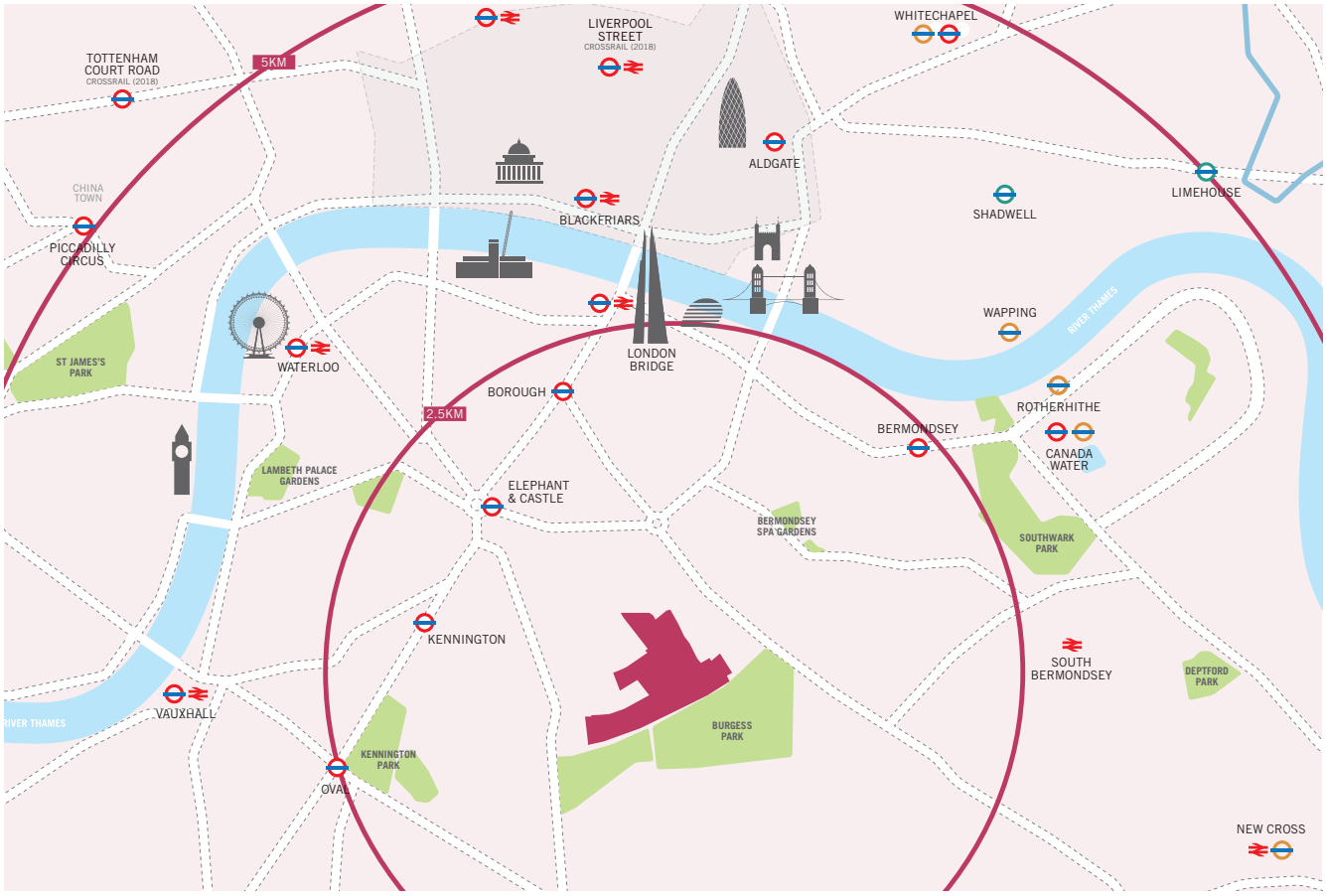

Planning Application for the Aylesbury Estate Regeneration

Masterplan & First Development Site Application

Environmental Statement:

ES Volume 1

WSP

v1

Nottinghill Housing · Southwark Council · BARRATT LONDON · hta · Hawkins\Brown · mæ · WSP · Deloitte · Soundings

AYLESBURYNOW

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Aylesbury Estate

Environmental Statement Volume 1 – Text and Figures

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Environmental Statement

This Environmental Statement (ES) comprises four volumes. Volume 1 contains the main text of the ES and the accompanying figures. Volume 2 comprises the appendices and contains the supporting information to the ES. Volume 3 contains the Townscape, Built Heritage and Visual Impact Assessment. Volume 4 comprises a Non-Technical Summary of the ES.

Copies of this document are available for viewing on the London Borough of Southwark website and at the Council offices.

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1 Introduction

1.1 Background and Context

1.1.1 This Environmental Statement (ES) is part of a suite of documents that supports the two separate planning applications by Notting Hill Housing Trust (the 'Applicant'), for the comprehensive regeneration of the Aylesbury Estate (the 'Estate'), which extends to 26.9 hectares (ha) located in the London Borough of Southwark (LBS) as shown on **Figure 1.1**. The design of the residential-led mixed use development proposed through both applications has evolved as a Comprehensive Masterplan compliant with the policy objectives of the adopted 2010 Aylesbury Area Action Plan (AAAP) (Ref. 1.1) which proposes the regeneration of the whole Estate, the boundary of which is shown on **Figure 1.2**. The early phases of the Estate have already been developed or are subject to recent planning permissions, which include Sites 1a and 7 as shown on **Figure 1.2**. The two separate planning applications now submitted by the Applicant propose development for the remainder of the Estate, namely phases 1b, 1c, 2, 3 & 4 and site 10, split as follows:

- **First Development Site Application (FDS Application):** Detailed application for the demolition of existing buildings and redevelopment to create a residential-led development comprising 815 private and affordable units (Use Class C3); flexible community use, early years facility (Use Class D1) or gym (Use Class D2); public and private open space; formation of new accesses and alterations to existing accesses; and energy centre; gas pressure reduction station; associated car and cycle parking; and associated works. **Figure 1.3** shows the FDS Application boundary which extends to approximately 4.4 ha; and
- **Masterplan Application:** Outline Application, including access for demolition of existing buildings and redevelopment to provide up to 2,745 private and affordable units (Use Class C3); 600 to 2,500 sqm of employment use (Use Class B1); 200 to 500 sqm of retail space (Use Class A1); 3,100 to 4,750 sqm of community use, medical centre and early years facility (Use Class D1); 600 to 3,000 sqm flexible retail use (Use Class A1/A3/A4) or workspace use (Use Class B1); new landscaping; public and private open space; energy centre; gas pressure reduction station; up to 1,070 car parking spaces; cycle parking; landscaping and associated works. **Figure 1.4** shows the Masterplan Application boundary which extends to approximately 22.5 ha.

1.1.2 For the purposes of this ES, the adjoining parcels of land (FDS Application site and Masterplan Application site) which are the subject of the two separate applications are referred to as the 'Site'.

1.1.3 In combination, the development applied for by the FDS Application and the Masterplan Application is referred to as the 'Comprehensive Development' (**Figure 1.5** shows the Comprehensive Development boundary) and will deliver up to 397,565 sqm gross external area (GEA) of floorspace, comprising the following:

- 3,560 residential dwellings (Use Class C3);
- 2,500 sqm of business space / employment use (Use Class B1);
- 3,000 sqm of retail (Use Class A1, A3 or A4) or workspace (Use Class B1);
- 500 sqm of retail (Use Class A1);
- 263 sqm of community / leisure use (Use Class D1 or D2); and
- 4,750 Health / Community / Early Years (Use Class D1).

1.1.4 The overall design of the two application schemes has been developed consistent with the adopted AAAP as a Comprehensive Masterplan for the whole Estate to be implemented in phases. The FDS Application will be implemented as the first phase, whilst the detailed design of the Masterplan Application is developed further consistent with the Parameter Plans, Development Specification and Design Code. In this context, the Applicant fully accepts there will be planning conditions and Section 106 obligations imposed to limit the implementation of development to the options set out below. It is these two development options which are the

subject of the Environmental Impact Assessment (EIA) and reported within this one ES as submitted with both applications. The two Development Scenario Options are:

- **Site Wide Development Option**: this option relates to the combination of both the Masterplan Application site and the FDS Application site (Comprehensive Development); and
- **FDS Development Option**: this option relates to the FDS Application site in isolation.

1.1.5 The EIA Regulations (Ref. 1.2) are clear that it is the likely significant environmental effects of the proposed development that have to be assessed in the ES, however there is no requirement in those Regulations either to submit one ES for each individual 'EIA application' or to assess the effects of the development to be permitted by an individual application on its own.

1.1.6 Schedule 4 of the EIA Regulations sets out the information that must be included in environmental statements. It requires a "description of the likely significant effects of the development on the environment" to be included in the ES. This ES sets out the two potential 'EIA development' scenarios that have been assessed. The Masterplan Development will not take place in isolation of the FDS Development. The likely significant effects on the environment of the two development scenarios are assessed in each chapter and **Table 1.2** sets out the information provided consistent with Schedule 4.

1.1.7 **Table 1.1** below provides the key terms and definitions that are used throughout this ES.

Table 1.1: Key Terms Used Within the ES

Term	Definition
The Applicant	Notting Hill Housing Trust.
AAAP	The Aylesbury Area Action Plan Supplementary Planning Document adopted by the London Borough of Southwark in 2010.
The Estate	This refers to the whole Aylesbury Estate as existing and defined by the AAAP. It includes the two application sites and also the previously consented Sites 1a (Built out and completed) and 7 (Currently under construction).
First Development Site (FDS Application)	The detailed planning application.
Masterplan Application	The outline planning application.
Comprehensive Development	The combined development proposed by the FDS Application and the Masterplan Application.
Site	The adjoining parcels of land (FDS Application site and Masterplan Application site) which are the subject of the two separate applications.
Site Wide Development Option	For the purposes of the EIA and each of the technical ES Chapters (**Chapters 6 – 16**), this option relates to the assessment of the combination of both the Masterplan Application site and the FDS Application site (Comprehensive Development).
FDS Development Option	For the purposes of the EIA and each of the technical ES Chapters (**Chapters 6 – 16**), this option relates to the assessment of the FDS Application site in isolation.
Plot	The defined parcel of development within the FDS Application site and Masterplan Application site. A Plot is made up of a number of sub-plots.
Sub-plot	The defined parcel of development within the FDS Application site and Masterplan Application site. A number of Sub-plots make up a Plot.
Block	The defined parcel of development within the FDS Application site and Masterplan Application site. A number of Blocks make up a Sub-plot.

1.1.8 This ES presents the findings of the EIA in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (the 'EIA Regulations 2011') (Ref. 1.2). It is based on the total extent of the development as defined on the Application Plans and Parameter Plans for the FDS and Masterplan Applications. Throughout this ES the term 'Comprehensive Development' will be used to refer to the combined area of the two Application Sites as identified on **Figure 1.5** and includes the maximum land area for the proposed works including built and non-built development (such as access arrangements and areas of open space).

1.1.9 Further details of the Comprehensive Development, including the anticipated construction phasing, construction methods and details of the evolution of the scheme design are set out in **Chapter 3 'The Comprehensive Development'** and **Chapter 5 'Demolition and Construction'.**

1.2 Planning Policy Context

1.2.1 The planning issues raised by the Comprehensive Development have been assessed against relevant national, regional and local planning policy in the Planning Statement that accompanies the applications.

1.2.2 The Estate falls within the AAAP, which was developed and adopted by LBS in January 2010 as a Supplementary Planning Document (SPD) and forms part of Southwark's Local Development Framework (LDF). The AAAP contains a vision for the area, policies for its development, and a delivery plan for future investment to guide the redevelopment of the Estate and to show how it will create a new neighbourhood over the next 15 to 20 years to regenerate the Estate and provide a net increase in homes from 2,400 to 4,200. The AAAP area is made up of two parts; firstly the Masterplan Regeneration Area, namely the Aylesbury Estate itself, which will be completely redeveloped. Secondly, there is the wider area including East Street, Walworth Road, Old Kent Road, and Burgess Park where there will be improvements to workplaces, shops, leisure facilities, transport, schools and open space.

1.2.3 Planning permission has already been granted for Site 1a (Ref No. 07/AP/0046) and Site 7 (Ref No. 12/AP/2332) (both part of the Estate) for 260 residential dwellings within a series of buildings ranging in height from 1 to 10 storeys approximately 400 m^2 retail floor space and a new day centre on Site 1a and 147 residential units within two apartment blocks on Site 7. Construction is currently underway on Site 7 and completed for Site 1a. Neither application was defined as EIA development requiring the submission of an ES.

1.2.4 **Chapter 4 'Planning Policy Context'** and the technical chapters of this ES (**Chapters 6 – 16**) provide an overview of the relevant policy where appropriate, and demonstrate that the Comprehensive Development has been assessed against relevant national and local planning policy.

1.3 The Site and Surrounding Area

Overview of the Existing Site

1.3.1 The Estate was built between 1966 and 1977 and is currently home to approximately 7,000 people. The Estate is predominantly residential, with a mixture of houses, flats and maisonettes, ranging from 2 to 14 storeys in height. The Estate also includes offices, community buildings and some shops.

1.3.2 The Estate extends to approximately 26 ha, with the FDS Application site extending to approximately 4 ha and the Masterplan Application site extending to approximately 22 ha.

1.3.3 The FDS Application site lies immediately to the south-west of the Masterplan Application site, across Portland Road. Westmoreland Road forms the northern boundary of the FDS Application site, Portland Street forms the eastern boundary and Albany Road (B214) forms the southern boundary beyond which lies Burgess

Park. The aforementioned Site 1a is already developed and is located immediately to the west of the FDS Application site.

1.3.4 The FDS Application site currently consists of residential development in eight blocks between 2 and 14 storeys in height. Chiltern House and Bradenham House are Jespersen in style and lie to the Far East and far west of the Estate respectively and range from 10 and 14 storeys in height. The central portion of the FDS Application site is comprised of five residential blocks also in the Jespersen style (Chartridge, Numbers 1-68, 69-76, 77-105, 106-119, and 120-149) which are between 10 and 14 storeys in height. Arklow House is a red brick building in the south of the FDS Application site and is between 2 and 5 storeys in height. Ellison House is located to the south-west of the FDS Application site and is 2 - 5 storeys in height.

1.3.5 The Masterplan Application site currently consists of residential developments between 2 and 14 storeys in height. The Masterplan Application site is bordered to the north by East Street, to the east by Alvey Street, to the south by Albany Road (B214), and to the west by Portland Street. This portion of the Site is predominantly comprised of Jespersen style housing blocks between 4 and 8 storeys in height, with three main clusters of red brick housing blocks, including Michael Faraday House and Galtskell House. Directly to the east of Thurlow Street five housing blocks (Wendover) are located, between 10 and 14 storeys, and one directly to the west (Taplow) between 10 and 14 storeys.

Overview of the Surrounding Area

1.3.6 There are no World Heritage Sites or sites included on the Tentative List of Future Nominations for World Heritage Sites (July 2010) situated within the Site, nor are there any scheduled monuments, Registered Parks and Gardens or Registered Battlefields. The Grade I listed Church of St Peter's lies to the west of the Site on Liverpool Grove. The Site also lies on the southern boundary of the Liverpool Grove Conservation Area and approximately 150 m north-east of the Addington Square Conservation Area.

1.3.7 Two European designated sites lie within 10 km of the Site. These include Wimbledon Common Special Area of Conservation (SAC) (approximately 9.5 km to the south-west) and Lee Valley Special Protection Area (SPA) (approximately 9.5 km to the north-east).

Historical Context

1.3.8 Historical records indicate the former site of the 19th century St Mary Newington Workhouse in the southern part of the Site between Beaconside Road and Albany road and the site of a former stonemason's yard in the north-west of the Site.

1.3.9 Within the wider area a limited range of heritage assets and periods are represented. There are no records of artefacts of Prehistoric origin. The putative alignment of the former Watling Street Roman road is recorded to the east of the Site, running broadly on a north-west to south-east alignment and close to Mina Road, to the east of the Site a desk-based assessment records the location of the former 'Earl's Sluice', which may have been the remnant of a still earlier Roman period water system.

1.3.10 The remainder of all recorded heritage assets within the surrounding area are associated with existing or former 19th century buildings, a park, and the railway and canal network.

1.3.11 Further information on the Site and surrounding area is provided in the technical chapters within this ES (**Chapters 6 - 16**).

1.4 Legal Framework for the ES

1.4.1 The EIA Regulations 2011 require that an EIA is undertaken prior to the granting of planning permission for certain types of development projects. EIA is mandatory for those projects listed within Schedule 1 of the EIA Regulations 2011. For projects listed within Schedule 2, EIA is only required if the Site is either

located within a 'sensitive area' or it exceeds the relevant thresholds and criteria in Schedule 2 and is likely to have significant environmental effects.

1.4.2 The FDS Application site and the Masterplan Application site individually do not fall within any of the types of development set out in Schedule 1. However the FDS Application site and the Masterplan Application site individually do fall within paragraph 10(b) of Schedule 2 'Urban Development Projects' as the size threshold of 0.5 hectares identified in Schedule 2 for 'Urban Development Projects' is exceeded.

1.4.3 This ES presents the likely significant environmental effects of the Comprehensive Development during construction and following completion (also referred to as operation); any mitigation measures recommended to prevent, reduce, and where possible, offset any significant adverse effects on the environment; and the residual effects remaining thereafter. The scope of the ES was agreed with LBS through the Scoping Opinion received from LBS in June 2014. Further details are provided in **Chapter 2 'Approach to the Assessment'**, and a copy of the WSP Scoping Report, LBS Scoping Opinion and WSP Scoping Opinion Response are provided in **Appendix 2.1, 2.2** and **2.3** of this ES.

1.4.4 Where, deemed appropriate, additional consultations have been undertaken with the relevant consultees as part of the EIA process. Further details are included in the respective technical chapters within this ES (**Chapters 6 - 16**).

Environmental Impact Assessment

1.4.5 An assessment of the likely significant environmental effects during construction and once the development is completed and operational has been undertaken and measures have been recommended to prevent, reduce and where possible, offset any likely significant adverse effects on the environment, referred to as mitigation measures. The results of the assessment and recommended mitigation measures are described in each of the technical chapters of this ES (**Chapters 6 - 16**).

1.4.6 The approach taken for the assessment of the likely significant effects of the development is discussed in **Chapter 2 'Approach to the Assessment'**.

1.4.7 The FDS and Masterplan Applications set out full details of the following aspects of the Site which have been assessed and reported in this ES:

- Quantum, type, size and tenure of residential units;
- Maximum building heights;
- Proposed land uses;
- Floor spaces of non-residential uses;
- Transport infrastructure;
- Public open spaces;
- Open Land;
- Landscaping;
- Building materials; and
- Phasing of construction works.

1.4.8 The findings of the EIA are presented in this ES, which has been prepared in accordance with the *EIA Regulations 2011*. An overview of the methodology adopted for each technical study is provided in the respective chapters of this ES (**Chapters 6 - 16**). This ES contains the information specified in Part I (where relevant) and Part II of Schedule 4 of the *EIA Regulations 2011* (see **Table 1.2**).

1.5 Structure of the ES

1.5.1 This ES has been prepared in accordance with the *EIA Regulations 2011* and the Department for Communities and Local Government's (DCLG) *National Planning Practice Guidance 'Environmental Impact Assessment'* (Ref. 1.3) and best practice guidance issued by the Institute of Environmental Management and Assessment (IEMA). An overview of the methodology adopted for each technical study is provided in the respective technical ES chapters (**Chapters 6 - 16**). The ES contains the information specified in Part 1 (where relevant) and Part 2 of Schedule 4 of the *EIA Regulations 2011* (see **Table 1.2** below) and comprises 4 volumes as described below, incorporating Volume 1: Text and Figures, Volume 2: Appendices, Volume 3: Townscape, Built Heritage and Visual Impact Assessment and the Non-Technical Summary, which provides a summary of the Applications and the findings of the ES in non-technical language.

Volume 1: Environmental Statement –Text and Figures

1.5.2 This is the full text of the ES which is divided into chapters which are supported by a series of figures and technical appendices as appropriate (see Volume 2 below).

Volume 2: Technical Appendices

1.5.3 Volume 3 contains the full text of a number of surveys and technical assessments undertaken as part of the EIA, as well as relevant survey and modelling data, such as the Geo-environmental and Geotechnical Preliminary Risk Assessment, Archaeological Desk Based Assessment, results of modelling for air quality and noise and the ecological survey reports. Pertinent information from these studies has been incorporated into this ES, and the technical reports related to these studies are submitted in support of the planning applications for the Comprehensive Development.

