White Hart Yard.	
Effects of the Development on pedestrian amenity.		Beneficial effect of major significance.	New pedestrian connection through the Site and public realm enhancements to encourage diversion of pedestrian movements onto King's Head Yard from White Hart Yard.	Beneficial effect of major significance.
Effects of the Development cycle trips on cyclists using the local cycle network.		Negligible	None required	Negligible
Effects of the Development bus services on bus users.		Negligible	None required	Negligible
Effects of the Development underground trips on Underground passengers.		Negligible	None required	Negligible
Effects of the Development Rail trips on train passengers.		Negligible	None required	Negligible
Effects of the Development Traffic Flows on road users on the local highway network.		Negligible	Implementation of a DSWP minimising servicing vehicles during peak periods.	Negligible
Noise and Vibration: The Works				
Noise	SRA - 4-6 London Bridge Street	Negligible	Adoption of Best Practical Means (BPM) mitigation measures which will be outlined in the SEMP as well as noise and vibration limits. The SEMP is expected to be secured by planning condition. Monitoring of Site vibration levels when piling within 10m of listed buildings, utilities or London Underground Limited (LUL) lines.	Negligible
	SR B - Shard Place, 28 London Bridge Street	Local, temporary, short to medium term effects of minor to major adverse significant.		Negligible
	SR C - Guy's Hospital and associated buildings including Guy's Chapel	Local, temporary, short to medium term effects of major adverse significant.		Negligible to Local, temporary, short to medium term effects of moderate adverse significance.
	SR D - Bunch of Grapes, 2 St. Thomas Street	Local, temporary, short to medium term effects of		Negligible to Local, temporary, short to medium

Issue		Likely Significant Effect	Mitigation Measures	Likely Residual Effect
		major adverse significant.		term effects of moderate adverse significance.
	SR E - The Old King's Head, 47-49 Borough High Street	Negligible, except during demolition where local, temporary, short to medium-term effects of moderate adverse significance.		Negligible
	SR F - Iris Brook House / Orchard Lisle House	Local, temporary, short to medium term effects of major adverse significant.		Negligible to local, temporary, short to medium term effects of moderate adverse significance.
	SR G - Guy's Hospital Courtyard	Negligible		Negligible
	SR H - Iris Brook House Courtyard	Negligible		Negligible
	SR I - Guy's Hospital Forecourt	Negligible		Negligible
	SR J - 43 Borough High Street	Negligible		Negligible
Vibration		Negligible to local, temporary, short to medium term effects of minor adverse significant.		Negligible
Traffic Noise		Negligible	Adoption of a CLP	Negligible
Noise and Vibration: Completed and Operational Development				
Building Services Plant Noise		Negligible	Plant noise limit secured through planning condition.	Negligible
Commercial Uses and Servicing Noise		Negligible	Building envelope and DSWP.	Negligible

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Air Quality: The Works			
Dust emissions arising from the demolition and construction works	Negligible	None required. However, some of the routine management controls prescribed in the SEMP would relate to good practice measures to limit the impacts of construction traffic and the use of plant and machinery.	Negligible
Emissions from demolition and construction vehicles	Negligible		Negligible
Emissions from demolition and construction plant.	Negligible	Plant to meet standards set for Non-Road Mobile Machinery (NRMM).	Negligible
Air Quality: Completed and Operational Development			
Emissions from traffic generation associated with the Development.	Negligible	None required.	Negligible
Archaeology (Buried Heritage): The Works			
Archaeological remains of medium (District) significance, i.e. isolated and truncated prehistoric and/or Roman cut features.	Direct, permanent, local adverse effects of major significance.	Implementation of an agreed phased programme of archaeological investigation under a planning condition to secure preservation by record. This would comprise evaluation (if feasible this would be combined with any geotechnical works) following removal of the basement slab. The results would inform the need and scope for any necessary subsequent targeted excavation and	Direct, permanent, local adverse effects of major significance.
Archaeological remains of Low (local) significance, i.e. redeposited prehistoric and/or Roman artefacts, truncated post-medieval remains, and disarticulated human bone.	Direct, permanent, local adverse effects of moderate significance.		Direct, permanent, local adverse effects of moderate significance.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
		recording, and/or a watching brief during ground reduction, as appropriate.	
Water Resources and Flood Risk: The Works			
Tidal and fluvial flood risk	Negligible	None required	Negligible
Groundwater flooding	Temporary, short to medium-term, local, adverse effect of minor significance.	Appropriate dewatering and disposal, using standard techniques such as sumps and pumps.	Negligible
Surface water (pluvial) flooding	Temporary, short to medium term, local, adverse effect of minor significance.	Implementation of SEMP including adequate temporary drainage.	Negligible
Effects to Controlled Waters from ground contamination.	Temporary, short to medium term, local, adverse effect of minor significance.	Implementation of SEMP detailing protective measures	Negligible
Foul and potable water infrastructure.	Negligible (foul); Negligible (potable water)	None required (foul) Implementation of SEMP including measures to minimise and reduce water use (potable water).	Negligible
Water Resources and Flood Risk: Completed and Operational Development			
Tidal and fluvial flood risk	Negligible (non-breach scenario of the flood defence) Long-term, local adverse effect of minor significance (breach scenario of the flood defence).	Registration with EA Flood Warning System and a Flood Warning and Evacuation Plan	Negligible
Flooding from sewers	Negligible	None required	Negligible
Surface water (pluvial) flooding	Negligible	None required	Negligible
Groundwater flooding	Negligible	None required	Negligible
Change in foul Water drainage capacity	Negligible	None required	Negligible