Volume 3: Townscape, Built Heritage and Visual Impact Assessment

1.5.4 The assessment of the Comprehensive Development in terms of Townscape, Built Heritage and Visual Impact Assessment.

Non-Technical Summary

1.5.5 Presented as a summary of the ES in 'non-technical language', the Non-Technical Summary (NTS) is a separate volume of the ES which provides a concise summary of the development proposals, likely significant environmental effects and measures proposed to mitigate or avoid these effects.

1.5.6 Regulation 2 (1) of the *EIA Regulations 2011* defines an "environment statement" as a statement:

- "that includes such of the information referred to in Part 1 of Schedule 4 [of the EIA Regulations 2011] as is reasonably required to assess the environmental effects of the development and which the applicant can, having regard in particular to current knowledge and methods of assessment, reasonably be required to compile, but that includes at least the information referred to in Part 2 of Schedule 4".

1.5.7 The *EIA Regulations 2011* (Part 1 of Schedule 4) require information that is *"reasonably required to assess the environmental effects of the development and which the applicant can, having regard in particular to current knowledge and methods of assessment, reasonably be required to compile"* to be provided in an ES. This information is presented in **Table 1.2**, which also indicates where the relevant information is located within this ES.

Table 1.2: Location of Required Information within this ES

	Required Information	Location within this ES
1	Description of the developments, including in particular:	
(a)	Description of the physical characteristics of the developments and the land-use requirements during the construction and	**Chapter 3: The Comprehensive**

	Required Information	Location within this ES
	operational phases.	**Development**
(b)	Description of the main characteristics of the production processes, for instance, nature and quantity of materials used.	**Chapter 3: The Comprehensive Development**
(c)	An estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the developments.	**Technical Chapters 6 – 16**
2	An outline of the main alternatives studies by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects.	**Chapter 3: The Comprehensive Development**
3	A description of the aspects of the environment likely to be significantly affected by the development, including in particular, population, fauna, flora, soil, water, air, climate factors, material assets including the architectural and archaeological heritage, landscape and inter-relationship between the above factors.	**Technical Chapters 6 - 16**
4	A description of the likely significant effects of the developments on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the developments, resulting from: (a) the existence of the development; (b) the use of natural resources; (c) the emissions of pollutants, the creation of nuisances and the elimination of waste; and (d) the description by the applicant of the forecasting methods used to assess the effects on the environment.	**Technical Chapters 6 - 16**
5	A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.	**Technical Chapters 6 - 16**
6	A non-technical summary of the information provided.	Non-Technical Summary (included as a separate document)
7	Townscape, Visual and Built Heritage Assessment	Included as a separate document – Volume 3
8	An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.	**Chapter 2: Approach to the Assessment**, and technical chapters as relevant.

1.6 Planning Application Documents

1.6.1 The planning applications are supported by the following documents outlined in **Table 1.3**.

Table 1.3: List of Planning Application Documents

Planning Application Documents	Masterplan Application	FDS Application
Planning Application Forms	✓	✓
Design and Access Statement	✓	✓
Application Plans, Sections and Elevations	✓	✓
Environmental Statement	✓	
Transport Assessment	✓	

Planning Application Documents	Masterplan Application	FDS Application
Flood Risk Assessment	✓	
Site Wide Waste Strategy	✓	
Affordable Housing Statement	✓	✓
Landscape Strategy	✓	✓
Sustainability Statement	✓	
Statement of Community Involvement	✓	✓
Energy Strategy	✓	
Travel Plan	✓	
Lighting Strategy	✓	✓
Design Code	✓	
Development Specification	✓	
Parameter Plans	✓	

1.7 Project Team

1.7.1 WSP prepared the ES in conjunction with a full project team, the details of which are identified in **Table 1.4** below and which also includes the authors of the above Reports submitted in support of the planning applications.

Table 1.4: Project Team

Team Members	Role
Notting Hill Housing Trust	Applicant
Deloitte	Planning Consultant
hta mæ Hawkins\Brown	Architects
WSP	EIA Project Management, Ecology & Nature Conservation, Socio-Economics, Telecommunications, Transport and Access, Noise & Vibration, Air Quality, Archaeology, Ground Conditions, Hydrogeology & Contamination, Water Resources, Water Quality, Flood Risk & Drainage.
HTA	Sustainability, Landscape Architects, Townscape, Visual and Built Heritage Assessment, Wind, Daylight, Sunlight and Overshadowing.

1.8 References

Ref. 1.1 London Borough of Southwark (2010), Aylesbury Area Action Plan

Ref. 1.2 HM Government (2011), The Town and Country Planning (Environmental Impact Assessment) Regulations 2011

Ref. 1.3 Department for Communities and Local Government (2012), National Planning Practice Guidance 'Environmental Impact Assessment'

2 Approach to the Assessment

2.1 Introduction

2.1.1 This Chapter sets out the approach that has been taken to undertake and complete the assessment of the likely significant effects of the Comprehensive Development as defined and described by the Development Specification and Application and Parameter Plans submitted for approval. This reflects the requirements set out in the Council's Scoping Opinion (see **Appendix 2.2**) and the *Town and Country Planning (Environmental Impact Assessment) Regulations, 2011* (the *EIA Regulations 2011*) (Ref 2.1) and contains the information specified in Part I (where relevant) and Part II of Schedule 4 of the EIA Regulations 2011 as confirmed in **Table 1.2 Chapter 1 'Introduction'** and informed by the following Scoping and agreement of assessment methodologies and approaches;

- Establishment of the existing / baseline environmental conditions of the Site;
- Identification of planning policy context and applicable guidance;
- Consultation with statutory consultees, other organisations and the public;
- Assessment of alternatives;
- Identification of the aspects of the environment likely to be significantly affected by the Comprehensive Development as identified at the Scoping stage, including in particular, population, fauna, flora, soil, water, air, climatic factors, material assets including the architectural and archaeological heritage, landscape and inter-relationship between the above factors;
- Identification of cumulative effects;
- Determination of significance criteria to assess the level of any identified environmental effects of the Comprehensive Development;
- Identification, prediction and assessment of the likely significance of the environmental effects, both positive and negative, of the Comprehensive Development (during construction and operation) including effects on socio-economics; traffic and transportation; noise and vibration; local air quality, nature conservation and ecology; landscape and visual impact, archaeology, ground conditions and contamination; flooding, drainage, water quality and water resources; agriculture and soil resources and effects in relation to climate change; and limitations and assumptions related to these assessments, including the management of uncertainty in the assessment process;
- Identification of suitable mitigation, enhancement and monitoring measures to prevent, reduce or remedy any likely significant negative environmental effects of the Comprehensive Development; and
- Assessment of the significance of any residual effects remaining following the implementation of mitigation measures.

2.1.2 . The approach to the assessment has been informed by relevant legal requirements and current best practice guidance, including the National Planning Practice Guidance (NPPG) document 'Environmental Impact Assessment' (Ref. 2.2) and the following:

- Department for Communities and Local Government (DCLG) 2006 - Amended Circular on Environmental Impact Assessment: A Consultation Paper, June 2006 (Ref. 2.3); and
- Department for Communities and Local Government (DCLG) 2006 – Environmental Impact Assessment: A Guide to Good Practice and Procedures: A Consultation Paper (Ref. 2.4).

2.1.3 An overview of the guidance and methodology adopted for each technical study is provided within the respective technical chapters within this ES (**Chapters 6 – 16**). The Comprehensive Development has been assessed using available information and knowledge of the Site and surrounding area to determine the

potential for likely significant environmental effects. Where such effects are identified, mitigation measures to prevent, reduce or remedy these effects are recommended. In addition, enhancement opportunities have been identified to optimise the benefits and positive aspects of the Comprehensive Development.

2.2 Design and Environmental Interface

2.2.1. Throughout the design process for the Comprehensive Development, the environmental specialists involved in the assessment and the project design team have worked together to ensure that where possible, adverse environmental effects are avoided through revisions to the scheme design.

2.2.2. The main alternative scheme layouts that have been considered are set out in **Chapter 3 'The Comprehensive Development'.**

2.2.3. Where significant effects have been identified, the design of the Comprehensive Development has, where possible, been adjusted to reduce these effects. For example the design and layout of the Comprehensive Development as shown on the Application and Parameter Plans submitted for approval has been informed by the on-going microclimate studies, including wind and daylight, sunlight and overshadowing. The final Application and Parameter Plans as described in **Chapter 3 'The Comprehensive Development'** include inherent mitigation measures, which are discussed further where relevant in each of the technical chapters (**Chapters 6 – 16**) of this ES.

2.3 The Assessment of the Comprehensive Development

2.3.1. The two Applications are defined by the Application (Detailed) and Parameter Plans (Outline) submitted for approval and have been the basis of the assessment for the purposes of the EIA, as presented in **Chapter 3 'The Comprehensive Development'** which in turn is also informed by the Development Specification.

2.3.2. The approach of using Parameter Plans with outline planning applications as a basis for the assessment is an accepted practice and ensures that the EIA is robust. The Parameter Plans represent the maximum amount of development within some limits of deviation as defined on the Parameter Plans which are also read with the Means of Access Plans and the Illustrative Masterplan (**Figure 3.1**). Adopting a 'parameters approach' to assess the development the subject of the Masterplan Application allows for some flexibility as to the detailed design of those elements of the application which are reserved for future approval.

2.3.3. The FDS Application is supported by a set of fully detailed Application Plans. The Development Specification captures the detail for both the FDS and Masterplan Applications and is used as a basis for the assessment of the likely significant effects of the Comprehensive Development as reported in the ES and therefore a reasonable worst case scenario is assessed in the technical chapters (**Chapters 6 - 16**) based on the following two development scenarios which have been considered in the EIA, and reported within the technical chapters:

- **Site Wide Development Option**: this option relates to the combination of both the Masterplan Application site and the FDS Application site (Comprehensive Development);
- **FDS Development Option**: this option relates to the FDS Application site in isolation.

Overall Quantum of Development and Uses

2.3.4. **Chapter 3 'The Comprehensive Development'** together with the Development Specification (Ref 2.5) confirms the quantum of development and land uses proposed by the combined two Applications. The Development Specification in particular defines and describes the principal components and includes details associated with the quantum of the land uses proposed which is stated as an upper limit to represent the likely development that will come forward.

2.3.5. The Comprehensive Development is for up to 3,560 dwellings, retail, healthcare facilities, and community space as defined in **Chapter 3 'The Comprehensive Development'**. For the purposes of the assessment of likely significant environmental effects, certain technical aspects of the EIA are based on the proposed quantum of development. The approach taken for those assessments is confirmed below.

- Socio-Economics specifically in relation to population and demand for social infrastructure (e.g. Doctors, dentists, school places, open space etc.) and additional local spending. For the assessment of the Site Wide development Option, the quantum assumed is as defined in the total of the two applications. For the assessment of the effects on employment during the operational stage of the Site Wide Development Option, upper and lower floorspace values (Use Classes B1, D1, A1, A3, A4) of the Masterplan Application were both assessed; and
- Traffic and Transportation specifically in relation to trip generation and modal split (and so indirectly, Noise and Vibration and Air Quality in relation to the assessment of road traffic noise and air quality effects). The modelling and assessment of transport effects (and associated effects on air quality and noise) has been completed based on a maximum development of 3,560 residential dwellings (Use Class C3). In total the proposals are for the demolition of 2,647 dwellings and the construction of 3,560 dwellings within the same area, an increase of 993 dwellings. The transport effects of the non-residential development within the area have also been assessed. As there are existing non-residential uses on Site at the moment serving predominantly the existing population, the effect of the development proposals has assessed by assuming an uplift in existing trips. This uplift has been applied to the on-site retail, early years, community and healthcare trips. The uplift assumes that with approximately 33% more residents within the same area, that these services will see an equivalent 33% increase in trips. For the employment uses, there is approximately 3,000 sqm of office space on Site at the moment which means that the remaining 2,500 sqm has been applied as new office space.

Scale Dependent EIA Technical Studies

2.3.6. There are a number of technical aspects of the EIA which use details of scale for the purposes of the assessment of the likely significant environmental effects. These are as follows:

- Townscape, Visual and Built Heritage; and
- Ecology and Nature Conservation (indirectly in relation to the amount of public realm/open space proposed).

2.3.7. In relation to these scale-dependent studies of the EIA, the 3-dimensional envelope tested is the limit (maximum extent including height) of development in the case of built development areas and areas of open space.

2.3.8. A summary of the quantum and scale assessed (including the upper and lower limits) within each of the technical chapters (**Chapters 6 – 16**) is provided in **Table 2.1** below.

Table 2.1: Quantum and Scale of Assessment

	Assessment	
Chapter	**Site Wide Development Option**	**FDS Development Option**
Ecology and Nature Conservation	Maximum extent of the 3-dimensional envelope of the Comprehensive Development	Maximum extent of the 3-dimensional envelope of the FDS Development
Socio-economics and Population Effects	Maximum quantum of the Comprehensive Development. For the assessment of the effects on employment during the operational stage of the Site Wide Development Option, upper and lower floorspace values (Use Classes B1, D1, A1, A3, A4) of the Masterplan Application were both assessed.	Maximum quantum of the FDS Development
Telecommunications	Maximum extent of the 3-dimensional envelope of the Comprehensive Development	Maximum extent of the 3-dimensional envelope of the FDS Development

	Assessment	
Chapter	**Site Wide Development Option**	**FDS Development Option**
Wind	Maximum extent of the 3-dimensional envelope of the Comprehensive Development	Maximum extent of the 3-dimensional envelope of the FDS Development
Daylight, Sunlight and Overshadowing	Maximum extent of the 3-dimensional envelope of the Comprehensive Development	Maximum extent of the 3-dimensional envelope of the FDS Development
Transportation and Access	Maximum quantum of the Comprehensive Development	Maximum quantum of the FDS Development
Noise	Maximum extent of the 3-dimensional envelope of the Comprehensive Development	Maximum extent of the 3-dimensional envelope of the FDS Development
Local Air Quality	Maximum extent of the 3-dimensional envelope of the Comprehensive Development	Maximum extent of the 3-dimensional envelope of the FDS Development
Archaeology	Maximum extent of the 3-dimensional envelope of the Comprehensive Development	Maximum extent of the 3-dimensional envelope of the FDS Development
Ground Conditions, Hydrogeology and Contamination	Maximum extent of the 3-dimensional envelope of the Comprehensive Development	Maximum extent of the 3-dimensional envelope of the FDS Development
Water Resources, Water Quality, Flood Risk and Drainage	Maximum extent of the 3-dimensional envelope of the Comprehensive Development	Maximum extent of the 3-dimensional envelope of the FDS Development
Townscape, Built Heritage and Visual Impact Assessment	Maximum and minimum extent of the 3-dimensional envelope of the Comprehensive Development	Maximum extent of the 3-dimensional envelope of the FDS Development

2.4 Stages of the Assessment

2.5.1. The following stages have been followed during the preparation of this ES:

- Scoping study and provision of a Scoping Opinion by LBS;
- Baseline assessment of existing environmental conditions within the Site and the surrounding area;
- Identification of potential effects arising from the construction works, and once the Comprehensive Development is complete;
- Evaluation of the significance of potential effects;
- Identification of mitigation measures; and
- Assessment of any residual effects following implementation of the identified mitigation measures.

Scoping Study

2.5.2. An EIA Scoping Report was prepared by WSP in March 2014 (**Appendix 2.1**), and was submitted to LBS with a request for a Scoping Opinion, in accordance with Regulation 13 of the *EIA Regulations 2011.*

2.5.3. A formal Scoping Opinion was received from LBS in June 2014, which indicated that the scoping report prepared by WSP was reasonable and comprehensive, subject to certain comments and amendments. A summary of the key points raised in the Scoping Opinion is provided in **Table 2.1** below. This summary is not intended to be all-encompassing and contains only the main points which are considered to be of particular relevance to the context of the technical chapters (**Chapters 6 – 16**) of this ES (detailed in **Table 2.1**). These comments have been addressed through the technical studies as presented within this ES. The full Scoping Opinion is provided in **Appendix 2.2**, and also contains responses from a number of statutory consultees, including the Environment Agency, English Heritage and Natural England. These comments have also been

addressed through the technical studies as presented within this ES. WSP responded to the LBS Scoping Opinion to clarify a number of points (**Appendix 2.3**). At the time of drafting this ES, no further response has been received from LBS.

2.5.4. The agreed scope of the assessment for individual technical topics is set out in the respective technical chapters (**Chapter 6 - 16**) and **Chapter 17 'Cumulative Effects'** of this ES as confirmed by **Table 2.2** below.

Table 2.2: Summary of Key points from the LBS Scoping Opinion (Appendix 2.2)

Consultee	Comments relevant to ES Discipline	Location of Information in the ES
London Borough of Southwark	*Outline Application* ■ The Scoping Report does not explicitly define the upper limits of the outline application.	Chapter 3 'The Comprehensive Development' and Development Specification
	Cumulative Impact Assessment and Impact Interactions ■ EIA will need to carefully assess the cumulative schemes identified by LBS and reviewed regularly to ensure schemes remain up to date.	Chapter 17 'Cumulative Effects'
	Demolition and Construction ■ Overview of the demolition phases and works required across the Site. ■ Take into account the impact of additional traffic on the network, the impact on congestion, impacts on the disruption of flows / resulting displacement and impacts on vulnerable road users. ■ Identification of measures to ensure conflict is avoided and safety managed. ■ Information on site access / egress provided along with details on changes to locations through the construction / demolition period. ■ Demolition and Construction programme to be provided covering all phases. ■ Worst case scenario 'snap shots' to be assessed and agreed covering all phases. ■ Indication of typical plant to be used. ■ Framework for CEMP, SWMP and Code of Construction Practice. ■ Intentions for re-use, recycling and waste disposal.	Chapter 5 – 'Demolition and Construction'
	Climate Change ■ The ES should consider the potential impacts of climate change within each environmental topic.	All technical chapters 6 - 16
	Waste ■ Application Report in the form of a Site Waste Management Strategy for all phases ■ Demolition waste to be estimated and details of reuse/recycling provided ■ Vehicles used for waste transfer to be estimated ■ Air Quality and Noise to assess on-site waste processing	Chapter 3 'The Comprehensive Development', Development Specification and Waste Management Strategy
	Energy ■ Application Report in the form of an Energy Strategy ■ ES to include details regarding on-site energy regeneration	Chapter 3 'The Comprehensive Development', Development Specification and Energy Strategy
	Artificial Lighting ■ Scoped out	N/A
	Sustainability Statement ■ Application Report	Chapter 3 'The Comprehensive Development',

Consultee	Comments relevant to ES Discipline	Location of Information in the ES
		Development Specification and Sustainability Statement
	Townscape and Visual and Cultural Heritage Effects ■ Reference to be made to relevant CAA's and heritage guidance ■ Assessment to be informed by the Liverpool Grove CAA. ■ Viewpoint to assess worst case scenarios (Winter Views) ■ Detailed methodology to be included. ■ Full justification required on significant effects required.	Volume 3 'Townscape, Built Heritage and Visual Impact Assessment'
	Socio-Economic Impacts ■ Existing economic uses to be set out as sqm, numbers of employees and identification of employment displacement that may arise. ■ Inclusion of measurement of local impacts on businesses, shops, facilities and services within and neighbouring the site. To include displacement of existing businesses, shops, facilities and services and disruption to neighbouring sites. ■ Construction labour demand using best available data. ■ Education and Medical Scope to be informed by Aylesbury AAP and GLA projections for Faraday Ward (2012). ■ Consideration of wider impacts on health / wellbeing in accordance with Health Urban Development Unit methodology. ■ Cumulative impacts to be considered.	Chapter 7 – 'Socio-Economic and Population Effects'
	Transport ■ Construction Logistics Plan to cover the site. ■ ES to cover demolition traffic. ■ Consideration of additional traffic on the network and impacts on congestion and disruptions of flows across the site and displacements ■ Consideration of impacts on vulnerable road users and management	Chapter 11 'Transportation and Access'
	Noise and Vibration ■ Assessment of demolition, construction, construction traffic, plant, road, rail, off and on site commercial, plant and servicing. ■ Ambient sources of noise to be listed along with mitigation ■ Assessment approach to be agreed with LBS.	Chapter 12 'Noise and Vibration'
	Air Quality ■ Report on $PM_{2.5}$ as well as PM_{10} ■ Baseline monitoring to be undertaken ■ ES to include maps of baseline monitoring locations and air quality receptors ■ Offsite sources which are undergoing construction to be taken into account ■ Consideration on internal air quality and impacts of premises involved in hot food preparation. ■ ADMS verified using London Atmospheric Emission Inventory ■ Assessment to cover demolition, construction and operational phases ■ Consideration to be given to fuel type, thermal rating and location when assessing heating plant emissions	Chapter 13 'Local Air Quality'
	Wind ■ Consideration of effects on balconies, terraces and outdoor amenity. ■ Wind effects should be assessed for operational phase and reported for construction phases. ■ Significance of effects should be stated.	Chapter 9 'Wind'
	Day/Sunlight and Overshadowing ■ NSL assessment provided where appropriate. ■ APSH in summer and winter should be assessed for windows that face	Chapter 10 'Daylight, Sunlight and Overshadowing'

Consultee	Comments relevant to ES Discipline	Location of Information in the ES
	within 90 degrees of south. ■ Permanent and transient overshadowing to be modelled. Shadowing assessed hourly for 21st March and analysed for amenity space. ■ Results to be in relation to the BRE Guidelines.	
	Ecology and Nature Conservation ■ Local records centre information should inform the baseline ■ SINC should be considered as receptors ■ Bat Report will expire in September 2014. The Phase 1 does not highlight Bats and a survey is recommended to inform the baseline.	Chapter 6 'Ecology and Nature Conservation'
	Archaeology ■ DBA to be included as an Appendix. ■ 250m buffer to be used surrounding the site for the assessment using the Greater London HER, Southwark Local History Library and London Metropolitan Archive.	Chapter 14 'Archaeology'
	Ground Conditions, Hydrogeology and Contamination ■ Assessment should be informed by BS 10175 and CLSG 2012. ■ Assessment should consider contaminants beyond the site boundary. ■ Consideration of site drainage, run off and requirements for treatment of contaminated soil. ■ Consideration of hazardous waste.	Chapter 15 'Ground Conditions, Hydrogeology and Contamination'
	Water Resources, Quality, Flood Risk and Drainage ■ NPPF, SFRA, Sustainable Design and Construction SPD, "Flood Resilient Construction of New Buildings" and EA maps to inform the assessment. ■ Justification of the drainage hierarchy has been followed. ■ Assessment to include a review of the RFRA (consultation in January 2014).	Chapter 16 'Water Resources, Water Quality, Flood Risk and Drainage'
	Telecommunications ■ Scoped in	Chapter 8 'Telecommunications'
English Heritage	*Heritage* ■ The potential impact of designated heritage assets and key views should be fully assessed. ■ Visualisations of the Comprehensive Development in views from the affected heritage assets should be provided. ■ Reference to be made to NPPF, LVMF, "The Setting of Heritage Assets" (2011) and English Heritage/Cabe Guidance on Tall Buildings (2007) alongside CAA's and new design guidelines.	Volume 3 'Townscape, Built Heritage and Visual Impact Assessment'
Environment Agency	*Flood Risk* ■ FRA will be required to accompany the submission and should identify and assess the risk of all forms of flooding to and from the Comprehensive Development, including risk management throughout the lifetime of the development with climate change.	Flood Risk Assessment and Chapter 16 'Water Resources, Water Quality, Flood Risk and Drainage'
	Surface Water Management ■ Development should strive to achieve greenfield run off rates, manage surface water as close to its source as possible and utilise SUDS. ■ Potential impacts of the proposals on groundwater should be assessed and taken into account in the design of the drainage scheme. ■ Any constraints on the use of SuDS techniques to be fully justified.	Chapter 16 'Water Resources, Water Quality, Flood Risk and Drainage'
	Water Resources ■ Recommendation of CSH Level 3 for water efficiency, maximum number of credits for BREEAM, and meet AECB Water Standards.	Chapter 16 'Water Resources, Water Quality, Flood Risk and Drainage'
Brain Engi-	*General Principles*	Chapter 3 'The

Consultee	Comments relevant to ES Discipline	Location of Information in the ES
	■ Description of the Development ■ Expected residues/emissions resulting from construction and operational phases. ■ Clear assessment of alternatives. ■ Description of environmental aspects likely to be significantly affected. ■ Description of any likely significant effects of the development on the environment. ■ Description of measures for reducing/offsetting adverse effects ■ NTS ■ Indication of any difficulties in compiling information ■ Consideration of cumulative effects of this proposal including supporting infrastructure, planned and existing developments.	Comprehensive Development', Chapter 17 'Cumulative Effects', Chapter 13 'Local Air Quality' and the NTS
	Biodiversity and Geology ■ Potential impact upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included. ■ Consideration of impacts upon local wildlife and geological sites, including details of mitigation.	Chapter 6 'Ecology and Nature Conservation'
	Protected Species ■ Assessment of all phases on protected species. ■ Consideration of wider site linkages and protected species ■ Comprehensive surveys and appropriate mitigation strategies should be included. ■ Surveys to be carried out in optimal survey periods.	Chapter 6 'Ecology and Nature Conservation'
	Habitats and Specials of Principal Importance ■ The ES should assess the impact of the proposals on habitats/species listed in 'Habitats and Species of Principal Importance'. ■ A survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES. ■ A habitat survey (Phase 2) should be carried out on site. ■ Ornithological, botanical and invertebrate surveys should be carried out at appropriate times of the year. ■ ES to include details of: Historical data, Additional surveys, habitats/species present, status of habitats/species present, direct/indirect effects, mitigation/compensation required.	Chapter 6 'Ecology and Nature Conservation'
	Green Infrastructure ■ Green infrastructure and links to the local green character should be outlined in the ES. ■ Foot/Cycle path provision should be investigated.	Chapter 11 'Transportation and Access' and Chapter 6 'Ecology and Nature Conservation'
	Landscape Character ■ Local Land/Townscape character areas mapped as well as relevant management plans or strategies. ■ Assessment of visual effects on the surrounding area and landscape together with any physical effects of the development. ■ Full assessment of the potential impacts of the development on local landscape character ■ Landscape Character Assessment ■ Details of the measures to be taken to ensure the building design will be of a high standard as well as details of layout alternatives together with justification of the selected option in terms of landscape impact and benefit. ■ Assessment to include cumulative effect of the development (including proposals at scoping stage) ■ Assessment to refer to National Character Areas	Volume 3 'Townscape, Built Heritage and Visual Impact Assessment'
	Access and Recreation	Volume 3 'Townscape, Built

Consultee	Comments relevant to ES Discipline	Location of Information in the ES
	■ All London Green Grid should be incorporated	Heritage and Visual Impact Assessment' and Chapter 6 'Ecology and Nature Conservation'
	Air Quality ■ Assessment of risks of air pollution and management	Chapter 13 'Local Air Quality'
	Climate Change Adaptation ■ The ES should reflect climate change principles and how the developments effects on climate change will be influence by climate change.	All Technical Chapters 6 - 16
	Cumulative and in-combination effects ■ All supporting infrastructure should be included in the assessment. ■ Describe and evaluate projects and activities.	All Technical Chapters 6 - 16
Transport for London	■ TfL to have same status as other consultees	Chapter 11 'Transportation and Access'
Thames Water	Consideration of the following; ■ The developments demand for water supply and network infrastructure both on and of site and can it be met. ■ The developments demand for Sewage Treatment and network infrastructure both on and of site and can it be met. ■ Surface water drainage requirements and flood risk of the development both off and on site and can it be met. ■ Any piling methodology and will it adversely affect neighbouring utility issues.	Chapter 16 'Water Resources, Water Quality, Flood Risk and Drainage' and Utilities Report

Baseline Assessment

2.5.5. In order to identify the scale of likely significant effects as a result of the Comprehensive Development, it is necessary to establish the existing baseline environmental conditions of the site and surrounding area and for some technical assessments, it is necessary to establish the future baseline scenario, i.e. the environmental conditions at the Site in the future, without the Comprehensive Development.

2.5.6. The baseline conditions used in this assessment were established by the following means:

- Site visits and surveys;
- Desk-based studies;
- Review of existing site specific information;
- Modelling;
- Review of relevant national, regional and local planning policies; and
- Consultation with the relevant statutory consultees.

2.5.7. Relevant facts important for the assessment include the following:

- As mentioned in **Chapter 1 'Introduction'**, planning permission has already been granted for Site 1a (Ref No. 07/AP/0046) and Site 7 (Ref No. 12/AP/2332) (both part of the Estate). On the basis that Site 1a is already complete, this has been treated as existing baseline in the technical Chapters (**Chapters 6 - 16**). Site 7 is currently under construction and has therefore been treated as a cumulative scheme (see section

2.5 and **Table 2.3** of this Chapter), with the exception of **Chapter 10 'Daylight, Sunlight and Overshadowing'** and **Chapter 11 'Wind'** which has assessed Site 7 as part of the existing baseline; and

- The Site is currently home to over 7,500 people and includes several schools, offices, community buildings and some shops. The Site has a total of 2,647 dwellings that will be demolished, equating to a total of 5,607 bedrooms.
- Existing non-residential use is as follows, see **Table 2.3** below.

Table 2.3: Existing Non-Residential Use

Site Name	AAAP Site	Use	Approximate size (m^2) where known
BACC 84	1b	Community Facility	57
Bradenham Council Office*	1b	Office	3,214
Ellison House	1b	Probation Hostel	590
67-68 Chartridge	1c	Storage	43
Chiltern Council Office*	1c	Office	2,737
Taplow Housing Office	8	Office	486
Aylesbury Early Years Centre	8&9	Nursery	365
Aylesbury Health Centre	8&9	Health Centre	
Medipharmacy	8&9	Pharmacy	132
Taplow Nursery	8&9	Nursery	63
Taplow Medical Centre	8&9	Doctor's Surgery	790
Aylesbury Youth Centre	8&9	Offices	133
Chaplin Centre	9	Offices	1,515
Retail units	9	Retail	130
Barrow Stores	8&9	Retail	16
Aylesbury Access Centre	10	Religious & Spiritual Community Facility	160
Taplow Retail Units (13)*	9	Retail	730
Tykes Corner	10	Nursery	300
Creation Office	10	Office	127
2 Inspire	6	Community Facility	158
Aylesbury Childminding Unit	12&14	Nursery	127
Wendover Meeting Room	3a	Community Facility	
Aylesbury learning Centre	4b	Training facility	650
Thurlow Lodge Community Hall	4a	Community Facility	
The Hour Glass	11	Public House	730
Wendover Council Offices	4a	Office	913

* - currently vacant

Consultation

2.5.8. Consultation has been undertaken with statutory and non-statutory consultees as part of the technical studies for this ES. The purpose of these consultations was to identify any sensitivities or concerns associated with the Comprehensive Development which may need to be considered in the design process and assessed as part of this ES.

The following organisations were consulted during the preparation of this ES:

- Various departments and officers at LBS;
- Thames Water;
- Environment Agency;
- English Heritage;
- Transport for London; and
- Natural England.

2.5.9. Comments made by the statutory consultees and other interested parties, including the outcome of scoping as presented in **Appendices 2.1 - 2.3** are discussed where appropriate in the relevant chapters and associated appendices of this ES.

Assessment of the Main Alternatives

2.5.10. An outline of the main alternatives considered by the applicant is provided in **Chapter 3 'The Comprehensive Development'.** This also includes a description of the main reasons for the preferred approach taking into account the environmental effects.

Sensitive Receptors

2.5.11. Consistent with the *EIA Regulations 2011* (Part 1 of Schedule 4) (Ref. 2.1) the identification of the aspects of the environment likely to be significantly affected by the Comprehensive Development, have been identified and include in particular; population, fauna, flora, soil, water, air, climate factors, material assets including the architectural and archaeological heritage, landscape and inter-relationship between the above factors.

The following receptors have been identified as being potentially sensitive to activities during the construction and operation of the Comprehensive Development:

- Existing residential properties in the surrounding area;
- Proposed new residents and users of the Site;
- Users of the local road network; and
- Views to and from the Site.

2.5.12. Further details of the likely significant effects on the above sensitive receptors are included within the technical chapters of this ES (**Chapters 6 - 16).**

Identification of Likely Significant Effects

2.5.13. Various methodologies were applied in order to determine the potential for significant environmental effects as a result of the demolition / construction works and operation of the Comprehensive Development. The topic specific methodologies are provided in each of the technical chapters within this ES **(Chapters 6 – 16).**

Assessment of Likely Significant Environmental Effects (Evaluation of Significance)

2.5.14. The assessment of the likely significance of potential environmental effects arising from the demolition and construction works and operation of the Comprehensive Development required consideration of the following:

- Positive and negative effects;
- Short (0 – 2 years), medium (2 – 10 years) and long (> 10 years) term effects;
- Direct and indirect effects;
- Permanent and temporary effects; and
- Cumulative effects.

2.5.15. Several criteria have been used to determine whether or not the likely environmental effects of the Comprehensive Development will be deemed 'significant'. The effects have been assessed quantitatively, where possible.

2.5.16. Generally, the significance of effects has been assessed using one or more of the following criteria:

- International, national and local standards;
- Sensitivity of receiving environment;
- Extent and magnitude of the effect;
- Reversibility and duration of the effect;
- Inter-relationship between effects; and
- Nature and extent of cumulative effects.

2.5.17. Where no published standards exist, the assessments presented in the technical chapters describe the professional judgements (assumptions and value systems) that underpin the attribution of significance. For certain technical topics, such as ecology and air quality, widely recognised published significance criteria and associated terminology have been applied and these are presented in the technical chapters and associated appendices where relevant.

2.5.18. The assessment of significance has considered the magnitude of change (from the baseline conditions), the sensitivity of the effected environment / receptors and (in terms of determining residual effects) the extent to which mitigation and enhancement measures will reduce or reverse negative effects.

2.5.19. In addition, further influences such as those listed below have been factored into the assessment using professional judgement:

- Likelihood of occurrence;
- Geographical extent;
- The value of the affected resource;
- Adherence of the proposals to legislation and planning policy; and
- Reversibility and duration of the effect.

2.5.20. The magnitude (scale) of change for each effect has been identified and predicted as a deviation from the established baseline conditions, for the construction and operational phases of the Comprehensive Development. The scale used (high, medium, low, and negligible) is shown in **Table 2.4.**

2.5.21. The sensitivity of the receptors / receiving environment to change has been determined using professional judgement, consideration of existing designations (such as Air Quality Management Areas (AQMA's), and quantifiable data, where possible. The scale used (high, medium, low, and negligible) is also shown in **Table 2.4.**

2.5.22. Each effect has been assessed against the change of magnitude and the sensitivity of the receptor as shown in **Table 2.4**.

Table 2.4: Matrix for Determining the Significance of Effects

		Sensitivity of Receptor / Receiving Environment to Change / Effect			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Change / Effect	**High**	Major	Moderate to Major	Minor to Moderate	Negligible
	Medium	Moderate to Major	Moderate	Minor	Negligible
	Low	Minor to Moderate	Minor	Negligible to Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

2.5.23. The likely significance of effects reflects judgements as to the importance or sensitivity of the affected receptor(s) and the nature and magnitude of the predicted changes. For example, a moderate negative effect on a feature or site of low importance will be of lesser significance than the same effect on a feature or site of high importance.

2.5.24. The following terms1 are used to describe the significance of effects, where they are predicted to occur:

- **Major positive or negative effect:** where the Comprehensive Development would cause a significant improvement (or deterioration) to the existing environment;
- **Moderate positive or negative effect:** where the Comprehensive Development would cause a noticeable improvement (or deterioration) to the existing environment;
- **Minor positive or negative effect:** where the Comprehensive Development would cause a barely perceptible improvement (or deterioration) to the existing environment; and
- **Negligible:** where the Comprehensive Development would result in no discernible improvement or deterioration to the existing environment.

[1] These terms have been developed with reference to published best practice guidance as well as WSP EIA experience.

2.5.25. Effects which are deemed to be significant for the purposes of this assessment are those which are described as being moderate or major positive or negative.

2.5.26. Specific criteria have been developed for certain technical studies and are provided in the respective technical chapters of this ES. The inter-relationship between likely significant environmental effects and residual effects following implementation of mitigation measures has also been discussed.

2.5.27. Tables summarising the likely significant effects associated with an environmental topic, potential mitigation measures and residual effects are provided at the end of each corresponding chapter.

Mitigation Measures

2.5.28. Following the assessment, mitigation measures have been recommended to prevent, reduce or remedy any potentially significant environmental effects. Such measures are to be implemented during design, demolition and construction and / or operation of the Comprehensive Development. Each technical chapter details the measures which are recommended to mitigate any identified significant effects.

Residual Effect Assessment

2.5.29. Following the implementation of mitigation measures, an assessment of the significance of residual effects was undertaken. The findings are presented within each technical chapter of this ES (**Chapters 6 - 16**).

2.5 Cumulative Effects

Overview

2.5.1. Schedule 4 of the *EIA Regulations 2011* requires that the cumulative effects of a development are considered within an EIA. DCLG published a consultation draft of *'Environmental Impact Assessment: A Guide to Good Practice and Procedures'* in June 2006 (Ref. 2.6) which identified two types of cumulative effects that required consideration within EIA:

- The combined effect of the Comprehensive Development together with other reasonably foreseeable developments (taking into consideration effects at the site preparation and earthworks, construction and operational phases); and
- The combined or synergistic effects caused by the combination of a number of effects on a particular receptor (taking into consideration effects at the site preparation and earthworks, construction and operational phases), which may collectively cause a more significant effect than individually. An example could be the culmination of disturbance from dust, noise, vibration, artificial light, human presence and visual intrusion on sensitive fauna (e.g. certain bat species) adjacent to a construction site.

2.5.2. The *'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions'* provides the following guidance on cumulative effects:

> *"In practical terms, the extent of the assessment in terms of how far into the past and into the future will be dependent upon the availability and quality of information…"*
>
> *"…it is only reasonable to consider current events and those that will take place in the foreseeable future. Furthermore, the assessment can only be based on the data that is readily available."*

2.5.3. The guidance above identifies that regard should be had to the possible cumulative effects with any existing or approved development. This is usually taken to be those schemes that are validated, registered or have the benefit of Planning Permission as identified on the relevant authority's / authorities' planning application Register(s).

Development Considered in the Assessment of Cumulative Effects

2.5.4. The assessment of cumulative effects of the Comprehensive Development in conjunction with other developments in the local area considers a number of committed developments. See **Table 2.5**.