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Change in potable water demand	Negligible	None required. However, a technical guide would be prepared for the Development, detailing the operation and performance of the building, including information on water efficient fittings and recommendations for their most efficient usage.	Negligible
Wind Microclimate: The Works			
Wind effects on and around the Site during the Works.	Short-term, local, adverse effect of minor significance.	The effect is entirely within the site boundary and not publicly accessible during the works. Mitigation developed for the completed Development should be provided around buildings as they are occupied.	Negligible
Wind Microclimate: Completed and Operational Development			
Wind effects on off-site local thoroughfares.	Negligible (London Bridge Underground station entrance, Southwark Cathedral) to Long-term, local, beneficial effect of minor significance (on London Bridge Street).	None required as there is a significant benefit in the area near London Bridge Place.	Negligible
Wind effects on on-site public realm.	Negligible (Main Courtyard, undercut passage, St	None required as conditions at ground level are suitable for intended.	Negligible

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	Thomas Street entrances).		
Wind effects on on-site amenity spaces.	Long-term, local, adverse effect of moderate significance (on podium terrace).	Inclusion of planned planting and landscaping measures both restricting access to extremities in addition to mitigation from tree planting.	Negligible
	Negligible (Northern Balconies)	None required as conditions on the northern balconies are considered suitable for intended use.	Negligible
	Long-term, local, adverse effect of moderate significance (on roof terrace).	Inclusion of planned planting and landscaping measures both restricting access to extremities in addition to mitigation from tree planting.	Negligible
	Long-term, local, adverse effect of moderate significance (on upper roof terrace)	Inclusion of mitigation measures, including changes to the balustrade, localised planting and restriction of access. (pending development and testing of mitigation).	Negligible
Daylight, Sunlight, Overshadowing, Solar Glare and Light Pollution: The Works			
Daylight, sunlight and overshadowing effects during demolition.	Temporary, beneficial effects considered likely during demolition.	None proposed	Temporary, beneficial effects considered likely during demolition.
Solar glare effects during demolition.	Temporary, beneficial effects considered likely during demolition.	None proposed	Temporary, beneficial effects considered likely during demolition.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Daylight, sunlight and overshadowing during construction.	Effects would gradually change from beneficial to those expected once the Development is complete and operational.	None proposed	Effects would gradually change from beneficial to those expected once the Development is complete and operational.
Solar glare during construction	Effects would gradually change from beneficial to those expected once the Development is complete and operational.	None proposed	Effects would gradually change from beneficial to those expected once the Development is complete and operational.
Light pollution during demolition.	Temporary, beneficial effects considered likely during demolition.	None proposed	Temporary, beneficial effects considered likely during demolition.
Daylight, Sunlight, Overshadowing and Solar Glare: Complete and Operational Development			
Daylight	Long term, local, Negligible to 8 properties, minor adverse to 9 properties, moderate adverse to 9 properties.	None proposed.	Long term, local, Negligible to 8 properties, minor adverse to 9 properties, moderate adverse to 9 properties.
Sunlight	Long term, local, Negligible to 19 properties, minor adverse to 1 property, moderate adverse to 3 properties.	None proposed.	Long term, local, Negligible to 19 properties, minor adverse to 1 property, moderate adverse to 3 properties.
Overshadowing	Negligible to most amenity areas. Long term, local, moderate adverse to 1 property.	None proposed.	Negligible to most amenity areas. Long term, local, moderate adverse to 1 property.
Solar Glare	Long term, local, Negligible to 12 locations,	None proposed.	Long term, local, Negligible to 12 locations,