Table 2.5: Developments Considered in the Assessment of Cumulative Effects

Committed development	Status	Description
Eileen House	09/AP/0343 – Consented	Demolition of existing building and erection of a 41 storey (128.7m AOD) building and separate 8 storey (35.60m AOD) building incorporating 270 private flats (16 x studio, 126 x 1-bed, 92 x 2-bed and 36 x 3-bed), 65 intermediate flats (17 x 1-bed, 44 x 2-bed and 4 x 3-bed), 4,785sq.m. of office (Use Class B1) and 287 sq.m. of retail (Use Class A1-A5), together with 34 disabled car parking spaces, 44 motorcycle spaces and 411 cycle spaces within 2 basement levels, plus associated servicing facilities (4,626sq.m.) and public realm improvements including creation of a resident's garden (458sq.m.) and University Square (2,768sq.m.)
Elmington	11/AP/4309-Consented	Demolition of existing buildings and redevelopment of the site comprising new buildings ranging from 3 to 7 storeys in height to provide 279 residential units (96 x 1 bed, 124 x 2 bed, 57 x 3 bed, 2 x 4 bed) together with the construction of a new road, pedestrian and cycle routes and new access to the public highway, car and cycle parking, energy centre, open space and landscaping.
Heygate	12/AP/1092-Consented	Outline application for: Redevelopment to provide a mixed use development comprising a number of buildings ranging between 13.13m (AOD) and 104.8m (AOD) in height with capacity for between 2,300 (min) and 2,469 (max) residential units together with retail (Class A1-A5), business (Class B1), leisure and community (Class D2 and D1), energy centre (sui generis) uses. New landscaping, park and public realm, car parking, means of access and other associated works. The application is accompanied by an Environmental Statement submitted pursuant to the Town and Country Planning (Environmental Impact Assessment) 2011.
Leisure Centre	12/AP/2570-Consented	Redevelopment to provide a new public leisure centre (maximum height of 21.2m) comprising swimming pool, learner pool, gymnasium, four court sports hall, studio spaces, indoor cycling room, crèche and cafe, disabled parking, cycle parking, landscaping and public realm, servicing and plant areas. This development may affect the setting of a Listed Building(s)
Former London Park Hotel	07/AP/0760-Consented	Erection of buildings comprising 1 building of up to 44 storeys (145.5 metres AOD) and a terrace of up to 7 storeys in height to provide 470 residential flats (Class C3), theatre (Class D2) and cafe (Class A3) uses and a pavilion building for retail/marketing suite purposes (Class A1/ Sui Generis) with associated public open space, landscaping, underground car parking for 30 cars and servicing space.
Newington Causeway	09/AP/1940-Consented	Demolition of existing building and erection of a 22 storey mixed use building (max.building height 69.82m AOD) incorporating a 65sq.m cafe/kiosk (Use Class A3) over ground and mezzanine floors, 366sq.m of commercial floorspace (Use Class B1) from ground to second floor level, with 38 residential units above (10x 1 bed, 24x 2 bed and 4x 3 bed), 50 cycle spaces over ground/ mezzanine floors with 6 visitor cycle spaces external to the building, in addition to a basement area containing plant and an energy centre, and two wind turbines sited at rooftop level.
One the Elephant	12/AP/2239-Consented	Redevelopment to provide a 37 storey building (maximum building height 127m AOD) and 4 storey pavilion building (maximum building height 22.47m AOD), comprising 284 residential units, 809 sq.m flexible ground floor retail / financial and professional services / restaurant uses (Use Classes A1-A3) and 413 sq.m commercial (Use Class B1) use, basement car parking, cycle parking, vehicular access from Brook Drive, servicing and plant areas, landscaping and public realm

Committed development	Status	Description
		improvements and associated works.
Site 7 Aylesbury Estate	12/AP/2332-Consented	Demolition of existing buildings and redevelopment of the site to provide 147 residential units including flats, maisonettes and houses (30 x 1 bed, 71 x 2 bed, 13 x 3 bed, 28 x 4 bed, 5 x 5 bed) of which 58% would be affordable housing. The proposed residential blocks range between 3 and 10 storeys in height (10 Storeys at Thurlow Street) with a basement car park together with new vehicle access, plant, landscaping, cycle storage and refuse/recycling facilities.
Elephant One	08/AP/2403-Consented	Erection of 3 buildings linked by a two storey podium incorporating retail and restaurant use across the ground floor (Use Classes A1/A3), retail/ restaurant/ crèche and cinema use across the first and mezzanine floors (Use Classes A1/A3/D1/D2) and basement car parking with associated storage facilities together with new landscaping to link to a proposed market square and 577 cycle spaces. Northern building located on New Kent Road to consist of 243 student rooms (Use Class C2) over 18 storeys above podium level (68.3mAOD, lift overrun to 70.7m); Western building along Elephant Road to consist of 262 private residential units (Use Class C3) over 23 storeys above podium level (87.5mAOD); Southern building to consist of 111 private residential units (Use Class C3) over 15 storeys above podium level (63.10mAOD). [RESUBMISSION]
Trafalgar Place	12/AP/1455-Consented	Demolition of existing buildings, and construction of new buildings ranging in height between 4 and 7 storeys, to provide a total of 140 residential units (19x 1 bed, 85x 2 beds, 32x 3 beds and 4x 4 beds) a 244sqm church hall (use class D1), and a 117sqm retail unit (use class A1); with associated landscaping, amenity space and residential car parking and cycle storage spaces.
Walworth Road 1	14/AP/0833-Consented	Erection of two buildings, one a 5 storey building plus lower ground floor and part basement plant room to provide student accommodation (143 bedspaces) (Sui generis) and medical centre (Class D1) and the other a part 2, part 3, part 4 storey building together with a single storey extension to the flying freehold to provide 4 dwelling houses and 3 dwellings (Class C3), the provision of four disabled car parking spaces, cycle parking and associated landscaping works
Walworth Road 2	14/AP/0830-Consented	Erection of two buildings, one a part 5, part 6 storey building plus lower ground floor and part basement plant room and the other a part 2, part 3, part 4 storey building together with a single storey extension to the flying freehold to provide 68 residential units (comprising a mix of 19 x 1 bed, 42 x 2 bed, 3 x 3 bed, 2 x 4 bed and 2 x 5 bed) the provision of four disabled car parking spaces, cycle parking and associated landscaping works.

2.5.5. The assessment results presented in the Transport Assessment and **Chapter 11 'Transportation and Access'** consider future growth on the local highway network of up to approximately 3,560 Residential Dwellings (Use Class C3) associated with other developments in the local area together with the Comprehensive Development. The cumulative effect in terms of the changes on the local highway network as a result of future developments is therefore also included within the traffic data that have been used in the assessments presented in **Chapter 11 'Transportation and Access'**, **Chapter 12 'Noise and Vibration'** and **Chapter 13 'Air Quality'**. This is discussed further in **Chapter 17 'Cumulative Effects'**.

2.5.6. The developments considered in respect of the potential for cumulative effects together with the Comprehensive Development are set out in **Table 2.3** and their locations in relation to the Comprehensive Development Site are shown in **Figure 17.1**. **Chapter 17 'Cumulative Effects'** presents the findings of the assessment of cumulative effects that include effects of the Comprehensive Development with other schemes and effect interactions arising from the Comprehensive Development and provides the context for this assessment.

2.6 Structure of Technical Chapters

2.6.1. Each technical chapter (**Chapters 6 - 16**) is structured as follows:

- Introduction;
- Legislative Policy and Guidance;
- Assessment Methodology and Significance Criteria;
- Sensitive Receptors;
- Baseline Conditions;
- Assessment of Effects, Mitigation and Residual Effects;
- Limitations and Assumptions; and
- Summary.

2.7 Assumptions and Limitations

2.7.1. The key assumptions that have been made and any limitations that have been identified in producing this ES are set out below. Assumptions specific to certain topics are identified in the appropriate technical chapters:

- All of the principal existing land or permitted uses adjoining the Site remain;
- Baseline conditions have been established from a variety of sources, including historical data, and are assumed for the EIA to be unchanged, but due to the dynamic nature of certain aspects of the environment, conditions may change during the course of the construction and operation of the scheme;
- Information received from third parties is complete and up to date;
- Impact assessments for each EIA topic are based upon current or emerging legislative and policy framework;
- The description of development is as outlined in **Chapter 3 'The Comprehensive Development**' and assessments are based upon the application plans and schedules submitted as part of the Applications;
- Construction activities will be as outlined in **Chapter 3 'The Comprehensive Development**'; submitted as part of the Applications.
- Construction activities are expected to be undertaken during normal construction industry working hours, assumed to be 08.00 – 18.00 Mondays to Fridays, Saturdays 08.00 – 13.30 and no noisy activities to occur on Sundays and Bank Holidays (out of hours works / deliveries will be subject to prior agreement and / or notice of LBS);
- The design, construction and completed scheme will satisfy minimum environmental standards and be consistent with contemporary legislation, good practice and knowledge;
- Conditions will be attached to the planning permissions, if approved, that will minimise disturbance during construction works; and
- Comprehensive Developments included with the Cumulative effect assessment (**Chapter 17**) will be implemented as per the information pertaining to these applications that is publicly available. It is assumed that these developments will be subject to the same environmental standards, legislation, policy and good practice conditions.

2.8 References

Ref. 2.1 HM Government (2011), Town and Country Planning (Environmental Impact Assessment) (England) Regulations 2011

Ref. 2.2 Department for Communities and Local Government (2014), Planning Practice Guidance

Ref. 2.3 Department of Communities and Local Government (June 2006), Amended Circular on Environmental Impact Assessment: A Consultation Paper

Ref. 2.4 Department of Environment (1995), Good Practice Guide to the Preparation of Environmental Statements

Ref. 2.5 WSP (2014), Aylesbury Estate - Development Specification

Ref. 2.6 Department of Communities and Local Government (June 2006), Environmental Impact Assessment: A Guide to Good Practice and Procedures: A Consultation Paper

3 The Comprehensive Development

3.1 Introduction

3.1.1 The Comprehensive Development that forms the basis of the planning applications is described below and defined in the application and parameter plans and documents submitted with each application that collectively comprise the residential-led mixed use development across the FDS and Masterplan Application sites ('the Site').

3.1.2 The alternatives which have been considered by the Applicant during the iterative design process to reach the defined position now proposed in the applications and parameter plans for the Masterplan Development, are also described below together with a description of the activities that can be expected during the construction and operational phases with reference to **Figures 3.1 – 3.25** which show the construction phasing, general arrangement and elevations. This forms the basis of the assessment of the likely significant effects associated with the Comprehensive Development as reported in the technical chapters (**Chapters 6 – 16**).

3.2 Consideration of Alternatives

Legislative Framework

3.2.1 The *Town and Country Planning (Environmental Impact Assessment) Regulations, 2011* (the *'EIA Regulations'*) (Ref. 3.1), require an ES to provide:

"… an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for the choice made, taking into account the environmental effects."

The "Do Nothing" Scenario

3.2.2 The "Do Nothing" scenario would result in the Site remaining in its current use.

3.2.3 Given that the Site is identified in the AAAP (Ref. 3.2), it is likely that if the Comprehensive Development did not go ahead, similar, alternative proposals would be submitted for the Site.

3.2.4 Should the "Do Nothing" option be chosen, this would leave the need for new residential dwellings to be accommodated elsewhere within LBS, and result in a failure to comply with the London Plan Spatial Development Strategy for Greater London (2011) (the 'London Plan') (Ref. 3.3) and the Core Strategy with Detailed Policies *(*Adopted July 2014*)* (the *'*Core Strategy').

3.2.5 The Draft Further Alterations to the London Plan (January 2014) (Ref. 3.4) has been prepared to address key housing and employment issues emerging from an analysis of census data released since July 2012, which indicate a substantial increase in the capital's population and an acute housing shortage. In order to address this shortage, without a comprehensive review of the Greenbelt around London, the Mayor is seeking to ensure that the housing output of opportunity and intensification areas is optimised (Policy 2.13 and Paragraphs 2.60 to 2.62).

3.2.6 The "Do Nothing" scenario could result in a lower level of housing development in LBS if no other sites come forward for the delivery of new housing.

(ii) Alternative Sites

3.2.7 The Site is identified in the AAAP which sets out the key objectives for the Site for a residential-led mixed use development with public open space and improved transport links.

3.2.8 There are no reasonable or feasible alternative sites to assess given the clear policy context. Based on the above, no alternative sites have been considered by the Applicant.

(iii) Design Evolution and Alternative Forms of the Comprehensive Development

3.2.9 As part of the evolution of the Comprehensive Development, as now defined in the application and parameter plans, detailed consideration has been given to the existing environmental constraints and opportunities within and surrounding the Site and the adjoining areas, to inform the land uses, nature, scale and massing and proposed layout of the built form and the areas of open space and public realm of the Comprehensive Development. Such considerations have occurred over a period of time in the context of relevant national and local planning policies, best practice guidance and development standards as operated by LBS and other decision making bodies.

3.2.10 The over-arching objective has been to ensure the creation of a deliverable, sustainable development, as defined by the National Planning Policy Framework (2012) (NPPF) (Ref. 3.5), which responds to local needs, environmental conditions and the Site context, and development plan policies and objectives.

3.2.11 The design evolution has been an iterative process that has been informed by the baseline studies for the EIA and where practicable, measures to mitigate likely significant negative environmental effects are now inherent in the application plans assessed in this ES.

3.2.12 The evolution of the layout, scale and appearance of the built form, together with the landscape / public realm is outlined below and in the Design and Access Statements submitted with the applications.

3.2.13 The layout, scale and massing of the Comprehensive Development was informed by key elements of the Site's context and urban grain, with the orientation of blocks dictated by an understanding of the Site's constraints. The Applicant selected the Comprehensive Development design, taking into account the sunlight and daylight, townscape and technical issues, as well as the issues raised during consultation with officers at LBS and the Greater London Authority (GLA).

October 2012

3.2.14 The initial design in October 2012 was a direct response to the details outlined in the AAAP that set out locations for height, massing and the general principles across the Comprehensive Development. The AAAP also set out details of the phasing and demolition proposals for the Site and detailed design guidance.

3.2.15 The key attributes of the approach to the Comprehensive Development were underpinned by three key themes; to develop a new London townscape, to embrace 'park life' and to create a neighbourhood adapted to 21st century life.

3.2.16 The layout indicated in the AAAP separated the FDS Application site into three building plots, with a new proposed public space on Westmoreland Square. The design development of the FDS Application site evolved around the key movement lines and connections set out in the AAAP, namely the east-west community spine and the north-south connections from Queens Row and Phelp Gardens to Albany Road.

October 2013

3.2.17 As part of the October 2013 scheme design evolution, Westmoreland Road was extended across the top of the Site to create a more street based approach to the northern edge of the Site where the AAAP created a plot of land backing onto the existing houses to the north. In addition, a further north-south connection linking back to Queens Row was introduced, strengthening the idea of improved connections and a more integrated movement network across the Site. This was in direct compliance with the AAAP, to encourage safe walking and cycling across the site and improve site permeability.

3.2.18 Working on these themes of improved access and permeability, the building footprints were adjusted as the streetscape and public open space proposals evolved. A smaller open space at Westmoreland Square was developed and supplemented by a new public open space proposed to the east of sub-plot 1 (Westmoreland Park). Another open space (Phelp Gardens) was created to increase the connectivity between Albany Road and Phelp Street.

3.2.19 The design of the housing to the northern part of the Site evolved with terraced housing running in an east-west direction across the two plots terminating in a six storey flatted block to the eastern edge of the Site. A pair of houses were located facing west onto Westmoreland Park.

3.2.20 To the south, the three sub plots delivering higher density accommodation were designed each providing undercroft/podium car parking, a perimeter block approach and a tall building in the south west corner.

3.2.21 The allocation of higher density development to the park edge is consistent and remained compliant with the AAAP. The massing was tested against daylight, sunlight, overshadowing modelling, microclimate and townscape.

3.2.22 The massing across the front of the Site comprised a series of building stepping from eight storeys up to two towers at sixteen and one at eighteen storeys. In addition, to the southern edge of each perimeter block the massing stepped down to four storeys to maximise daylight into the courtyard spaces.

2014

3.2.23 In the evolution of the 2014 scheme, the design principles were retested and proven to be robust but this evaluation and consultation period raised other themes which were then tested against the proposals. This review process also allowed LBS to review elements of the scheme. Key issues that were assessed during this period included:

- Review of tree retention proposals along Albany Road;
- Review of heights along the Burgess Park edge;
- Development of the architectural expression to create a single building approach;
- Location of the learning disabilities building;
- Review of the design of the open space to create a more street based language;
- Design development of block 6 to omit the proposed car parking podium and provide additional car parking on street;
- Overall reduction in parking numbers;
- Design development to incorporate additional plant requirements for the CHP connection and gas pressure reduction system (PRS);
- Design development of block 2 to relocate massing onto Westmoreland Park elevation;
- Ongoing review of massing in response to daylight, sunlight and overshadowing and wind microclimate modelling; and
- Design development of the Extra Care Housing.

3.3 Comprehensive Development

Overview of the Comprehensive Development

3.3.1 The Comprehensive Development for which permission is sought is described in detail in the planning statement and Design and Access Statements which are submitted in support of the two separate planning applications. These documents provide guidance on how the design aspirations for the Comprehensive

Development has been achieved and describes the key design principles and initial development concept which informed the design work.

3.3.2 The two separate planning applications are as follows:

- **First Development Site Application (FDS Application):** Demolition of existing buildings and redevelopment to create a residential-led development comprising 815 private and affordable units (Use Class C3); flexible community use, early years facility (Use Class D1) or gym (Use Class D2); public and private open space; formation of new accesses and alterations to existing accesses; and energy centre; gas pressure reduction station; associated car and cycle parking; and associated works; and
- **Masterplan Application:** Outline Application, including access for demolition of existing buildings and redevelopment to provide up to 2,745 private and affordable units (Use Class C3); 600 to 2,500 sqm of employment use (Use Class B1); 200 to 500 sqm of retail space (Use Class A1); 3,100 to 4,750 sqm of community use, medical centre and early years facility (Use Class D1); 600 to 3,000 sqm flexible retail use (Use Class A1/A3/A4) or workspace use (Use Class B1); new landscaping; public and private open space; energy centre; gas pressure reduction station; up to 1,070 car parking spaces; cycle parking; landscaping and associated works.

3.3.3 Details of the applications and parameter plans and the content of the Comprehensive Development, (within the FDS Application site and the Masterplan Application site) are provided in the sections below.

3.4 Application and Parameter Plans

FDS Application Plans

3.4.1 The FDS Application is for 815 mixed tenure dwellings, arranged in 3 plots (plots 1-3) comprising 6 development sub-plots that include 23 blocks, see **Table 3.1** below and **Figures 3.1 – 3.16.**

Table 3.1: FDS Application Content

Sub-plot	Description
Sub-Plot 1 4 Blocks, 1A, B, C and D.	Block 1A is between 5 and 6 storeys' in height and comprises 50 Extra Care units in a mix of 1 bed and 2 bed flats. Block 1B is on the ground floor of Block 1A and contains the Community Facility. Blocks 1C and 1D comprise 10 and 7 storeys respectively, for a total of 64 units with a mix of target rent and shared ownership.
Sub-Plot 2 2 blocks, 2A and B.	Block 2A is 4 storeys' in height and provides 6 flats for adults with learning disabilities. Block 2B is 3/4 storey providing a mix of target rent and private houses.
Sub-Plot 3 2 blocks, 3A and B	Block 3A is 3/4 storeys of rented and private houses. Block 3B is 5/6 storeys providing 20 shared ownership units.
Sub-Plot 4 Comprises 5 blocks, 4A, B, C, D and E.	Block 4A is a 20 storey tower, of 92 private flats. Block 4B is between 6 and 10 storeys of 47 units with a mix of flats and maisonettes/duplex for market rent. Block 4C is 7 storeys of 26 units with a mix of shared ownership flats and maisonettes. Block 4D is 10 storeys of 36 target rent flats and maisonettes. Block 4E is 6 storeys of 14 flats and maisonettes for private sale.

Sub-Plot 5 5 blocks, 5A, B, C, D and E	Block 5A is 18 storeys for 80 flats for private sale. Block 5B is 6 storeys for 14 shared ownership flats and maisonettes. Block 5C is between 6 and 8 storeys for 39 flats and maisonettes for private sale. Block 5D is between 5 to 7 storeys for 33 flats and maisonettes for private sale. Block 5E is between 4 to 10 storeys for 65 target rent flats and maisonettes.
Sub-Plot 6 4 blocks, 6A, B, C and D.	Block 6A is 15 storeys for 64 flats and maisonettes for private sale. Block 6B is 3 to 9 storeys for 35 target rent flats and maisonettes. Block 6C is 8 storeys for 31 flats and maisonettes for private sale. Block 6D is 9 storeys and includes 44 target rent flats and maisonettes, with 8 shared ownership maisonettes on the ground floor.

Masterplan Application/Parameter Plans

3.4.2 The 9 Parameter Plans (**Figures 3.17 – 3.25**) all use an Ordnance Survey base and should be read with the description below and in conjunction with the Development Specification (Ref. 3.6). All subsequent reserved matters submissions will be in accordance with the principles of these plans which show how the quantum of development and uses set out in the tables within the previous section, are distributed around the Masterplan Application site.

3.4.3 Each of the 15 development plots has a reference which is used throughout the Application documentation for ease of understanding of the proposed development. Together, the Parameter Plans provide the clear parameters for all the plots and sufficient detail to meet the statutory requirements and enable the Masterplan Application to be determined and to enable the detailed design to be progressed at reserved matters stage.

Site Boundary (PP01)

3.4.4 PP 01 shows the extent of the red line boundary of the 22 ha Masterplan Application site which is transposed on all the Parameter Plans. The application site boundary includes the extent of all access works associated with the Masterplan Application site. (**Figure 3.17**).

Land Uses (PP 02)

3.4.5 PP 02 identifies the broad location of the primary ground floor land uses through a colour coded key as follows:

- Red: Flexible uses including Residential (Use Class C3) and Employment (Use Class B1) 600 to 2,500 sqm;
- Orange: Flexible uses including Residential (Use Class C3) and Early years facility (Use Class D1) 500 to 650 sqm;
- Blue: Flexible uses including Residential (Use Class C3) and Retail (Use Classes A1/A3/A4) or Workspace (Use Class B1) 600 to 3,000 sqm;
- Purple: Flexible uses including Residential (Use Class C3), Retail (Use Class A1) 200 to 500 sqm, Medical facility (Use Class D1) 2,000 to 3,000 sqm, Community facility (Use Class D1) 300 to 600 sqm and Early years facility (Use Class D1) 300 to 500 sqm;
- Green: Energy centre (Use Class sui generis), size and precise location to be determined at reserved matters stage; and
- Hatched Zone: Residential (Use Class C3). (**Figure 3.18**).

Building Heights Plan (PP 03)

3.4.6 PP 03 defines the maximum and minimum building heights expressed in metres above the current site levels and number of storeys. The number of storey heights range between 2 and 20 storeys.

3.4.7 These heights represent the maximum parameters which were assessed for the purposes of the EIA. In practice, the whole Masterplan Application will not be built to the theoretical maximum given the limitations on floorspace. Any future plant would be required to fit within the maximum height defined. Only minor elements may extend above the defined level if acceptable in design terms. (**Figure 3.19**).

Access and Circulation Plan (PP 04)

3.4.8 PP 04 fixes the key access and circulation routes for vehicles, cycles and pedestrians within the site in the context of the surrounding existing access network.

3.4.9 The existing roads and routes through the Masterplan Application site fall into the following 4 types:

- Existing road alignment to be upgraded;
- Existing road under construction as part of Site 7;
- Existing road to become pedestrian and cycle only; and
- Existing road to become shared surface.

3.4.10 The existing proposed routes through the Masterplan Application site fall into the following 5 types:

- Road;
- Key pedestrian links as part of the Community Spines;
- Shared surface;
- Delivery / drop off access only; and
- Public transport route as existing.

3.4.11 In addition, the plan defines the 22 two-way points of access to the site, seven road termination points including both existing and proposed, and the location of 2 junctions to be upgraded and form part of the matters for determination as part of the Masterplan Application.

3.4.12 The precise alignment of the proposed routes can only be defined once the associated phase layouts are fixed, and it is related with the sub-plots horizontal limits of deviation. The minimum distances for each different type of road are defined in the Design Code accompanying this application.

3.4.13 PP 04 does not attempt to define the network of new roads that will serve individual sub-plots. These will be defined in the context of subsequent detailed Masterplan for each phase. (**Figure 3.20**).

Open Space and Public Realm Plan (PP 05)

3.4.14 PP 05 identifies the minimum area and type of publicly accessible open space which will comprise both hard and soft landscaping. The distribution of open space across the site has been determined by an understanding of the existing local landscape and topography, and the need for certain types of open space to be within easy walking distance from all homes.

3.4.15 A minimum of 24,983 sqm of publicly accessible open space will be provided including:

- 2 x Civic (Adopted) Open Space (dark green).
- 10 x Parks (Non-adopted) Open Space (light green).
- The above to total a minimum of 19,542 (Adopted (Civic) + Non Adopted (Parks))

- Adopted (Streets) to total a minimum of 5,441 sqm (yellow);
- Minimum public realm (hatched zone); and
- Maximum sub-plot line (red). (**Figure 3.21**).

3.4.16 Each development plot will also include a courtyard of 400 sqm at a minimum 20m x 20m with children's play equipment consistent with the Design Code.

Horizontal Deviations Plans (PP 06)

3.4.17 PP 06 shows the extent of the development plot within which are the proposed sub-plots (15 plots and 35 sub-plots in total). The extent of each plot is shown with a dashed black line. Within these are the maximum building lines (Blue Line). Hence the plan defines the sub-plot layout of the proposal and also the public realm around which the scheme is designed. At the centre of each sub-plot a minimum private amenity space is indicated (Yellow line) with dimensions, plus the maximum extent that balconies can hang over this amenity zone (Red dashed line), to ensure good daylight penetration into the private amenity spaces. (**Figure 3.22**).

Basement Plan (PP 07)

3.4.18 PP 07 shows which sub-plots (16a, 16b, 17c, 14a, 14b, 4a and 18b) may have a basement. It specifies through a red dashed zone the maximum extent the basements and through a blue zone the no-build zone for each Sub-plot. It also indicates the maximum basement depth. (See **Figure 3.23**).

Demolition Plan (PP 08)

3.4.19 All existing buildings within the Site are to be demolished as shown on PP 08. This plan shows the proposed 9 stages of demolition across the Site. (**Figure 3.24**).

Phasing Plan (PP 09)

3.4.20 PP 09 shows 3 development phases of the Masterplan Application. The FDS Application site is expected to be developed prior to the Masterplan Application Site. (**Figure 3.25**).

3.5 Description of the Comprehensive Development

Comprehensive Development

3.5.1 The maximum floorspace for the Comprehensive Development by proposed land uses is set out in **Table 3.2** before the respective content of each application is described. The maximum figures allow for a limited amount of flexibility, particularly for the ground floors where it is desirable to have active frontages for a number of the plots, with a mix of retail, community, and business uses. The figures for each of the Use Classes are nonetheless the maximum and will not be exceeded. In all cases, they represent the gross external areas (GEA).

Table 3.2: Comprehensive Development - Maximum Floorspace by Land Use

Use	Use Class	Maximum Floorspace (GEA) sqm
Residential	C3	(FDS – 97,852 + Masterplan 288,700 = **386,552**)
Business Space/Employment	B1	2,500
Retail Or Workspace	A1, A3 or A4 Or B1	3,000
Retail	A1	500
Community/Leisure	D1 or D2	263
Health/Community/Early Years	D1	4,750
Energy Centre	Sui generis	To be determined
Maximum Total	All floorspace	397,565

Proposed Quantum and Floorspace by Land Use

3.5.2 The proposed maximum quantum and floorspace for each of the different land uses for the FDS and Masterplan Applications is set out in **Tables 3.3** and **3.4** below.

Table 3.3: FDS Application: Maximum Floorspace by Land Use

Sub-Plot	Residential (C3)				Community Facility (GIA sqm)	Extra Care Facility/Learning Disability Unit (GIA sqm)
	GEA (sqm)	GIA (sqm)	NIA (sqm)	No of Units		
Sub-Plot 1	13,648	12,430	7,172	114	**263 (523 sqm GEA)**	**6,669 (Extra Care)**
Sub-Plot 2	5,495	4,545	4,192	33		**782 (Learning Disability)**
Sub-Plot 3	5,520	46,519	41,81	40		
Sub-Plot 4	27,078	21,991	15,706	215		

Sub-Plot	Residential (C3)				Community Facility (GIA sqm)	Extra Care Facility/Learning Disability Unit (GIA sqm)
	GEA (sqm)	GIA (sqm)	NIA (sqm)	No of Units		
Sub-Plot 5	27,449	22,782	16,304	231		
Sub-Plot 6	18,662	17,403	12,932	182		
Sub plot Total	**97,852**	**83,804**	**60,490**	**815**	**263 GIA** **523 GEA**	

Table 3.4: Masterplan Application: Maximum Floorspace by Land Use

Land Use	Use Class	Maximum GEA sqm
Residential	C3	288,700
Employment	B1	2,500
Retail Or Workspace	A1, A3 or A4 Or B1	3,000
Retail	A1	500
Health/ Community/ Early Years	D1	4,750
Energy Centre	Sui generis	To be determined
Maximum Masterplan Total	**All Floorspace**	**299,450**

Land Uses within the Masterplan Application Plots

3.5.3 **Table 3.5** below describes the uses that are proposed within each of the 15 plots (4 to 18) of which 6 plots are solely for residential use.

Table 3.5: Masterplan Application: Land Uses

Plot	Description of Land Use
Plot 4	The principle use is residential within Use Class C3, which will occupy all upper floors and most parts of the ground floor, with the exception of an area where workspace or retail within Use Classes A1, A3, A4 or B1 will be included. An Energy Centre will also be located within this plot.
Plot 5	Residential (Use Class C3) on all floors
Plot 6	The principle use is residential within Use Class C3, which will occupy all upper floors and most parts of the ground floor, with the exception of an area where employment or retail within Use Classes A1, A3, A4 or B1 will be included.
Plot 7	The principle use is residential within Use Class C3, which will occupy all upper floors and most parts of the ground floor, with the exception of an area where an Early Years facility, Use Class D1, and employment or retail within Use Classes B1 or A1, A3, A4 will be included.

Plot	Description of Land Use
Plot 8	The principle use is residential within Use Class C3, which will occupy all upper floors and most parts of the ground floor, with the exception of an area where employment space within Use Class B1 will be included.
Plot 9	The principle use is residential within Use Class C3, which will occupy all upper floors and most parts of the ground floor, with the exception of an area where employment or retail within Use Classes A1, A3, A4 or B1 will be included.
Plot 10	Residential (Use Class C3) on all floors
Plot 11	Residential (Use Class C3) on all floors
Plot 12	The principle use is residential within Use Class C3, which will occupy all upper floors and most parts of the ground floor, with the exception of an area where employment or retail within Use Classes A1, A3, A4 or B1 will be included.
Plot 13	Residential (Use Class C3) on all floors
Plot 14	The principle use is residential within Use Class C3, which will occupy all upper floors and most parts of the ground floor, with the exception of an area where employment or retail within Use Classes A1, A3, A4 or B1 will be included.
Plot 15	Residential (Use Class C3) on all floors
Plot 16	Residential (Use Class C3) on all floors
Plot 17	The principal use is residential (Use Class C3), on all upper floors. The ground floor also includes residential and an Early Years facility (Use Class D1).
Plot 18	This plot has a mix of uses, including Residential (Use Class C3), a Health Facility, Community Facility and Early Years Facility (Use Class D1) and Retail (Use Class A1).

Residential

3.5.4 The applications seek planning permission to construct up to 3,560 dwellings. If planning permission is granted in 2015, it is anticipated that the first dwelling completions would take place in 2018. The tenure mix for both applications is included in **Table 3.6** below.

Table 3.6: Tenure Mix

Tenure	FDS Application	Masterplan Application (Indicative)	Total
Target Rent	255	1,019	1,269
Extra Care Rent	40	0	40
LD Affordable Rent	6	0	6
Intermediate	92	377	468
Extra Care **Intermediate**	10	0	10
Private	365	1,349	1,708
Market Rent	47	0	47
Total Units	**815**	**Up to 2,745**	**3,560**

3.5.5 The Comprehensive Development will comprise a full range of housing types, sizes and tenures. This will extend from one bedroom flats to five bedroomed houses.

3.5.6 Since market demand and affordable housing needs will change over the next twenty years, it is not considered appropriate to fix the dwelling mix for the Masterplan Application now.

3.5.7 The housing mix is as follows is as follows in **Table 3.7** below.

Table 3.7: Housing Mix (Excluding 50 Extra Care Units in FDS Application)

	No Bedrooms	FDS Application (Actual)	Masterplan Application (Indicative)
Flats	1B	314	664
	2B	258	746
	3B	43	294
	4B	0	3
Maisonette / Duplex	2B	36	220
	3B	61	244
	4B	6	36
Houses	4B	27	350

Residential Standards

3.5.8 Within the FDS Application, 96 dwellings will be wheelchair units (11%). This includes the 50 Extra Care Dwellings, including 9 built out to SELHP standards, 6 units within the LD Building, plus 17 homes within the Target Rent, 4 within the Shared Ownership and 19 homes within the private sale. Within the Target Rent, Shared Ownership and Private sale, half of these will be adaptable.

3.5.9 For the Masterplan Application, at the reserved matters stage, 10% of all dwellings will be designed to be capable of adaptation for wheelchair users. 100% of the dwellings will be designed to meet the Mayor's Lifetime Homes standards. The detailed design will aim for a high degree of compliance with the Mayor's Housing Design Guide and all units will meet the minimum floorspace requirements.

Public Realm

3.5.10 Public realm makes up 11% (2.49 ha) of the Masterplan Application site and 10 % (3,975 sqm) of the FDS Application site. The largest individual areas of public open space are highlighted in **Table 3.8** below.

Table 3.8: Open Space

Open Space	Masterplan Application (Minimum)	FDS Application
Public Open Space	15,927 sqm	2,010 sqm
Civic Open Space – Adopted (Streets and Squares) Maximum	9,056 sqm	1,965 sqm
TOTAL	24,983 sqm	3,975 sqm*

*** Includes playable space**

3.5.11 As well as these distinct defined areas, there are streets and pedestrianised routes between the plots for both applications.

Amenity Space

3.5.12 In addition to the public realm there is a range of shared/communal and private gardens both within and to the front of a number of the residential Plots in the Masterplan Application site. These areas are defined within the open space Parameter Plans and are subject to minor change resulting from the building Parameter Plans that define a small degree of flexibility in the envelope of the built form. There is also some communal garden space above ground on roofs and set-backs, as well as private amenity space within balconies that will be designed at the reserved matters stage.

3.5.13 The requirements for play space are provided as part of the amenity space with a range of different types in line with the Mayor's Supplementary Planning Guidance on 'Providing for Children and Young People's Play and Informal Recreation'.

3.5.14 The FDS Development will provides 3,830 sqm of playable space across the public realm and shared amenity.

Environmental Performance Standards

3.5.15 The Comprehensive Development will be low carbon and energy efficient. Within the FDS Application site as a minimum, all dwellings will be built to Code 4 levels set out in the Code for Sustainable Homes. Under current legislation the Code rating will aim to progressively rise to Code 6 (zero carbon) in 2016.

3.5.16 Development within the Masterplan Application site will comply with the relevant standards prevailing at the time each phase is built. Non-residential buildings will be built to BREEAM 'Very Good' standard in accordance with Policy 11.1 of the Southwark Sustainable Design & Construction SPD (2009).

3.5.17 In accordance with the Southwark Sustainable Design & Construction SPD, the buildings will incorporate sustainable design features to reduce the consumption of natural resources.

3.5.18 The energy strategy covers the Comprehensive Development and proposes the inclusion of two energy centres – one within the FDS Application site (sub-plot 5) and one within the Masterplan Application site (sub-plot 4).

3.5.19 A CHP led district heating network (DHN) is recommended for all dwellings including houses in the FDS Application site. A 500 kWe system is recommended to achieve a notional saving of 32 % in CO_2 emissions. Photovoltaic panels are positioned on the unshaded roof space in the FDS Application site.

3.5.20 It is anticipated that the heat network to be included in the FDS Application site will be extended to include the Masterplan Application site. Photovoltaic panels are recommended on the unshaded roof space in the Masterplan Application site.

Transportation and Access

Access

3.5.21 The Comprehensive Development has been designed to ensure that each residential unit is easily accessible both by pedestrians and vehicles alike, without the car dominating the public realm, helping to create safe, green streets. The primary objectives of the proposal include provisions to ensure ease-of-use for all pedestrians including a legible layout and disabled access throughout the Site.

Pedestrian and Cycle Routes

3.5.22 Pedestrian access improvements that are being implemented as part of the Comprehensive Development scheme will be delivered through the comprehensive re-design of the area to pedestrian-friendly streets. Routes will be established that link green spaces along desirelines creating direct and pleasant walking routes between the new dwellings and key service areas such as shops, schools and other facilities. Along Albany Road, the junction improvements have been focused around the removal of multi-stage pedestrian crossings, replacing them with single stage crossings across shorter distances. The redesign of junctions has also allowed more landscaping.

3.5.23 Quiet cycle-friendly streets are proposed as part of the Comprehensive Development street hierarchy with proposals also being made for new cycle routes through new areas of public open space to promote connectivity through the site. These will provide attractive parallel routes away from higher traffic movements. The use of vehicle movement restrictions and shared space areas will mean that traffic movements will be very light and designed for low speed.

3.5.24 The proposals for new on-street cycling provision include a scheme to calm traffic on Albany Road and Thurlow Street and provide advisory on-street lanes combined with early start at signal junctions in certain locations.

3.5.25 The community spine is the key east-west access route through the regeneration area and is designed as a series of streets linking civic spaces and parks where pedestrians and cyclists are prioritised.

3.5.26 The London Cycle Hire Scheme already has docking stations on Rodney Road and Walworth Road to the north of the site. It is proposed that a number of new cycle hire docking stations are provided within the Site in order to extend the provision and opportunities south into the site. The docking stations will be incorporated within Westmoreland Square, plot 18, close to Faraday School and at the southern end of Thurlow Street. The details of the location within the FDS Application site have been included in the plans to allow TfL to implement a docking station under the planning permission. It is proposed that the subsequent reserved matters submissions for the remaining stations will include the docking station location and layout to allow TfL to implement the facility post-grant of permission.

Car and Cycle Parking

FDS Application

3.5.27 Parking for the private residential dwellings is provided within secure undercroft parking within sub-plots 4 and 5. Wheelchair parking spaces are provided within these car parks across tenure.

3.5.28 A total of 308 car parking spaces are provided within the FDS Application site.

3.5.29 A total of 102 parking spaces are provided within the undercroft car parking plus 12 on street spaces. This equates to 27.6% for private dwellings including 19 wheelchair spaces. A further 21 wheelchair spaces are provided for the accessible and adaptable flats provided within the accommodation for rent and shared ownership. 125 on street spaces are provided for the affordable dwellings. 48 additional car parking spaces are provided including two off street parking spaces provided for each of the Extra Care and the Learning Disabilities housing.

3.5.30 A car share scheme is proposed within the FDS Application site to reduce car dependency and to create a sustainable community. Three car share bays will be located within the FDS Application site.

3.5.31 A mix of cycle storage solutions is available within the FDS Application site to allow flexibility and to offer choice to residents. The houses and maisonettes are all equipped with individual secure storage that is designated to typically accommodate at least two bicycles.

3.5.32 A TfL bike docking station will be provided within the FDS Application site located within Westmoreland Square.

Masterplan Application

3.5.33 Cycle parking will be provided to meet or exceed the following ratios and numbers in **Table 3.9** below.

Table 3.9: Cycle Space

Land Use	Minimum Cycle Parking Numbers Masterplan
Residential	• Studios/1 Bed/2 Bed – storage for one cycle per two dwellings • 3+ bedrooms - storage for two cycles
Non-Residential	• up to 500 users – 1 space per 10 users • 501-1,000 users – 1 space per 15 users • 1001+ users -1 space per 20 users • These numbers are cumulative, e.g. a 2,000 user office building would have 50 for the first 500 users, 33 for the next 500, and 50 for the remaining 1,000 users = 133 in total.

Public Transport

3.5.34 The Comprehensive Development is situated between two bus corridors (the A2 and the A215), but also has bus services that pass through the existing estate, along Albany Road and Thurlow Street. Consequently, the Public Transport Accessibility Level (PTAL) of the site varies by location, with the areas closer to the A2 and A215 having a higher PTAL than the area around Thurlow Street.

3.5.35 The PTAL of the Site varies from 5 (very good) close to Camberwell Road, to between 1 (very poor) and 2 (poor) for areas around the Albany Road/ Wells Way and Albany Road/ Thurlow Street junction.

Existing Bus Services

3.5.36 There are 20 daytime bus services operating within a 400m walk of the boundary of the Site (excluding school buses), and there are also 7 night buses.

3.5.37 There are 14 bus stops which are situated within 400m of the Site boundary with a number of bus services available depending on the bus stop.

3.5.38 TfL has recently extended bus service 136 to follow the route of bus 343 through the Aylesbury Estate area, due to overcrowding of the 343 service. TfL has also indicated that it would be likely to extend a bus service which currently terminates at Elephant and Castle, along Albany Road and Thurlow Street to the Old Kent Road Tesco supermarket.

3.5.39 There are a large number of bus stops on the entries to the Elephant and Castle roundabout, including interchange facilities between buses and trains at Elephant and Castle underground and railway station. Many of the very frequent bus services operating in the vicinity of the Site stop at Elephant and Castle, meaning that the bus offers a quick, convenient way of accessing the station from the Site.

3.5.40 The Comprehensive Development is also accessible via the underground and by rail. Further information on the accessibility of the Site and public transport connections can be found in **Chapter 11 'Transportation and Access'** and the Transport Assessment (Ref. 3.7).

Materials

3.5.41 The predominant materials for the Comprehensive Development are brick, cast stone / concrete and anodised aluminium. Further details on the types of materials to be used are presented in the Design and Access Statements.

Drainage

3.5.42 The existing Site is identified as located within the defended tidal Flood Zone 3a. The Environment Agency have confirmed that the River Thames defences to the north of the site provide the site with fluvial flood protection up to and including the 1 in 1000 year fluvial flood event.

FDS Application Site

3.5.43 Surface water discharge rates have been proposed exceeding London Plan minimum requirements at 65% less than existing brownfield discharge rates. Existing discharge rates are based on the 2 year 15 minute Wallingford Procedure Modified Rational Method (as provisionally agreed with the Environment Agency and LBS). The maximum surface water discharge rate of 111 l/s is proposed for all events up to and including the 1 in 100 year plus 30% allowance for climate change rainfall event.

3.5.44 Sub podium surface water storage tanks will be provided within the identified catchments to the sum of 500 m^3 and 350 m^3 respectively.

3.5.45 Sustainable Urban Drainage Systems (SuDS) in the form of bio-retention, green roofs, geo-cellular soil vault assembly and tree pits throughout the site provide an element of source control coupled with surface water quality treatment and biodiversity qualities.

Masterplan Application Site

3.5.46 It is proposed that the general principles behind the wider Masterplan Development will follow that identified for the FDS Development above.

3.5.1 Any basements proposed throughout the Masterplan Application site will be designed and built utilising flood resilient measures including appropriate signage. External levels at thresholds of basements will be set to ensure surface water flow routes are directed away from entering the basement.