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	minor adverse to the remaining 14 locations.		minor adverse to the remaining 14 locations.
Light Pollution	Negligible to most properties. Long term, local, moderate adverse to 1 property.	Occupancy sensors for lighting strategy.	
Townscape, Visual Impact and Built Heritage: The Works			
Views	No effect to (short to medium term, local to regional, adverse or neutral) effect of major significance.	Hoarding.	No effect to (short to medium term, local to regional, adverse or neutral) effect of major significance.
Townscape Character Areas (TCA)	Short to medium term, local to regional, adverse or neutral effect of minor to major significance.	Hoarding.	Short to medium term, local to regional, adverse effect of minor to major significance.
Built Heritage Assets	Short to medium term, adverse effect (direct) of moderate to major significance. Short to medium term, adverse effect (indirect) of moderate to major significance.	Pre-condition survey. Historic building recording. Detailed method statement. Hoarding. Vibration monitoring. Implementation of SEMP and mitigation measures as set out in outline Construction Management Plan.	Short to medium term, adverse effect (direct – physical works) of moderate to major significance. Short to medium term, adverse effect (indirect - on setting) of moderate to major significance.
Townscape, Visual Impact and Built Heritage: Complete and Operational Development			
Views			
View 1. LVMF 1A.1 Alexandra Palace: the viewing terrace – south-western section	Long-term, regional, neutral effect of	None required	Long-term, regional, neutral effect of

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	moderate significance.		moderate significance.
View 2. LVMF 1A.2 Alexandra Palace: the viewing terrace – approaching from the north-eastern car park	Long-term, regional, neutral effect of moderate significance.	None required	Long-term, regional, neutral effect of moderate significance.
View 3. LVMF 2A.1 Parliament Hill: the summit - looking toward St Paul's Cathedral.	Long-term, regional, neutral effect of moderate significance.	None required	Long-term, regional, neutral effect of moderate significance.
View 4. LVMF 2B.1 Parliament Hill: east of the summit – at the prominent oak tree	Long-term, regional, neutral effect of minor significance.	None required	Long-term, regional, neutral effect of minor significance.
View 5. LVMF 3A.1 Kenwood: the viewing gazebo - in front of the orientation board	Long-term, regional, neutral effect of moderate significance.	None required	Long-term, regional, neutral effect of moderate significance.
View 6. LVMF 4A.1 Primrose Hill: the summit - looking towards St Paul's Cathedral	Long-term, regional, neutral effect of moderate significance.	None required	Long-term, regional, neutral effect of moderate significance.
View 7. LVMF 6A.1 Blackheath Point - near the orientation board	Long-term, regional, neutral effect of minor significance.	None required	Long-term, regional, neutral effect of minor significance.
View 8. LBS Borough View 1 - North facing view from One Tree Hill	Long-term, district, neutral effect of moderate significance.	None required	Long-term, district, neutral effect of moderate significance.
View 9. LBS Borough View 2 – St Paul's Cathedral from Nunhead Cemetery	Long-term, district, neutral effect of moderate significance.	None required	Long-term, district, neutral effect of moderate significance.
View 10. LVMF 10A.1 Tower Bridge: Upstream - the North Bastion	Long-term, regional, neutral effect of minor /negligible significance.	None required	Long-term, regional, neutral effect of minor /negligible significance.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
View 11. St Katharine's Dock, at Girl with a Dolphin Fountain	Long-term, regional, neutral effect of minor/negligible significance.	None required	Long-term, regional, neutral effect of minor/negligible significance.
View 12. LVMF 12B.1 Southwark Bridge: downstream - close to the City of London bank	Long-term, regional, beneficial effect of moderate to major significance.	None required	Long-term, regional, beneficial effect of moderate to major significance.
View 13. Millennium Bridge (centre)	No effect	None required	No effect
View 14. LVMF 15B.2 Waterloo Bridge: downstream - at the centre of the bridge	Long-term, regional, neutral effect of minor/negligible significance.	None required	Long-term, regional, neutral effect of minor/negligible significance.
View 15. LVMF 17B.2 Golden Jubilee/Hungerford Footbridges: downstream close to the Westminster bank	Long-term, regional, neutral effect of minor/negligible significance.	None required	Long-term, regional, neutral effect of minor/negligible significance.
View 16. Victoria Embankment, opposite Temple Gardens	Long-term, regional, neutral effect of minor significance.	None required	Long-term, regional, neutral effect of minor significance.
View 17. Gracechurch Street, corner with Lombard Street	Long-term, regional, neutral effect of moderate significance.	None required	Long-term, regional, neutral effect of moderate significance.
View 18. London Bridge: upstream - at the City of London bank	Long-term, regional, beneficial effect of moderate to major significance.	None required	Long-term, regional, beneficial effect of moderate to major significance.
View 19. Old Billingsgate Walk	Long-term, regional, neutral effect of minor/negligible significance.	None required	Long-term, regional, neutral effect of minor/negligible significance.
View 20. Tower of London: Inner Curtain Wall Walkway	Long-term, regional, beneficial effect of moderate significance.	None required	Long-term, regional, beneficial effect of moderate significance.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
View 21. Tower of London: Inner Ward, north of the White Tower	Long-term, regional, neutral effect of minor significance.	None required	Long-term, regional, neutral effect of minor significance.
View 22. Tower of London Setting Study View 1: Tower Green, Inner Ward	No effect.	None required	No effect
View 23. Tower of London Setting Study View 8: The Royal Mint	No effect.	None required	No effect.
View 24. Tower Bridge Road / Queen Elizabeth Street	Long-term, district, neutral effect of minor/negligible significance.	None required	Long-term, district, neutral effect of minor/negligible significance.
View 25. Saint Mary Magdalen Churchyard	No effect.	None required	No effect.
View 26. Leathermarket Gardens	Long-term, local, neutral effect of minor/negligible significance.	None required	Long-term, local, neutral effect of minor/negligible significance.
View 27. Tabard Gardens	Long-term, district, neutral effect of minor/negligible significance.	None required	Long-term, district, neutral effect of minor/negligible significance.
View 28. Borough High Street / Great Suffolk Street	Long-term, district, neutral effect of minor significance.	None required	Long-term, district, neutral effect of minor significance.
View 29. Southwark Bridge Road outside no.92	Long-term, district, neutral effect of minor to moderate significance.	None required	Long-term, district, neutral effect of minor to moderate significance.
View 30. Red Cross Garden (middle)	Long-term, district, neutral effect of moderate significance.	None required	Long-term, district, neutral effect of moderate significance.
View 31. Borough High Street / Borough London Underground Station	Long-term, district, neutral effect of moderate significance.	None required	Long-term, district, neutral effect of moderate significance.
View 32. Borough High Street / Mermaid Court	Long-term, district, neutral effect of minor	None required	Long-term, district, neutral effect of minor