Service Arrangements

3.5.2 Appendix S of the Transport Assessment (Ref. 3.7) contains a framework Delivery and Servicing Plan (DSP) for the proposed regeneration scheme. The DSP sets out the estimated delivery and service vehicle trip generation for the proposed development, and the potential measures that future occupiers could use to manage delivery and servicing trips.

3.6 References

Ref. 3.1 HM Government (2011), Town and Country Planning (Environmental Impact Assessment) (England) Regulations 2011

Ref. 3.2 London Borough of Southwark (2010), The Aylesbury Area Action Plan

Ref. 3.3 Mayor of London (2011), The London Plan

Ref. 3.4 Greater London Authority (2014), Draft Further Alterations to the London Plan

Ref. 3.5 Department of Communities and Local Government (2012), National Planning Policy Framework.

Ref. 3.6 WSP (2014), Aylesbury Estate – Development Specification

Ref. 3.7 WSP (2014), Aylesbury Estate - Transport Assessment

4 Planning Policy Context

4.1 Introduction

4.1.1 This Chapter of the ES summarises the planning policy designations relevant to the Site and the national, strategic and local planning policy context against which the Applications for the redevelopment of the Site will be determined. A more detailed assessment of how the Comprehensive Development complies with planning policy is contained within the respective planning statement (Ref. 4.1) prepared by Deloitte Real Estate (DRE) for each of the Applications and also reviewed in the relevant technical chapters of the ES (**Chapters 6 – 16**).

4.2 Planning Policy Framework

4.2.1 The planning issues raised by the Comprehensive Development have been assessed against relevant national, regional and local planning policy in the Planning Statement that accompanies the Applications.

4.2.2 The current development plan for the Borough comprises the London Plan: Spatial Development Strategy for Greater London (2011) ('the London Plan') together with a mixture of the policies identified within the LBS Core Strategy and saved policies from the UDP (which will remain in force until they are superseded by the LBS Development Management Development Plan Document (which is expected to be adopted in November 2017).

4.2.3 The Revised Early Minor Alterations to the London Plan (REMA) (October 2013), (Ref. 4.2) set out a series of formal alterations to London Plan Policy. These are adopted and supersede their counterpart policies within the July 2011 London Plan.

4.2.4 The Southwark Plan (Unitary Development Plan) (2007) Saved Polices (Ref. 4.3) and was the primary policy document within the Borough until the adoption of the LBS Core Strategy in April 2011 when several of the policies contained within the Plan expired. However, a number of policies have been saved, as set out in LBS's updated list of April 2013. The Core Strategy sets out how Southwark will change up to 2026 to be the type of place set out in the sustainable community strategy (Southwark 2016).

National Policy

National Planning Policy Framework (2012)

4.2.5 The National Planning Policy Framework (NPPF) (Ref. 4.4) sets out the national planning policies for England and how these are expected to be applied. The NPPF states that the purpose of the planning system is to contribute to the achievement of sustainable development. The Framework defines sustainable development as having three dimensions; economic, social and environmental.

4.2.6 At the heart of the NPPF is a presumption in favour of sustainable development, which "should be seen as a golden thread running through both plan making and decision taking". This means that development proposals that accord with the development plan should be approved without delay and, where the development plan is absent, silent or relevant policies are out-of-date, approving development unless any adverse impacts of doing so would significantly and demonstrably outweigh the benefits.

4.2.7 The NPPF also introduces a set of 12 Core land use Planning Principles. These include proactively driving sustainable economic development in order to deliver the homes business and industrial units, infrastructure and thriving local plans that the country needs; always seeking to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings; taking account of the different roles and character of different areas and promoting the vitality of our main urban areas; supporting

the transition to a low carbon future; contributing to conserving and enhancing the natural environment and reducing pollution; encouraging the effective use of land by reusing land that has been previously developed (brownfield land); promoting mixed use developments and encouraging multiple benefits from the use of land in urban areas; actively managing patterns of growth to make the fullest possible use of public transport, walking and cycling, and focusing significant development in locations which are sustainable.

4.2.8 The NPPF also states that the Government is committed to securing economic growth in order to create jobs and prosperity and ensuring that the planning system does everything it can to support sustainable economic growth.

4.2.9 The most relevant policies and supporting text in the NPPF are set out in the following paragraphs.

4.2.10 Policy 4 'Promoting Sustainable Transport' – requires transport policies to be balanced in favour of sustainable transport modes with the appropriate Transport Assessment or Transport Statement provided. Decisions must take account of whether the opportunities for sustainable transport modes have been taken up, depending on the nature and location of development and whether improvements can cost effectively limit the significant impacts of the development.

4.2.11 Policy 6 'Delivering a Wide Choice of High Quality Homes' – establishes the Government's objectives for housing provision and allows for a rolling five year housing supply (plus 5% additional buffer). It also considers the location of new housing in sustainable locations with the requirement for affordable housing provision.

4.2.12 Policy 6 'Requiring Good Design' – outlines the importance to plan for good design that optimises the potential of the Site to accommodate development; a key part of this process is working with those directly affected by the proposals to evolve designs that take into consideration the views of the community.

4.2.13 Policy 8 'Promoting Healthy Communities' – sets out the importance of access to high quality open spaces and opportunities for sport and recreation as contributing to health and well-being of communities.

4.2.14 Policy 10 'Meeting the Challenge of Climate Change, Flooding and Coastal Change' – outlines the key role that planning has in helping to shape places to secure radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure. This is described as central to the economic, social and environmental dimensions of sustainable development.

4.2.15 This policy also outlines that Local Planning Authorities (LPA's) should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where an appropriate flood risk assessment is carried out.

4.2.16 When new development is brought forward (in vulnerable areas) care should be taken to ensure that risks can be managed through sustainable measures including the planning of green infrastructure.

4.2.17 Policy 11 'Conserving and Enhancing the Natural Environment' – places great emphasis on enhancing and protecting the natural environment; minimising impacts on biodiversity and providing net gains in biodiversity where possible and preventing new development from contributing or being put at unacceptable risk from soil, air, water and noise pollution by remediating and mitigating where appropriate. This policy encourages the effective reuse of brownfield land provided that it is not of high environmental value.

4.2.18 This policy states that when determining planning applications, LPA's should aim to conserve and enhance biodiversity by applying the following principles:

- If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- Proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other

developments) should not normally be permitted. Where an adverse effect on the Site's notified special interest features is likely, an exception should only be made where the benefits of the development, at site, clearly outweigh both the impacts that it is likely to have on the features of the Site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;

- Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;
- Opportunities to incorporate biodiversity in and around developments should be encouraged;
- Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland unless the need for, and benefits of, the development in that location clearly outweigh the loss; and
- The following wildlife sites should be given the same protection as European sites:
  - Potential Special Protection Areas and possible Special Areas of Conservation;
  - Listed or proposed Ramsar sites; and
  - Sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

4.2.19 Policy 12 'Conserving and Enhancing the Historic Environment' – places emphasis on the preservation and enjoyment of the historic environment. There is recognition that heritage assets are irreplaceable resources and that they should be conserved in a manner appropriate to their significance and provides guidance to LPA's in determining applications that may affect heritage assets or their setting.

4.2.20 The NPPF outlines that LPA's should approach decision taking in a positive way to foster the delivery of sustainable development. The right information is crucial to good decision-taking, particularly where formal assessments such as EIAs are required. This includes participation of other consenting bodies to enable early consideration of all the fundamental issues.

Planning Practice Guidance (March 2014)

4.2.21 In March 2014, the DCLG published the Planning Practice Guidance. The Planning Practice Guidance is a web based resource and largely superseded former Planning Policy Guidance, Statements and Circulars.

4.2.22 The most relevant policies and supporting text in the Planning Practice Guidance are discussed in relevant technical chapters and **Table 4.1** below.

Table 4.1 Relevant Policies and supporting text from the Planning Practice Guidance

Policy Name	Summary of Policy
Environmental Impact Assessment	The aim of the EIA is to protect the environment by ensuring that a Local Planning Authority (LPA) when deciding whether to grant planning permission for a project, which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant effects, and takes this into account in the decision making process. The regulations set out a procedure for identifying those projects which should be subject to an EIA, and for assessing, consulting and coming to a decision on those projects which are likely to have significant environmental effects.
Air Quality	When there are concerns about air quality, the LPA may want to know about: ■ The 'baseline' local air quality; ■ Whether the Proposed Development could significantly change air quality during the construction and operational phases; and / or ■ Whether there is likely to be a significant increase in the number of people exposed to a problem with air quality, such as when new residential properties are proposed in an area known to experience poor air quality. Assessments should be proportionate to the nature and scale of development proposed and the level of concern about air quality, and because of this are likely to be locationally specific. The scope and content of

Policy Name	Summary of Policy
	supporting information is therefore best discussed and agreed between the LPA and Applicant before it is commissioned. Air quality is a consideration in EIA, if one is required, and also in a Habitats Regulations Appropriate Assessment. The following could figure in assessments and be usefully agreed at the outset: ■ A description of baseline conditions and how these could change; ■ Relevant air quality concerns; ■ The assessment methods to be adopted and any requirements around verification of modelling air quality; ■ Sensitive locations; ■ The basis for assessing impact and determining the significance of an impact; ■ Construction phase impact; and/or ■ Acceptable mitigation measures. Mitigation options where necessary will be locationally specific, will depend on the Proposed Development and should be proportionate to the likely impact. It is important therefore that LPAs work with applicants to consider appropriate mitigation so as to ensure the new development is appropriate for its location and unacceptable risks are prevented. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met. Examples of mitigation include: ■ The design and layout of development to increase separation distances from sources of air pollution; ■ Using green infrastructure, in particular trees, to absorb dust and other pollutants; ■ Means of ventilation; ■ Promoting infrastructure to promote modes of transport with low impact on air quality; ■ Controlling dust and emissions from construction, operation and demolition; and ■ Contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development.
Conserving and Enhancing the Historic Environment	The conservation of heritage assets in a manner appropriate to their significance is a core planning principle. Heritage assets are an irreplaceable resource and effective conservation delivers wider social, cultural, economic and environmental benefits. Any decisions relating to listed buildings and their settings and conservation areas must address the statutory considerations of the *Planning (Listed Buildings and Conservation Areas) Act 1990* as well as satisfying the relevant policies within the NPPF and the Local Plan.
Natural Environment (Landscape)	One of the core principles in the NPPF is that planning should recognise the intrinsic character and beauty of the countryside. Local plans should include strategic policies for the conservation and enhancement of the natural environment, including landscape. This includes designated landscapes but also the wider countryside. Where appropriate, landscape character assessments should be prepared to complement Natural England's National Character Area profiles. Landscape Character Assessment is a tool to help understand the character and local distinctiveness of the landscape and identify the features that give it a sense of place. It can help to inform, plan and manage change and may be undertaken at a scale appropriate to local and neighbourhood plan-making.
Natural Environment (Biodiversity)	Section 40 of the *Natural Environment and Rural Communities Act 2006*, places a duty on all public authorities in England and Wales to have regard, in the exercise of their functions, to the purpose of conserving biodiversity. A key purpose of this duty is to embed consideration of biodiversity as an integral part of policy and decision making throughout the public sector, which should be seeking to make a significant contribution to the achievement of the commitments made by Government in its Biodiversity 2020 strategy. The NPPF is clear that pursuing sustainable development includes moving from a net loss of biodiversity to achieving net gains for nature, and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution. Local and neighbourhood plans and planning decisions have the potential to affect biodiversity or geodiversity outside as well as inside designated areas of importance for biodiversity or geodiversity. LPAs and neighbourhood planning bodies should therefore seek opportunities to work collaboratively with other partners, including Local Nature Partnerships, to develop and deliver a strategic approach to protecting and improving the natural environment based on local priorities and evidence. Equally, they should consider the opportunities that individual development proposals may provide to enhance biodiversity and contribute to wildlife and habitat connectivity in the wider area. In considering how development can affect biodiversity, and how biodiversity benefits could be delivered through the planning system, it is useful to consider:

Policy Name	Summary of Policy
	■ The policies and commitments in Biodiversity 2020; ■ The contents of any existing biodiversity strategies covering the relevant local or neighbourhood plan area and any local biodiversity action plans; ■ The potential effects of a development on the habitats or species on the *Natural Environment and Rural Communities Act 2006* section 41 list (in Biodiversity 2020) ■ Whether an ecological survey is appropriate; ■ The factors listed in guidance on local ecological networks that supports NPPF paragraph 117. The statutory obligations in regard to international and national designated sites of importance for biodiversity must also be considered. Information on biodiversity impacts and opportunities should inform all stages of development (including, for instance, site selection and design including any pre-application consultation as well as the application . An ecological survey will be necessary in advance of a planning application if the type and location of development are such that the impact on biodiversity may be significant and existing information is lacking or inadequate. Pre-application discussion can help scope whether this is the case and, if so, the survey work required. LPAs should only require ecological surveys where clearly justified, for example if they consider there is a reasonable likelihood of a protected species being present and affected by development. Assessments should be proportionate to the nature and scale of development proposed and the likely impact on biodiversity.
Noise	Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment. LPAs' plan-making and decision taking should take account of the acoustic environment and in doing so consider: ■ Whether or not a significant adverse effect is occurring or likely to occur; ■ Whether or not an adverse effect is occurring or likely to occur; and ■ Whether or not a good standard of amenity can be achieved. In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy. ■ Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur. ■ Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected. ■ No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected. At the lowest extreme, when noise is not noticeable, there is by definition no effect. As the noise exposure increases, it will cross the no observed effect level as it becomes noticeable. However, the noise has no adverse effect so long as the exposure is such that it does not cause any change in behaviour or attitude. The noise can slightly affect the acoustic character of an area but not to the extent there is a perceived change in quality of life. If the noise exposure is at this level no specific measures are required to manage the acoustic environment. As the exposure increases further, it crosses the lowest observed adverse effect level boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise). Increasing noise exposure will at some point cause the significant observed adverse effect level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is above this level the planning process should be used to avoid this effect occurring, by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused. At the highest extreme, noise exposure would cause extensive and sustained changes in behaviour without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be prevented from occurring.

Policy Name	Summary of Policy
	The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. These factors include: ■ The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night; ■ For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise; ■ The spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features). The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area. More specific factors to consider when relevant: ■ Where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration; ■ Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations. ■ In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur.
Land Affected by Contamination	If there is a reason to believe contamination could be an issue, developers should provide proportionate but sufficient site investigation information (a risk assessment) to determine the existence or otherwise of contamination, its nature and extent, the risks it may pose and to whom / what (the 'receptors') so that these risks can be assessed and satisfactorily reduced to an acceptable level. A risk assessment of land affected by contamination should inform an EIA if one is required. The risk assessment should also identify the potential sources, pathways and receptors ('pollutant linkages') and evaluate the risks. This information will enable the local planning authority to determine whether further more detailed investigation is required, or whether any proposed remediation is satisfactory. At this stage, an applicant may be required to provide at least the report of a desk study and site walk-over. This may be sufficient to develop a conceptual model of the source of contamination, the pathways by which it might reach vulnerable receptors and options to show how the identified pollutant linkages can be broken. Unless this initial assessment clearly demonstrates that the risk from contamination can be satisfactorily reduced to an acceptable level, further site investigations and risk assessment will be needed before the application can be determined. Further guidance can be found on the Environment Agency website.
Flood Risk and Coastal Change	Developers and Applicants need to consider flood risk to and from the development site, and it is likely to be in their own best interests to do this as early as possible, in particular, to reduce the risk of subsequent, significant additional costs being incurred. The broad approach of assessing, avoiding, managing and mitigating flood risk should be followed. The assessment should demonstrate to the decision-maker how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its users. The objectives of a site-specific Flood Risk Assessment are to establish: ■ Whether a Proposed Development is likely to be affected by current or future flooding from any source; ■ Whether it will increase flood risk elsewhere; ■ Whether the measures proposed to deal with these effects and risks are appropriate; ■ The evidence for the local planning authority to apply (if necessary) the Sequential Test, and; ■ Whether the development will be safe and pass the Exception Test, if applicable.
Water Supply, Wastewater and Water Quality	***Water Supply*** Planning for the necessary water supply would normally be addressed through the Local Plan. Water supply is therefore unlikely to be a consideration for most planning applications. Exceptions might include: ■ Large developments not identified in Local Plans that are likely to require a large amount of water; and / or

Policy Name	Summary of Policy
	■ Where a Local Plan requires enhanced water efficiency in new developments as part of a strategy to manage water demand locally and help deliver new development. ***Water Quality*** Water quality is only likely to be a significant planning concern when a proposal would: ■ Involve physical modifications to a water body such as flood storage areas, channel diversions and dredging, removing natural barriers, construction of new locks, new culverts, major bridges, new barrages/dams, new weirs (including for hydropower) and removal of existing weirs; and / or ■ Indirectly affect water bodies, for example, - As a result of new development such as the redevelopment of land that may be affected by contamination, mineral workings, water or wastewater treatment, waste management facilities and transport schemes including culverts and bridges; - Through a lack of adequate infrastructure to deal with wastewater. ***Assessing Impacts on Water Quality*** Where water quality has the potential to be a significant planning concern an applicant should be able to explain how the Proposed Development would affect a relevant water body in a river basin management plan and how they propose to mitigate the impacts. Applicants should provide sufficient information for the local planning authority to be able to identify the likely impacts on water quality. The information supplied should be proportionate to the nature and scale of development proposed and the level of concern about water quality. Where it is likely a proposal would have a significant adverse impact on water quality then a more detailed assessment will be required. The assessment should form part of the environmental statement, if one is required because of a likely significant effect on water. When a detailed assessment is needed, the components are likely to include: ■ The likely impacts of the Proposed Development (including physical modifications) on water quantity and flow, river continuity and groundwater connectivity, and biological elements (flora and fauna). ■ How the Proposed Development will affect measures in the river basin management plan to achieve good status in water bodies. ■ How it is intended the development will comply with other relevant regulatory requirements relating to the water environment (such as those relating to bathing waters, shellfish waters, freshwater fish and drinking water) bearing in mind compliance will be secured through the Environment Agency's permitting responsibilities.

Regional Policy

The London Plan: Spatial Development Strategy for Greater London (2011) (Revised October 2013)

4.2.23 The London Plan: Spatial Development Strategy for Greater London (2011) (the London Plan) is the overall strategic plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. It forms part of the development plan for Greater London. London boroughs' local plans need to be in general conformity with the London Plan, and its policies guide decisions on planning applications by councils and the Mayor.

4.2.24 The Revised Early Minor Alterations, (REMA), published in October 2013, sets out a series of formal alterations to London Plan Policy. These are adopted and supersede their counterpart policies within the July 2011 London Plan.

4.2.25 In January 2014, the Mayor published Draft Further Alterations to the London Plan (FALP) for a twelve week period of public consultation.

4.2.26 Amongst the key themes of the *London Plan* are London's Places, London's People, London's Economy, London's Response to Climate Change, London's Transport and London's Living Places and Spaces. The objective of the *London Plan* is to plan for continued growth.

4.2.27 The Mayor has stated that his intentions are increasing housing supply (Policy 3.3), optimising the development of land to secure the maximum benefits (Policy 3.4), ensuring housing developments are of the highest quality (Policy 3.5) and promoting complimentary non-residential uses as part of large residential developments (Policy 3.7).

4.2.28 Notable policies relevant to the application for the Comprehensive Development are set out in the following paragraphs.

4.2.29 Policy 2.6 'Outer London' – seeks to realise the potential of outer London in ways that recognise and build upon its diversity and varied strengths by providing locally sensitive approaches to enhance and promote its distinct existing and emerging strategic and local economic opportunities and transport requirements.

4.2.30 Policy 2.13 'Opportunity Areas and Intensification Areas' – opportunity areas are the capital's major reservoir of brownfield land with significant capacity to accommodate new housing, commercial and other development linked to existing or potential improvements to public transport accessibility.

4.2.31 Policy 2.15 'Town Centres' – the Mayor will, and boroughs and other stakeholders should, co-ordinate the development of London's network of town centres so they provide the main foci beyond the CAZ for commercial development and intensification, including residential development; the structure for sustaining and improving a competitive choice of goods and services conveniently accessible to all Londoners, particularly by public transport, cycling and walking; together with local neighbourhoods, the main foci for most Londoner's sense of place and local identity within the capital.

4.2.32 Policy 2.18 'Green Infrastructure' – enhancements to London's green infrastructure should be sought from development.

4.2.33 Policy 3.3 'Increasing Housing Supply' – the Mayor recognises the pressing need for more homes in London and seeks maximum provision of additional housing.

4.2.34 Policy 3.4 'Optimising Housing Potential' – seeks that development should optimise housing output for different types of location, taking in to account local context and character, high quality design principles and public transport capacity.