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	to moderate significance.		to moderate significance.
View 33. Southwark Street - east of the railway bridge	Long-term, district, neutral effect of moderate to major significance.	None required	Long-term, district, neutral effect of moderate to major significance.
View 34. Southwark Street / Southwark Bridge Road	Long-term, district, neutral effect of moderate significance.	None required	Long-term, district, neutral effect of moderate significance.
View 35. Borough High Street, St Saviours Southwark War Memorial	Long-term, district, adverse effect of moderate to major significance.	None required	Long-term, district, adverse effect of moderate to major significance.
View 36. Southwark Street / Stoney Street	Long-term, district, adverse effect of moderate to major significance.	None required	Long-term, district, adverse effect of moderate to major significance.
View 37. King's Head Yard, outside King's Head	Long-term, local, beneficial effect of moderate to major significance.	None required	Long-term, local, beneficial effect of moderate to major significance.
View 38. George Inn Yard	Long-term, local, neutral effect of moderate to major significance.	None required	Long-term, local, neutral effect of moderate to major significance.
View 39. Guy's Hospital: West Wing Quad	Long-term, local, adverse effect of major significance.	None required	Long-term, local, adverse effect of major significance.
View 40. Guys Courtyard – near the War Memorial	Long-term, local, neutral effect of moderate to major significance.	None required	Long-term, local, neutral effect of moderate to major significance.
View 41. Guy's Hospital: North Quad	Long-term, local, adverse	None required	Long-term, local, adverse

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	effect of major significance.		effect of major significance.
View 42. St Thomas Street / London Bridge Street	Long-term, local, adverse effect of major significance.	None required	Long-term, local, adverse effect of major significance.
View 43. St Thomas Street, opposite Guy's Hospital	Long-term, local, beneficial effect of major significance.	None required	Long-term, local, beneficial effect of major significance.
View 44. St Thomas Street, outside St Thomas' Church	Long-term, local, beneficial effect of major significance.	None required	Long-term, local, beneficial effect of major significance.
View 45. Bedale Street / Borough Market	Long-term, district, neutral effect of moderate to major significance.	None required	Long-term, district, neutral effect of moderate to major significance.
View 46. Borough High Street / Bedale Street	Long-term, district, neutral effect of moderate to major significance.	None required	Long-term, district, neutral effect of moderate to major significance.
View 47. Cathedral Street / Winchester Walk	Long-term, district, neutral effect of moderate to major significance in winter.	None required	Long-term, district, neutral effect of moderate to major significance in winter.
View 48. Southwark Cathedral, west	No effect.	None required	No effect.
View 49. Southwark Cathedral, north-west corner 1	Long-term, district, adverse effect of moderate to major significance.	None required	Long-term, district, adverse effect of moderate to major significance.
View 50. Southwark Cathedral, north-west corner 2	Long-term, district, adverse effect of moderate to major significance.	None required	Long-term, district, adverse effect of moderate to major significance.
View 51. Southwark Cathedral, north	Long-term, district, neutral effect of	None required	Long-term, district, neutral effect of