4.2.35 Policy 3.5 'Quality and Design of Housing Developments' – seeks to ensure that housing developments are of the highest quality both internally and externally, enhance the quality of local places, taking into account physical context, local character, density, tenure and land use mix. Table 3.3 sets out the minimum space standards for new residential developments.

4.2.36 Policy 3.6 ' Children and Young People's Play Space and Informal Recreation Facilities' – sets out that development proposals that include housing should make provision for play and informal recreation based on the expected child population.

4.2.37 Policy 3.7 'Large Residential Developments' – seeks to encourage proposals for large residential developments including complementary non-residential uses in areas of high public transport accessibility. The policy recognises that large new developments make a significant contribution to meeting housing needs and provide opportunities to create attractive neighbourhoods and provide employment opportunities.

4.2.38 Policy 3.8 'Housing Choice' – seeks to ensure that Londoners have a choice of homes that they can afford and which meet their requirements for different sizes and types of dwellings in the highest quality environments.

4.2.39 Policy 3.9 'Mixed and Balanced Communities', 3.10 'Definition of Affordable Housing', 3.11 'Affordable Housing Targets' and 3.12 'Negotiating Affordable Housing on Individual Private Residential and Mixed Use Schemes' – seek to ensure mixed and balanced communities and suitable affordable housing provision.

4.2.40 Policy 4.7 'Retail and Town Centre Development' seeks to support strong partnership approaches to assessing need and bringing forward capacity for retail, commercial, culture and leisure development in town centres. Development should be at a scale related to the size, role and function of a town centre.

4.2.41 Policy 4.8 'Supporting a Successful and Diverse Retail Sector' seeks that boroughs and other stakeholders should support a successful, competitive and diverse retail sector which promotes sustainable access to goods and services. The retail sector should contribute to the broader objectives of the spatial structure of the Plan, especially town centres.

4.2.42 Policy 4.12 'Improving Opportunities for All' seeks to improve employment opportunities for Londoners, ensuring that Londoners are able to access jobs and other opportunities within their city, bringing about transport and environmental benefits by reducing the need for longer distance commuting. The policy recognises that the planning system should play an important role to ensure that adequate mixes of businesses and public services (and therefore employment opportunities) are provided close to those communities who particularly benefit from local jobs.

4.2.43 Policy 5.1 'Climate Change Mitigation', 5.2 'Minimising Carbon Dioxide Emissions' , 5.3 ' Sustainable Design and Construction' and 5.4 'Sustainable Designs and Construction' – seek to ensure that development proposals make the fullest contribution to the mitigation of and adaptation to climate change, minimising carbon dioxide emissions and ensuring sustainable design and construction of new developments.

4.2.44 Policies 5.5 'Decentralised Energy Networks', 5.6 'Decentralised Energy in Development Proposals', 5.7 'Renewable Energy' and 5.8 'Innovative Energy Technologies' require developments to where appropriate provide decentralised energy, renewable energy and innovative energy technologies.

4.2.45 Policy 5.10 'Urban Greening' and 5.11 'Green Roofs and Development Site Environs' require greening of developments and encourage the provision of green roofs.

4.2.46 Policy 5.12 'Flood Risk Management' and Policy 5.13 'Sustainable Drainage' require flood risk assessments in connection with developments to be carried out in accordance with PPS25 and for Proposed Developments to include SUDS.

4.2.47 Policy 6.1 'Strategic Approach' which concerns the integration of transport and development, seeks to encourage the closer integration of transport and development, encourage patterns and nodes of development that reduce the need to travel, especially by car, and supporting development that generates high levels of trips at locations with high levels of public transport accessibility and/or capacity.

4.2.48 Policy 6.3 'Assessing Effects of Development on Transport Capacity' seeks to ensure that development proposals fully assess the impact on transport capacity and should not adversely affect the transport network.

4.2.49 Policy 6.9 'Cycling' seeks to increase cycling in London and policy 6.10 'Walking' seeks to increase walking in London by emphasising the quality of the pedestrian and street environment.

4.2.50 Policy 6.13 'Parking' seeks to ensure that an appropriate balance is struck between promoting new development and preventing excessive car parking provision that can undermine other sustainable forms of transport. Tables 6.2 and 6.3 within Policy 6.13 provide guidance and maximum parking space standards for different land uses including retail and residential development, including cycle parking standards.

4.2.51 Policies 7.1 'Building London's Neighbourhoods and Communities', 7.2 'An Inclusive Environment', 7.3 'Designing Out Crime', 7.4 'Local Character', 7.5 'Public Realm' and 7.6 'Architecture', 7.7 'Location and Design of Tall and Large Buildings' set out design principles for creating London's neighbourhoods and communities. The policies seek to ensure that environments are safe, secure and accessible to all. Developments are expected to respect and make a positive contribution to public realm and local context and be of the highest architectural quality.

4.2.52 Policies 7.8 'Heritage Assets and Archaeology' and 7.9 'Heritage-led Regeneration' sets out that new development should make provision for the protection of archaeological resources and heritage assets.

4.2.53 Policy 7.14 'Improving Air Quality' seeks to minimise increased exposure to poor quality air and make provision to address local problems of air quality.

4.2.54 Policy 7.19 'Biodiversity and Access to Nature' sets out that a positive approach to the protection, promotion and management of biodiversity is supported by the Mayor's Biodiversity Strategy

4.2.55 Policy 7.28 'Restoration of the Blue Ribbon Network' sets out that development proposals should restore and enhance the Blue Ribbon Network by taking opportunities to open culverts and naturalise river channels.

4.2.56 Policy 8.2 'Planning Obligations' identifies that when considering planning obligations public transport and affordable housing should generally be given the highest importance. Importance should also be given to tackling climate change, learning and skills and health facilities and services and childcare provisions.

4.2.57 The Mayor has also published Supplementary Planning Guidance. It provides additional information to support the implementation of London Plan Policy including the London View Management Framework Supplementary Planning Guidance *(SPG)* (Ref. 4.5) and Housing SPG (Ref. 4.6).

Local Policy

The Southwark Plan (Unitary Development Plan) (2007) Saved Polices (Updated 2013)

4.2.58 The Southwark Plan *(*Ref. 4.7*)* provides a range of policies relevant to the Site and the Comprehensive Development.

4.2.59 Strategic Policy (SP) 1 Sustainability, equality and diversity - All land use decisions must achieve or contribute towards sustainable development that meets the needs of Southwark's diverse population and the economy whilst improving accessibility and quality of life.

4.2.60 Strategic Policy (SP) 2 Participation - All development decisions should enable people from all communities especially those from the six equalities target groups to have meaningful opportunities to participate fully in planning decisions that affect their quality of life, their ability to participate in wealth creation and the quality of their environment, and to remove barriers which hinder accessibility to that process.

4.2.61 Strategic Policy (SP) 3 Quality and Accessibility – All developments should be accessible, improving peoples life chances by achieving the highest possible quality developments with the entire infrastructure required to meet people's needs within Southwark.

4.2.62 Strategic Policy (SP) 4 Removing Barriers to Employment - Developments should, where appropriate, help remove the barriers to employment and improve access to jobs and training opportunities for local people.

4.2.63 Strategic Policy (SP) 5 Regeneration and Creating Employment – Developments should, where appropriate, contribute towards strong, diverse long term economic growth, facilitate regeneration, and increase the number and range of employment opportunities available within Southwark.

4.2.64 Strategic Policy (SP) 6 Accessible Services - All developments should, where appropriate, improve the range and quality of services available in Southwark and ensure that they are easily accessible by all sections of the community, particularly by foot, cycle and public transport.

4.2.65 Strategic Policy (SP) 7 Arts, Culture and Tourism – All developments should, where appropriate, support regeneration and wealth creation through arts, culture and tourism uses.

4.2.66 Strategic Policy (SP) 8 Anti-Poverty – All developments should, where appropriate, reduce poverty, alleviate concentrations of deprivation and increase opportunities

4.2.67 Strategic Policy (SP) 9 Meeting Community Needs – All developments should, where appropriate, enable growth and development of education, community and welfare services in line with the community's needs.

4.2.68 Strategic Policy (SP) 10 Development Impacts – All developments should ensure that they contribute positively to the character and quality of their surroundings, thereby making places better for people to live in and improving the communities to which they belong.

4.2.69 Strategic Policy (SP) 11 Amenity and environmental quality – All developments should protect and improve amenity and environmental quality and encourage sustainable development.

4.2.70 Strategic Policy (SP) 12 Pollution - All developments should, where appropriate, reduce pollution and improve the environmental performance of buildings especially for energy, water and waste management.

4.2.71 Strategic Policy (SP) 13 Design and Heritage - All developments should be of a high standard of design and where appropriate should preserve or enhance the character or appearance of the historic environment.

4.2.72 Strategic Policy (SP) 14 Sustainable buildings – All development should promote the efficient use of land, and be of high quality and where appropriate, include a mix of use.

4.2.73 Strategic Policy (SP) 15 Open space and biodiversity - All developments should, where appropriate, create, preserve and enhance open spaces, green corridors, traffic free routes, and biodiversity. The benefits of open space include those associated with health, sport, recreation, children's play, regeneration, the economy, culture, biodiversity and the environment.

4.2.74 Strategic Policy (SP) 16 River Thames – Developments should protect and enhance the River Thames and its environs and, where appropriate, incorporate measures to protect against flooding.

4.2.75 Strategic Policy (SP) 17 Housing – All developments should, where appropriate, provide more high quality housing of all kinds, particularly affordable housing.

4.2.76 Strategic Policy (SP) 18 Sustainable transport – All developments should promote more sustainable transport choices for all members of the community, in order to reduce congestion, pollution and increase ease of movement.

4.2.77 Strategic Policy (SP) 19 Minimising the need to travel – All developments should reduce congestion and pollution within Southwark by minimising the need to travel, especially by car.

4.2.78 Strategic Policy (SP) 20 Development Site Uses - The "uses required" within the Proposals Map Schedule must be included within any development on sites designated on the proposals map. Planning permission may be granted for "other acceptable uses" within this schedule provided that development for the 'uses required' is, has been, or is thereby, secured. A temporary planning permission may be granted to allow good use to be made of a vacant site prior to the commencement of a permanent scheme. Development sites have been designated on the Proposals Map to meet the strategic objectives of this plan.

The Core Strategy (2011)

4.2.79 The Core Strategy (Ref. 4.8) sets out Southwark's long term vision, spatial strategy and 13 strategic polices with an implementation plan up until 2026 to deliver sustainable development. The policies will be used to make decisions on planning applications together with the London Plan.

- Strategic Policy 1 – Sustainable Development - *Development will improve the places we live and work in and enable a better quality of life for Southwark's diverse population. It will help meet the needs of a growing population in a way that respects the limits of the planet's resources and protects the environment.*
- Strategic Policy 2 - Sustainable Transport - *We will encourage walking, cycling and the use of public transport rather than travel by car. This will help create safe, attractive, vibrant and healthy places for people to live and work by reducing congestion, traffic and pollution*
- Strategic Policy 3 – Shopping, Leisure and Entertainment - *We will maintain a network of successful town centres which have a wide range of shops, services and facilities, to help meet the needs of Southwark's population. Our centres will be well used because they are vibrant, easy to get to, friendly and safe.*
- Strategic Policy 4 – Places to learn and enjoy - *There will be a wide range of well used community facilities that provide spaces for many different communities and activities in accessible areas.*
- Strategic Policy 5 – Providing new homes - *Development will meet the housing needs of people who want to live in Southwark and London by providing high quality new homes in attractive environments, particularly in our growth areas. Development will provide as much housing as possible whilst also making sure that we have enough land for other types of development and that new housing is in keeping with the character of the area.*
- Strategic Policy 6 – Homes for people of different incomes - *Development will provide homes including social rented, intermediate and private for people on a wide range of incomes. Development should provide*

as much affordable housing as is reasonably possible whilst also meeting the needs for other types of development and encouraging mixed communities.

- Strategic Policy 7 – Family Homes - *Development will provide more family housing with 3 or more bedrooms for people of all incomes to help make Southwark a borough which is affordable for families. New homes will have enough space for the needs of occupants.*
- Strategic Policy 8 – Student Homes - *Development will meet the needs of local universities and colleges for new student housing whilst balancing the building of student homes with other types of housing such as affordable and family housing.*
- Strategic Policy 9 – Homes for travellers and gypsies - *We will continue to protect our existing Traveller and Gypsy sites. We will provide new sites in the future to meet the accommodation needs of Travellers and Gypsies.*
- Strategic Policy 10 – Jobs and Businesses - *We will increase the number of jobs in Southwark and create an environment in which businesses can thrive. We will also try to ensure that local people and businesses benefit from opportunities which are generated from development.*
- Strategic Policy 11 – Open spaces and wildlife - *We will improve, protect and maintain a network of open spaces and green corridors that will make places attractive and provide sport, leisure and food growing opportunities for a growing population. We will protect and improve habitats for a variety of wildlife.*
- Strategic Policy 12 – Design and conservation - *Development will achieve the highest possible standards of design for buildings and public spaces to help create attractive and distinctive places which are safe, easy to get around and a pleasure to be in.*
- Strategic Policy 13 – High environmental standards - *Development will help us live and work in a way that respects the limits of the planet's natural resources, reduces pollution and damage to the environment and helps us adapt to climate change*

The Aylesbury Area Action Plan (AAAP) (January 2010)

4.2.80 The AAAP (Ref. 4.9) will be an essential part in the redevelopment of the Aylesbury Estate; it contains the vision for the area, policies for the Comprehensive Development and a delivery plan for any future investment.

4.2.81 A number of key policies have been identified to further the vision of the AAP and are listed below:

- *MP1: The Masterplan – Development proposals must be in general compliance with the masterplan;*
- *MP2: Proposals Sites - Proposals sites within the action area core have been designated on the Proposals Map. Planning Permission will be granted for proposals in accordance with the Proposals Map;*
- *BH2: Provision of 4,200 new homes between 2009 and 2027.*
- *BH2: Density and distribution of homes – Higher residential densities should be concentrated in the following areas – Thurlow Street, Albany Road, fronting to Burgess Park / open space, and locations where there are mixed uses. Lower residential densities should be located – adjacent to Liverpool Grove Conservation Area, near areas of existing development around East Street / Bagshot Street, and other residential areas.*
- *BH3: Tenure Mix – 50% split of private and affordable homes. 75% of the affordable homes should be social rented.*
- *BH4: Size of homes – a maximum of 3% studios in private tenure, 70% of homes to have 2 or more bedrooms, 20% of homes to have three bedrooms, 7% of homes to have four bedrooms, and 3% of homes to have 5 or more bedrooms.*
- *BH5: Type of Homes – Flats should contribute 60% of the dwellings, 17% should be Maisonettes/Houses over Houses, and 23% should be Houses (all houses to have two or more bedrooms).*
- *BH6: Energy – The energy supply should be generated by CHP and the redevelopment should result in zero carbon growth. Developments should meet the target of a 20% reduction in CO2 emissions through the use of renewable technologies.*

- *BH7: Sustainable design and construction – All homes must achieve at least CfSH Level 4 rating or the equivalent in any successor rating.*
- *PL1: Street Layout – The street layout should accord with the masterplan and the following streets will comprise the main network; Thurlow Street, Albany Road, a community spine, and three green fingers.*
- *PL2: Design Principles - Development should follow the block layout shown on the masterplan and should conform to the design guidance. It should help to create a strong sense of local distinctiveness and be well integrated with the surrounding area. Its materials and design should exude a sense of quality and permanence.*
- *PL3: Building block types and layouts - All proposals within the action area core should be designed as one of the following three building types – Perimeter Block, Mews Block, and Special Building. Blocks should be designed so that relatively few apartments are served off each core and most apartments should be dual aspect. Homes should look directly on to the street and on to the communal gardens to ensure that the streets and spaces are safer.*
- *PL4: Building heights - Developments must contain variations in height and make use of the full range of buildings heights to add interest and variety to the development. Most of the new development should have a general height of between 2 and 4 storeys. Height and scale should respect the setting of the conservation areas and preserve or enhance their character and appearance. The design of these taller buildings needs careful consideration. They should be elegant and slender.*
- *PL5: Public Open Space - New development must provide a high quality network of public open spaces of different sizes and functions which link well together and contain good pedestrian and cycling routes. Small children's play areas should be integrated into the residential areas. Detailed landscaping plans will be required as an integral part of development proposals.*
- *PL6: Children's Play Space - All development proposals must provide 10 sqm of children's play space / youth space per child bed space. Doorstep playable space should be provided within each of the housing blocks, whilst larger local playable spaces should be provided within selected housing blocks and within the green fingers and existing local parks.*
- *PL7: Private Amenity Space - All development must contain high quality private open space in the form of communal gardens, private gardens and useable balconies.*
- *TP1: Designing Streets – Proposals should provide a well-connected network of high quality streets that provide a safe, accessible, comfortable and attractive environment for walking and cycling, at the same time provide practical and logical routes for motor vehicles.*
- *TP2: Public Transport – Working with TfL to ensure significant improvements take place to the bus services operating in the action area core.*
- *TP3: Parking Standards: Residential – the amount of car parking in development proposals should not exceed a maximum of 0.4 spaces per home averaged over the masterplan.*
- *COM1: Location of Social and Community Facilities – New social and community facilities will be provided at five main locations within the area action core.*
- *COM2: Opportunities for new business – Approximately 2,500sqm of employment floorspace will be located at the junction of Thurlow Street and East Street.*
- *COM3: Health and Social Care - Approximately 2,500sqm of floor space will be provided for health facilities, and additionally, 1,500sqm of social care space will be provided.*
- *COM4: Education and Learning - Development proposals should provide sufficient facilities for early education and childcare space. About 1,150 square metres total of pre-school facilities will be required which will be provided in three or four locations, preferably co-located with other facilities.*
- *COM5: Community space and arts and culture - We will aim to make provision for about 500 square metres of flexible community space.*
- *COM6: Shopping/Retail – Approximately 1,750sqm of A Use Class space will be provided across the area action core. New retail space should be provided within the locations identified in COM1 and should meet day-to-day convenience retail needs or food and drink uses.*

- *Policy D1: Phasing – Sites will be released in accordance with a phasing programme.*

4.2.82 Policy D2: Infrastructure Funding - Financial contributions will be sought to ensure delivery of key infrastructure. Planning obligations will be sought to secure contributions or other works where these relate fairly and reasonably to the development and are necessary for it to proceed.

Assessment of the Development Proposals

4.2.83 In summary, it is clear from consideration of the adopted planning policy that the principle of the regeneration of the Estate in the form of a residential mixed-use development is acceptable and comply with the aspirations of the national, strategic and local plan policy, including the ambitions of the Aylesbury Estate AAAP and complies with the planning policy aspirations for the site and the wider area. The proposals would contribute to the housing targets set within the London Plan and would provide much needed housing within the borough. The Comprehensive Development would provide a range and type of residential units that would provide good choice for future occupiers within a high quality residential accommodation. The layout, orientation and provision of the development would ensure that good quality accommodation would be provided supported by private communal amenity space, public realm and amenities and attractions for occupiers and visitors of the site.

4.2.84 The design of the amenity areas are considered in detail in the landscape strategy, and the Design and Access Statement which has evolved contemporaneously with the Masterplan design and respective Design Code and Development Specification. The overall residential environment would achieve the aspirations of housing/residential design planning policies and together with the benefits it would deliver, it is considered that the Comprehensive Development is acceptable and on balance accords with relevant planning policies.

4.3 References

Ref. 4.1 Deloitte Real Estate (2014), *FDS Application Planning Statement*

Ref. 4.2 Greater London Authority (2011), *London Plan: Spatial Development Strategy for Greater London (2011)*

Ref. 4.3 The Southwark Plan (Unitary Development Plan) (2007*) Saved Polices (Updated 2013)*

Ref. 4.4 Department of Communities and Local Government (2012), *National Planning Policy Framework.*

Ref. 4.5 Department of Communities and Local Government (2012), *Planning Practice Guidance*

Ref. 4.6 Greater London Authority (2012), Housing *Supplementary Planning Guidance*

Ref. 4.7 London Borough of Southwark (2013), *The Southwark Plan (Unitary Development Plan)*

Ref. 4.8 London Borough of Southwark (2009), *The Core Strategy*

Ref. 4.9 London Borough of Southwark (2010), *The Aylesbury Area Action Plan*

5 Demolition and Construction

5.1 Introduction

5.1.1 This Chapter provides a factual report of the proposed demolition and construction works associated with the development of the Site.