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	moderate to major significance.		moderate to major significance.
View 52. Southwark Cathedral, entrance gates to Millennium Courtyard	Long-term, district, neutral effect of major significance.	None required	Long-term, district, neutral effect of major significance.
View 53. Southwark Cathedral, Millennium Courtyard	Long-term, district, neutral effect of major significance.	None required	Long-term, district, neutral effect of major significance.
View 54. London Bridge, outside Glazier's Hall	Long-term, local, beneficial effect of moderate to major significance.	None required	Long-term, local, beneficial effect of moderate to major significance.
View 55. Islington Local View 1: Clerkenwell Road, bridge across Farringdon	No Effect.	None required	No Effect.
View 56. Trinity Church Square, south-west corner	Long-term, district, neutral effect of minor to moderate significance.	None required	Long-term, district, neutral effect of minor to moderate significance.
Townscape Character Area (TCA)			
TCA 1 – Bankside, Borough and Potters Fields	Long-term, local to regional, beneficial effect of moderate to major significance.	None required	Long-term, district, beneficial effect of moderate to major significance.
TCA 2 – Newington	Long-term, district, neutral effect of minor significance.	None required	Long-term, district, neutral effect of minor significance.
TCA 3– Bermondsey	Long-term, regional, neutral effect of minor significance.	None required	Long-term, regional, neutral effect of minor significance.
TCA 4 - Tower	Long-term, regional, neutral effect of minor significance.	None required	Long-term, regional, neutral effect of minor significance.
TCA 5 – North Bank	Long-term, regional, neutral effect of	None required	Long-term, regional, neutral effect of

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	moderate significance.		moderate significance.
Built Heritage Assets			
World Heritage Sites Tower of London WHS	Long term, regional, neutral effect (indirect) of minor significance.	None required	Long term, regional, neutral effect (indirect) of minor significance.
Conservation Areas			
Borough High Street CA	Long-term, local, beneficial effect (direct) of moderate to major significance.	None required	Long-term, local, beneficial effect (direct) of moderate to major significance.
Tooley Street CA	Long-term, local, neutral effect (indirect) of minor to moderate significance.	None required	Long-term, local, neutral effect (indirect) of minor to moderate significance.
Thrale Street CA Liberty of the Mint CA	Long-term, district, neutral effect (indirect) of minor to moderate significance.	None required	Long-term, district, neutral effect (indirect) of minor to moderate significance.
Union Street CA	Long-term, district, neutral effect (indirect) of moderate significance.	None required	Long-term, district, neutral effect (indirect) of moderate significance.
King's Bench CA St. George's Circus CA	Long-term, district, neutral effect (indirect) of minor/negligible significance.	None required	Long-term, district, neutral effect (indirect) of minor/negligible significance.
Trinity Church Square CA Bear Gardens CA	Long-term, district, neutral effect (indirect) of minor significance.	None required	Long-term, district, neutral effect (indirect) of minor significance.
Bermondsey Street CA Tower Bridge CA	Long-term, local to district, neutral effect (indirect) of minor significance.	None required	Long-term, local to district, neutral effect (indirect) of minor significance.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Whitefriars CA	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
Bank Conservation CA Leadenhall Market CA	Long-term, regional, neutral effect (indirect) of minor /negligible significance.	None required	Long-term, regional, neutral effect (indirect) of minor /negligible significance.
Tower CA	Long-term, regional, neutral effect (indirect) of minor to moderate significance.	None required	Long-term, regional, neutral effect (indirect) of minor to moderate significance.
Listed Buildings			
Group (i) – The Site: Nos. 4-8 and 12-16 St Thomas Street and attached railings.	Long-term, local, beneficial effect (direct-– physical works) of moderate to major significance. Long-term, local, beneficial effect (indirect- on settings) of moderate to major significance.	None required	Long-term, local, beneficial effect (direct – physical works) of moderate to major significance. Long-term, local, beneficial effect (indirect – on setting) of moderate to major significance.
A: Cathedral Church of St Saviour and St Mary Overie (Southwark Cathedral), Cathedral Street (grade I)	Long-term, district, adverse effect (indirect) of moderate to major significance.	None required	Long-term, district, adverse effect (indirect) of moderate to major significance.
B: Remains of Winchester Palace, Clink Street (grade II*)	Long-term, district, neutral effect (indirect) of moderate significance.	None required	Long-term, district, neutral effect (indirect) of moderate significance.
Group (ii) – Montague Close / Clink Street (grade II)	Long-term, local to district, neutral effect (indirect) of	None required	Long-term, local to district, neutral effect (indirect) of

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	moderate significance.		moderate significance.
Group (iii) – St Thomas Street (grade II*)	Long-term, local, neutral effect (indirect) of moderate to major significance.	None required	Long-term, local, neutral effect (indirect) of moderate to major significance.
Group (iv) – St Thomas Street (grade II)	Long-term, local, neutral effect (indirect) of moderate significance.	None required	Long-term, local, neutral effect (indirect) of moderate significance.
C: Guy's Hospital main building including wings and chapel, St Thomas Street (grade II*)	Long-term, local, adverse effect (indirect) of major significance.	None required	Long-term, local, adverse effect (indirect) of major significance.
Group (v) – Guy's Hospital (grade II)	Long-term, local, neutral effect (indirect) of moderate significance.	None required	Long-term, local, neutral effect (indirect) of moderate significance.
D: The George Inn, no.77 Borough High Street (grade I)	Long-term, local, neutral effect (indirect) of major significance.	None required	Long-term, local, neutral effect (indirect) of major significance.
E: St Saviours Southwark War Memorial, Borough High Street (grade II*)	Long-term, district, neutral effect (indirect) of moderate to major significance.	None required	Long-term, district, neutral effect (indirect) of moderate to major significance.
Group (vi) – Borough High Street, north end (grade II)	Long-term, local to district, neutral effect (indirect) of moderate to major significance.	None required	Long-term, local to district, neutral effect (indirect) of moderate to major significance.
Group (vii) – Southwark Street, east end and streets to the north (grade II)	Long-term, district, neutral effect (indirect) of moderate significance.	None required	Long-term, district, neutral effect (indirect) of moderate significance.
Group (viii) – Borough Market (grade II)	Long-term, district, neutral effect (indirect)	None required	Long-term, district, neutral effect (indirect)

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	of moderate significance.		of moderate significance.
Group (ix) – London Bridge Station (grade II)	Long-term, local, neutral effect (indirect) of moderate significance.	None required	Long-term, local, neutral effect (indirect) of moderate significance.
F: St Olaf House, no.13 Tooley Street (grade II*)	Long-term, local, neutral effect (indirect) of moderate significance.	None required	Long-term, local, neutral effect (indirect) of moderate significance.
Group (x) – Tooley Street, north-west end (grade II)	Long-term, local, neutral effect (indirect) of minor to moderate significance.	None required	Long-term, local, neutral effect (indirect) of minor to moderate significance.
Group (xi) – Tooley Street, central (grade II)	Long-term, local, neutral effect (indirect) of minor to moderate significance.	None required	Long-term, local, neutral effect (indirect) of minor to moderate significance.
Group (xii) – Fair Street/Tooley Street, south-east end (grade II)	Long-term, local, neutral effect (indirect) of minor to moderate significance.	None required	Long-term, local, neutral effect (indirect) of minor to moderate significance.
Group (xiii) – Tower Bridge Road and riverside (grade II)	Long-term, local to district, neutral effect (indirect) of minor to moderate significance.	None required	Long-term, local to district, neutral effect (indirect) of minor to moderate significance.
Group (xiv) – Streets east of Tower Bridge Road (grade II)	Long-term, local to district, neutral effect (indirect) of minor significance.	None required	Long-term, local to district, neutral effect (indirect) of minor significance.
Group (xv) – Bermondsey Street, north / Brunswick Court and environs (grade II)	Long-term, local, neutral effect (indirect) of minor significance.	None required	Long-term, local, neutral effect (indirect) of minor significance.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
G: Church of St Mary Magdalene, Bermondsey Street (grade II*)	Long-term, local, neutral effect (indirect) of moderate significance.	None required	Long-term, local, neutral effect (indirect) of moderate significance.
Group (xvi) – Bermondsey Street, south / Leathermarket (grade II)	Long-term, local, neutral effect (indirect) of minor significance.	None required	Long-term, local, neutral effect (indirect) of minor significance.
Group (xvii) – Tower Bridge Road, south / Long Lane east (grade II)	Long-term, local to district, neutral effect (indirect) of minor significance.	None required	Long-term, local to district, neutral effect (indirect) of minor significance.
H: No.142 and attached railings, Long Lane (grade II*)	Long-term, district, neutral effect (indirect) of minor/ negligible significance.	None required	Long-term, district, neutral effect (indirect) of minor/ negligible significance.
Group (xviii) – New Kent Road / Harper Road and environs (grade II)	Long-term, district, neutral effect (indirect) of minor/ negligible significance.	None required	Long-term, district, neutral effect (indirect) of minor/ negligible significance.
Group (xix) – Trinity Street / Newington Causeway (grade II)	Long-term, district, neutral effect (indirect) of minor significance.	None required	Long-term, district, neutral effect (indirect) of minor significance.
Group (xx) – Borough Road / Lancaster Street (grade II)	Long-term, district, neutral effect (indirect) of minor significance.	None required	Long-term, district, neutral effect (indirect) of minor significance.
I: Church of St George the Martyr, Borough High Street (grade II*)	Long-term, district, neutral effect (indirect) of moderate significance.	None required	Long-term, district, neutral effect (indirect) of moderate significance.
Group (xxi) – Borough High Street, south end and environs (grade II)	Long-term, district, neutral effect (indirect) of moderate significance.	None required	Long-term, district, neutral effect (indirect) of moderate significance.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Group (xxii) – Southwark Bridge Road, south end and environs (grade II)	Long-term, district, neutral effect (indirect) of moderate significance.	None required	Long-term, district, neutral effect (indirect) of moderate significance.
J: Kirkaldy's testing works and testing machine, no.99 Southwark Street (grade II*)	Long-term, district, neutral effect (indirect) of minor/ negligible significance.	None required	Long-term, district, neutral effect (indirect) of minor/ negligible significance.
Group (xxiii) – Southwark Street, west end and environs (grade II)	Long-term, district, neutral effect (indirect) of minor/ negligible significance.	None required	Long-term, district, neutral effect (indirect) of minor/ negligible significance.
Group (xxiv) – Southwark Street, west end and environs (grade II*)	Long-term, district, neutral effect (indirect) of minor/ negligible significance.	None required	Long-term, district, neutral effect (indirect) of minor/ negligible significance.
Group (xxv) – Bankside (grade II)	Long-term, district, neutral effect (indirect) of minor significance.	None required	Long-term, district, neutral effect (indirect) of minor significance.
Group (xxvi) – Southwark Bridge (grade II)	Long-term, district, neutral effect (indirect) of minor significance.	None required	Long-term, district, neutral effect (indirect) of minor significance.
Group (xxvii) – Blackfriars Bridge and environs (grade II)	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
K: Church of St Benet, Paul's Wharf, Upper Thames Street (grade I)	Long-term, regional, neutral effect (indirect) of minor/ negligible significance.	None required	Long-term, regional, neutral effect (indirect) of minor/ negligible significance.
L: Vintners Hall, Upper Thames Street (grade I)	Long-term, regional, neutral effect (indirect) of	None required	Long-term, regional, neutral effect (indirect) of

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	minor/ negligible significance.		minor/ negligible significance.
Group (xxviii) – Upper Thames Street (grade II)	Long-term, regional, neutral effect (indirect) of minor/ negligible significance.	None required	Long-term, regional, neutral effect (indirect) of minor/ negligible significance.
M: Fishmongers' Hall, London Bridge (grade II*)	Long-term, regional, neutral effect (indirect) of moderate significance.	None required	Long-term, regional, neutral effect (indirect) of moderate significance.
Group (xxix) – Lower Thames Street (grade II)	Long-term, regional, neutral effect (indirect) of minor to moderate significance.	None required	Long-term, regional, neutral effect (indirect) of minor to moderate significance.
N: Church of St Magnus the Martyr, Lower Thames Street (grade I)	Long-term, regional, neutral effect (indirect) of moderate significance.	None required	Long-term, regional, neutral effect (indirect) of moderate significance.
O: Custom House, Lower Thames Street (grade I)	Long-term, regional, neutral effect (indirect) of minor/ negligible significance.	None required	Long-term, regional, neutral effect (indirect) of minor/ negligible significance.
P: River wall, stairs and cranes, Custom House Quay (grade II*)	Long-term, regional, neutral effect (indirect) of minor/ negligible significance.	None required	Long-term, regional, neutral effect (indirect) of minor/ negligible significance.
Q: The Monument, Monument Street (grade I)	Long-term, regional, neutral effect (indirect) of moderate significance.	None required	Long-term, regional, neutral effect (indirect) of moderate significance.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Group (xxx) – Gracechurch Street and environs (grade II)	Long-term, regional, neutral effect (indirect) of minor significance.	None required.	Long-term, regional, neutral effect (indirect) of minor significance.
R: Leadenhall Market with subsidiary numbering, Gracechurch Street (grade II*)	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
S: Church of St Peter, Cornhill (grade I)	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
T: Church of All Hallows by the Tower, Byward Street, Great Tower Street, Tower Hill (grade I)	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
Group (xxxi) – Byward Street / Tower Hill Terrace (grade II)	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
U: Merchant Seamen's Memorial, Trinity Square (grade II*)	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
V: The Mercantile Marine First World War Memorial, Trinity Square Gardens, Trinity Square, Tower Hill (grade I)	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
W: Portion of Old London Wall, Trinity Square, Tower Hill (grade I)	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
Group (xxxii) – Royal Mint (grade II)	Long-term, regional,	None required	Long-term, regional,

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	neutral effect (indirect) of minor significance.		neutral effect (indirect) of minor significance.
X: Royal Mint, Tower Hill (grade II*)	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
Group (xxxiii) – St Katharine's Dock (grade II)	Long-term, regional, neutral effect (indirect) of minor/ negligible significance.	None required	Long-term, regional, neutral effect (indirect) of minor/ negligible significance.
Group (xxxiv) – St Katharine's Way (grade II)	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
Group (xxxv) – Tower Bridge Road (grade I)	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
Group (xxxvi) – Tower of London WHS Listed Buildings (grades I, II* and II)	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
Y: The Cathedral Church of St Paul, St Paul's Churchyard (grade I)	Long term, regional, neutral effect (indirect) of moderate significance.	None required	Long term, regional, neutral effect (indirect) of moderate significance.
Scheduled Monuments			
Group (xxxvi) - Tower of London (WHS and Listed Buildings at grades I, II* and II)	See effects on listed buildings above	None required	See effects on listed buildings above
B: Remains of Winchester Palace, Clink Street (also grade II* LB)	See effects on listed buildings above	None required	See effects on listed buildings above

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
L: Vintners Hall, Upper Thames Street (also grade I LB)	See effects on listed buildings above	None required	See effects on listed buildings above
M: Fishmongers' Hall, London Bridge (also grade II* LB)	See effects on listed buildings above	None required	See effects on listed buildings above
Q: The Monument, Monument Street (also grade I LB)	See effects on listed buildings above	None required	See effects on listed buildings above
W: Portion of Old London Wall, Trinity Square, Tower Hill (also grade I LB)	See effects on listed buildings above	None required	See effects on listed buildings above
Group (xxxvii) – Queenhithe [Smiths' Wharf & Queenhithe Dock]	Long-term, regional, neutral effect (indirect) of minor significance.	None required	Long-term, regional, neutral effect (indirect) of minor significance.
Locally Listed Buildings			
Group (xxxviii) – Treveris Street	Long-term, district, neutral effect of negligible significance.	None required	Long-term, district, neutral effect of negligible significance.
Group (xxxix) – Borough Road / Newington Causeway	Long-term, district, neutral effect of negligible significance.	None required	Long-term, district, neutral effect of negligible significance.
Group (XL) – Harper Road / Newington Causeway / New Kent Road	Long-term, district, neutral effect of negligible significance.	None required	Long-term, district, neutral effect of negligible significance.
Other non-designated heritage assets			
Nos.9-17 Vinegar Yard	Long-term, district, neutral effect of negligible significance.	None required	Long-term, district, neutral effect of negligible significance.
No.8 Stoney Street	Long-term, district, neutral effect of negligible significance.	None required	Long-term, district, neutral effect of negligible significance.
Nos.54-56 Ayres Street	Long-term, district, neutral effect of	None required	Long-term, district, neutral effect of

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	negligible significance.		negligible significance.

Monitoring

15.3. In compliance with Schedule 4(7) of the EIA Regulations, this section outlines monitoring arrangements post mitigation to cover both the Works and operational phases.

Transport

15.4. The Development would be subject to a Travel Plan which would be expected to be subject to planning condition or Section 106 Obligation for discharge post-planning, prior to first occupation. As part of the Travel Plan, staff travel patterns would be monitored by means of a travel survey in accordance with LBS and TfL requirements. The usage of the cycle parking facilities would also be monitored as part of the Travel Plan.

15.5. The Development would also be subject to a Delivery and Servicing Management Plan (DSMP) as part of which, monitoring would be undertaken of the delivery and servicing vehicles in terms of arrival profile and dwell times.

Noise and Vibration

15.6. Monitoring of Site of vibration should be undertaken when piling works are being carried out within 10m of listed buildings, utilities and LUL lines. Monitoring will ensure vibration at these assets does not exceed 10mm/s.

15.7. The Development will be subject to a Site-specific Environmental Management Plan (SEMP) which is anticipated to be secured by means of a planning condition. The SEMP, which will be agreed prior to the commencement of the work with LBS, will include a requirement for ongoing noise and vibration monitoring during the works.

15.8. It is anticipated that there will be a planning condition which states the plant noise limits and requires monitoring to ensure these limits are adhered to.

15.9. As stated in **Chapter 7: Transportation and Access**, monitoring will be undertaken of the delivery and servicing vehicles in terms of arrival profile and dwell times.

Air Quality

15.10. Monitoring would be undertaken during the Works as required by the Scoping Opinion. Monitoring could include dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

15.11. Regular site inspections to would be carried out to monitor compliance with the Dust Management Plan (DMP), record inspection results, and make an inspection log available to the local authority when asked.

15.12. The frequency of Site inspections would be increased by the person accountable for air quality and dust issues on Site when activities with a high potential to produce dust were being carried out and during prolonged dry or windy conditions.

15.13. The monitoring approach and locations for monitoring would be agreed with LBS.

Archaeology

15.14. No specific monitoring requirements have been identified for archaeology.

Water Resources and Flood Risk

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

Wind

15.16. No specific wind condition monitoring has been identified.

Daylight, Sunlight, Overshadowing, Solar Glare and Light Pollution

15.17. No specific daylight, sunlight, overshadowing, solar glare and light pollution monitoring has been identified.

Townscape, Visual Impact and Built Heritage Assessment

15.18. No specific TBHVIA monitoring (other than vibration monitoring near listed buildings during the Works as identified above) has been identified.