5.1.2 This Chapter informs the detailed assessments of demolition and construction effects and mitigation which are provided in the technical chapters (**Chapters 6 - 16**) and should be read together with the introductory chapters of this ES (**Chapters 1 – 4**), the EIA Scoping Report (**Appendix 2.1**), the LBS EIA Scoping Opinion (**Appendix 2.2**) and the WSP Scoping Opinion Response (**Appendix 2.3**).

5.1.3 This Chapter is supported by a framework Construction Environmental Management Plan (FCEMP) which is provided as **Appendix 5.1** and a framework Code of Construction Practice (FCoCP) which is provided as **Appendix 5.2**.

5.1.4 The FCEMP provides a document structure for mitigating likely environmental effects during the demolition and construction works. The FCEMP will be further developed following the grant of the planning permissions for the development of the Site. The FCEMP will be developed in consultation with LBS and implemented on a site specific basis by the contractors appointed to carry out the works prior to construction works commencing in response to appropriate planning conditions.

5.1.5 The FCoCP follows the LBS Environmental Code of Construction Practice (Ref. 5.1) and provides a document structure for the required control measures and the standards to be implemented across the Site throughout the project to ensure that existing and new residents and businesses are protected from environmental impact during the construction phase of the adjacent new development. The FCoCP will be further developed and implemented on a site specific basis by the contractors appointed to carry out the works prior to construction works commencing in response to appropriate planning conditions.

5.1.6 A Construction Logistics Plan (CLP) has been developed for the Site, which is provided in the Transport Assessment (Ref. 5.2). The CLP sets out policies, procedures and efficiency measures for minimising road traffic before and during construction. It provides a summary of the main logistics activity expected during the construction stage of the project and will inform site specific CLPs to be developed and implemented on a site specific basis by contractors appointed to carry out the works prior to construction works commencing in response to appropriate planning conditions.

5.2 Phasing

FDS Application Site

5.2.1 Demolition and construction works are planned to commence in June 2015 on the FDS Application site. Subject to the granting of planning permission by LBS and the discharge of relevant conditions, the anticipated FDS Application site demolition phasing is outlined in **Table 5.1** and the anticipated FDS Application site construction phasing is outlined in **Table 5.2**.

Table 5.1: FDS Application Site Anticipated Demolition Phasing

Building Plot	Demolition Stage	Duration	Start	Finish
Plots 1,2 and 3 (excluding Ellison House)	Stage 1a	74 weeks	June 2015	November 2016
Ellison House	Stage 1b	16 weeks	July 2016	November 2016

Table 5.2: FDS Application Site Anticipated Construction Phasing

Building Plot	Building Sub-Plot	Duration	Start	Finish
Plot 1	Sub-Plot 5	124 weeks	June 2016	October 2018
	Sub-Plot 1	81 weeks	April 2017	October 2018
	Sub-Plot 2	66 weeks	August 2017	November 2018
Plot 2	Sub-Plot 6	105 weeks	May 2018	May 2020
Plot 3	Sub-Plot 4	124 weeks	December 2018	May 2021
	Sub-Plot 3	70 weeks	December 2019	April 2021

5.2.2 The FDS Application site phasing is driven by the need to demolish and clear sites as soon as possible, whilst maintaining existing services and causing as little disturbance as is reasonably practicable to the existing community. The phasing therefore follows the LBS rehousing programme, as before existing buildings can be demolished the residents have to be rehoused by LBS.

Masterplan Application Site

5.2.3 Demolition and construction works are planned to commence in January 2016 on the Masterplan Application site. The Masterplan Application site demolition stages are illustrated on Parameter Plan 08 (**Figure 3.24**) and the Masterplan Application site development phases are illustrated on Parameter Plan 09 (**Figure 3.25**).

5.2.4 Subject to the grant of planning permission and the discharge of relevant conditions, the anticipated Masterplan Application site demolition and construction phasing is outlined in **Table 5.3**.

Table 5.3: Masterplan Application Site Anticipated Demolition and Construction Phasing

Development Phase	Demolition Stage	Start	Finish
Phase 2	Stage 2a	January 2016	September 2018
	Stage 2b	December 2016	February 2023
	Stage 2c	July 2017	February 2025
Phase 3	Stage 3	May 2021	January 2027
Phase 4	Stage 4a/4b/4c	June 2023	July 2028
	Stage 4d	April 2025	May 2030
	Stage 4e	April 2027	March 2035

5.2.5 The Masterplan Application site phasing is driven by the need to demolish and clear sites as soon as possible, whilst maintaining existing services and causing as little disturbance as is reasonably practicable to the existing community. The phasing therefore follows the LBS rehousing programme, as before existing

buildings can be demolished the residents have to be rehoused by LBS. As new affordable homes become available, it may be possible to accelerate the programme and because of this, full details of the demolition and construction phasing are necessarily broad at this stage and will be confirmed in detailed construction method statements and phasing programmes to be agreed with LBS in response to appropriate planning conditions.

5.3 Key Principles

5.3.1 Throughout the development period, security and safety for existing and future residents is of paramount importance. Secure and safe pedestrian routes will be maintained at all times. These measures will be implemented and managed in accordance with the Code of Construction Practice to be developed on a site specific basis prior to demolition or construction works commencing in response to appropriate planning conditions.

5.3.2 Demolition and construction works will be carried out to minimise disruption to residents, in particular, the works will not adversely impact on the continuity of utility/heat supply to existing and future residents. These measures will be implemented through a programme of enabling works prior to demolition works commencing to ensure the necessary utility/heat supply diversion and protection works and temporary supplies are undertaken to maintain continuity of supply. These works are detailed in the Utility Infrastructure Report which is provided at **Appendix 5.3**.

5.3.3 Access for pedestrian, cyclists, car and emergency and refuse collection routes will be maintained at all times throughout the development period. Where necessary temporary routes will be implemented and managed in accordance with the CEMP to be developed on a site specific basis prior to demolition or construction work commencing in response to appropriate planning conditions.

5.3.4 Close liaison will be maintained between the Developer, the LBS, the Police and local residents' groups including the Creation Trust, (a local charity committed to supporting residents living on the Aylesbury Estate), throughout the development period. This will be achieved in accordance with the Code of Construction Practice to be developed on a site specific basis prior to demolition or construction works commencing and regular meetings with key stakeholders.

5.4 Generation of Employment

Site Wide Development Option

5.4.1 It is not possible to confirm the number of jobs likely to be created at this stage due to lack of precise construction details. Set out in **Table 5.4** is the estimate of construction employment for the Site Wide Development Option (Please refer to **Chapter 7 'Socio-economics and Population Effects'**). It is based on an estimated construction value of £737m. Note that this is an indicative estimate that has been generated only for the purposes of assisting calculations within the EIA and should not be relied upon for any other purpose.

Table 5.4: Site Wide Development Option Construction Employment

Site Wide Development Option	
Estimated Construction Value	£737m (a)
Ratio of construction employment to output (Ref. 5.3)	£116,405 per year (b)
Construction job years (c = a/b)	6,331 (c)
Construction period	20 Years (d)
Temporary construction jobs per year (e = c/d)	316 (e)
Full Time Equivalent Jobs (FTE) (f = c/10)*	633 (f)

5.4.2 The ONS Annual Business Survey data 2012 states that the average ratio of expenditure (on materials, goods, services and employment) to jobs in the construction industry is £116,405. Applying this ratio to the estimated construction cost outlined above shows that the Site Wide Development Option would be expected to create a total of 6,331 person-years of construction employment. Following the convention adopted by the Treasury that 10 person years of employment can be taken as equivalent to one permanent full-time job created, this would equate to 616 new Full Time Equivalent (FTE) construction jobs being created. The actual number of construction workers employed on-site would vary over time and through different stages of the development with different levels and types of employment depending on the stage of the development programme.

FDS Development Option

5.4.3 It is not possible to confirm the number of jobs likely to be created at this stage due to lack of precise construction details. Set out in **Table 5.5** is the estimate of construction employment for the FDS Development Option (Please refer to **Chapter 7 'Socio-economics and Population Effects'**). It is based on an estimated construction value of £215m. Note that this is an indicative estimate that has been generated only for the purposes of assisting calculations within the EIA and should not be relied upon for any other purpose.

Table 5.5: FDS Development Option Construction Employment

FDS Development Option	
Estimated Construction Value	£215m (a)
Ratio of construction employment to output (Ref. 5.3)	£116,405 per year (b)
Construction job years (c = a/b)	1,847 (c)
Construction period	6 Years (d)
Temporary construction jobs per year (e = c/d)	307 (e)
Full Time Equivalent Jobs (FTE) (f = c/10)*	184 (f)

5.4.4 The ONS Annual Business Survey data 2012 states that the average ratio of expenditure (on materials, goods, services and employment) to jobs in the construction industry is £116,405. Applying this ratio to the estimated construction cost outlined above shows that the FDS Development Option would be expected to create a total of 1,847 person-years of construction employment. Following the convention adopted by the Treasury that 10 person years of employment can be taken as equivalent to one permanent full-time job created, this would equate to 184 new Full Time Equivalent (FTE) construction jobs being created. The actual number of construction workers employed on-site would vary over time and through different stages of the development with different levels and types of employment depending on the stage of the development programme.

5.5 Description of the Work

FDS Application Site

Procurement Strategy

5.5.1 The FDS Application site demolition and construction works will be procured by means of a number of construction packages. The packages relate to the plots and sub-plots and a summary of the currently envisaged strategy is set out below:

- Contract 1:
    - Demolition of entire FDS Application site and enabling works / site wide infrastructure to allow for construction of all sub-plots;

- Construction of sub-plots 4 and 5.

- Contract 2 – Construction of sub-plot 1;
- Contract 3 – Construction of sub-plots 2 and 3;
- Contract 4 – Construction of sub-plot 6.

5.5.2 Prior to occupation of each sub-plot, the associated highways will be offered to LBS for adoption and public realm areas including land for the community facility and the play areas will be transferred to the agreed third parties

Pre-Commencement and Enabling Works

5.5.3 The following pre-commencement and enabling works activities have been carried out:

- Topographical and Underground Services Survey (Ref. 5.4 & **Appendix 5.3**);
- Unexploded ordnance survey (Ref. 5.5 & **Appendix 15.1**);
- Utilities assessment to identify and scope utilities protection, removal, stopping up and diversion works and temporary supplies required to enable demolition (**Appendix 5.3**);
- Review of existing structural records and structural survey of buildings and structures to be demolished to identify the hazards and associated risks which may affect demolition workers and members of the public and to inform the demolition methodology and the Structural Engineer's Planning Report (**Appendix 5.4**);

5.5.4 The following pre-commencement and enabling works activities will be carried out prior to demolition works commencing:

- Demolition survey to establish the location and quantity of asbestos containing material within the buildings and associated structures to be demolished;
- Trial pits to accurately locate existing services;
- Condition survey of adjacent roads;
- Condition survey of adjacent buildings;
- Condition survey of adjacent sewers;
- Tender and procure utilities enabling works package;
- Tender and procure district heating system enabling works package.

5.5.5 The following pre-demolition and enabling works activities will be carried out following the appointment of a Demolition Contractor:

- Preparation of a written risk assessment and method statement for the demolition works;
- Issue of all necessary statutory notifications and consents;
- Development of a site specific CEMP and agree with LBS;
- Development of a site specific CoCP and agree with LBS;
- Development of a site specific CLP and agree with LBS;
- Erection of site hoarding; set up of site welfare facilities and supply of temporary building services; environmental clean of the properties and site; removal of landscaping items such as bollards, fencing, garden walls and the like; and removal of trees and installation of tree protection measures;
- Pre-strip works including removal of loose furniture and fittings from the properties; strip of built in kitchens and heating systems; removal of remaining building services such as water tanks and electricity and gas meters; and

- Soft-strip, asbestos removal and post-strip works including window and glazing removal; non-structural elements and remaining floor finishes.

5.5.6 It is expected that a site wide asbestos survey will be carried out and that specific method statements will be written for the removal of asbestos by a specialist sub-contractor. Approval of these method statements will be required by the Health and Safety Executive prior to commencement. Proposals for exclusion zones, air testing and specialist waste disposal will be explained in detail in the method statements.

Demolition and Site Preparation

5.5.7 Details of the existing FDS Application site and the nature of the buildings to be demolished are discussed in the Structural Engineer's Planning Report which is provided in **Appendix 5.4**.

5.5.8 The report concludes that buildings above six storeys are expected to have been constructed with suitable robustness detailing to prevent progressive collapse. Buildings below six stories are anticipated not to have been constructed with any vertical or horizontal ties and thus will be susceptible to the "stack of cards" effect during demolition. It is therefore expected that a combination of techniques will be implemented including local dismantling/deconstruction and the use of high reach demolition equipment.

5.5.9 The demolition methodology will be finalised following tender and appointment of a demolition contractor who will be responsible for preparing a detailed method statement and phasing plan for both the asbestos removal and demolition. The method statement will cover in detail the Health, Safety and Environmental considerations associated with the demolition of the FDS Application site as well as demonstrating compliance with relevant planning conditions.

5.5.10 An indicative methodology for the FDS Application site demolition works is outlined below and further details are provided in **Appendix 5.4**. It must be stressed that the outline methodology will be subject to change to suit the appointed demolition contractor's proposed method of working.

5.5.11 A number of the existing buildings including both 13 storey blocks and Ellison House are located very close to the FDS Application site boundary and so full height scaffolding will be required to protect the public. The scaffold will be tied back to the structure and fully sheeted.

5.5.12 Dismantling/deconstruction works may include:

- Installation of temporary back propping of precast floor panels and bracing of precast cross walls;
- Gradual removal of floor and walls by mini-excavators supported on back propped floors;
- Removal of debris to ground level via mobile crane where it can be safely crushed as required for waste disposal or recycling.

5.5.13 It is anticipated that the dismantling will occur in a sequence similar to that of construction and will take the form of a pyramid, stepped down on a floor by floor basis. The dismantling technique could be used for the upper storeys of the 13 storey blocks to bring them down to an acceptable height for the use of the demolition equipment.

5.5.14 Demolition works may include the use of a high reach demolition rig equipped with a hydraulic crusher on the machine arm. It is anticipated that this demolition technique will be used for all buildings under 6 storeys as these structures are expected to have no inherent robustness and will create an unsafe, working environment for operatives once demolition has commenced. It can also be used for the large 13 storey blocks once they have been dismantled to a height within the reach of the demolition rig.

5.5.15 The existing buildings up to 5 stories are likely to be founded on large mass concrete pad foundations. The foundation details for the taller 13 storey blocks are unknown but are expected to be piled foundations.

5.5.16 Due to the extensive coverage of existing buildings and services across the development, it is expected that site clearance will require the breaking out and excavation of all existing foundations down to a level equal to the base of the existing pad foundations or to the underside of new pile caps, whichever is greater.

Construction Works

5.5.17 The proposed development within the FDS Application site comprises a range of building types between 3 and 20 storeys split into six blocks. The Structural Engineer's Planning Report identifies two types of building:

- Type A – high density residential accommodation and community facilities of 4 or more storeys;
- Type B – Terraced housing of 4 or less storeys.

5.5.18 For the Type A buildings, the majority will be supported on bored piles. Under the cores and the towers, it is likely that a piled raft solution will be required.

5.5.19 For the Type B buildings, a bored pile solution is anticipated supporting reinforced concrete ground beams. It is expected that the ground floors will comprise either a suspended reinforced concrete slab or a beam and block solution.

5.5.20 Where basements are proposed under the towers on Blocks 4, 5 and 6 to house plant rooms and under Blocks 4 and 5 podiums to house attenuation tanks, the excavations will require battering back for stability.

5.5.21 The following summarises the superstructure options for both building types with further details provided in **Appendix 5.4**.

- Type A – Large buildings such as these lend themselves to either a steel or concrete frame construction. The options are therefore as follows:
    - Traditional reinforced concrete columns and flat slabs cast in-situ;
    - Traditional reinforced concrete columns cast in-situ with post tensioned concrete slabs;
    - A hybrid construction where some or all of the vertical elements become precast concrete.

5.5.22 The decision on the final superstructure solution would be led by the main contractor in discussion with the design team at a later stage.

- Type B – For the terraced housing, there are three possible construction methods which are:
    - concrete frame,
    - cross laminated timber
    - traditional load bearing masonry.

5.5.23 Construction methodology will be finalised following tender and appointment of contractors responsible for development plot infrastructure and building works. A likely indicative construction sequence for a typical development sub-plot is outlined below. It must be stressed that the outline methodology may be subject to change depending on the mix of building types and the contractors preferred construction techniques and supply chains.

Development Sub-Plot Infrastructure and Public Realm Works

- Enabling works;
- Site clearance and earthworks;
- Ground remediation works (if required);
- Drainage and services installation including new district heating system;

- Onsite highways infrastructure including signing and lighting to serve the development sub-plot;
- Offsite highway improvement works to Albany Road, Bradenham Close, Westmoreland Road and Portland Street;
- External works including public realm, hard and soft landscaping and Sustainable Drainage Systems (SuDS).

Building Works

- Piling and foundation works;
- Basement construction including basement car parking and surface water attenuation tanks (where applicable);
- Tall building superstructure;
- Podium car parking structures (where applicable);
- Mid and low rise buildings;
- MEP works including installation of new energy centres (where applicable);
- Fit out and finishes.

Masterplan Application Site

5.5.24 Some or all of the following pre-commencement and enabling works activities would be carried out as required before commencement of each stage of demolition works:

Prior to the Appointment of a Demolition Contractor

- Site investigation to identify soil type, contamination and ground conditions;
- Unexploded ordnance survey;
- Update of habitat surveys;
- Condition survey of adjacent roads;
- Condition survey of adjacent buildings;
- Condition survey of adjacent sewers;
- Demolition survey to establish the location and quantity of asbestos containing material within the buildings and associated structures to be demolished;
- Structural survey of buildings and structures to be demolished to identify the hazards and associated risks which may affect demolition workers and members of the public and to inform the demolition methodology and Structural Engineer's Planning Report;
- Utilities assessment to identify and scope utilities protection, removal, stopping up and diversion works and temporary supplies required to enable demolition;
- Tender and procure utilities enabling works package;
- Assessment of the district heating system to identify and scope decommissioning works and temporary supplies required to enable demolition;
- Tender and procure district heating system enabling works package;

Following the Appointment of a Demolition Contractor

- Preparation of a written risk assessment and method statement for the demolition works;

- Issue of all necessary statutory notifications and consents;
- Development of a site specific CEMP and agree with LBS;
- Development of a site specific CoCP and agree with LBS;
- Development of a site specific CLP and agree with LBS;
- Installation of perimeter fencing and gates and establishment of site security;
- Construction of site access and construction compound;
- Installation of tree protection measures;
- Set up noise and air quality monitoring facilities.

5.5.25 It is anticipated that the demolition works would be carried out in accordance with the demolition and construction phasing in **Table 5.3**.

5.5.26 Demolition methodology will be finalised following tender and appointment of a demolition contractor who will be responsible for both the asbestos removal and demolition.

Construction Works

5.5.27 It is anticipated that the construction works would be undertaken in accordance with the construction phasing in **Table 5.3**.

5.5.28 Parameter Plans 06 and 07 identify the extent and deviation of building sub-plots. The exact location of these sub-plots will be determined at reserved matters stage in accordance with the restrictions and deviations imposed by the Parameter Plans and the Design Code.

5.5.29 Construction methodology will be finalised following tender and appointment of contractors responsible for development plot infrastructure and building works. A likely indicative construction sequence for a typical development sub-plot following demolition is outlined below. It must be stressed that the outline methodology may be subject to change depending on the final mix of building types and the contractors preferred construction techniques and supply chains.

Development Sub-Plot Infrastructure and Public Realm Works

- Enabling works;
- Site clearance earthworks;
- Ground remediation works (if required);
- Drainage and services installation including new district heating system;
- Offsite roadworks including signing and lighting works associated with development sub-plot;
- Onsite roadworks including signing and lighting works to serve development sub-plot;
- External works including Hard and soft landscaping and SuDS.

Building Works

- Piling and foundation works;
- Basement construction including basement car parking and surface water attenuation tanks (where applicable);
- Tall building superstructure;
- Podium car parking structures (where applicable);
- Mid and low rise buildings;

- MEP works including installation of new energy centres (where applicable);
- Fit out and finishes.

5.5.30 The procurement strategy for the Masterplan Application site will be determined on a phase by phase basis.

5.6 Material and Resources

5.6.1 A Site Wide Waste Management Strategy has been developed for all phases (Ref. 5.6). The Strategy includes an assessment of demolition and construction waste generated across the Site by the proposals and sets out the intentions for dealing with demolition and operational waste including re-use, recycling and waste disposal.

5.6.2 A summary of the estimated quantities of demolition waste is provided in **Tables 5.6 and 5.7**.

Table 5.6: Summary of Estimated Quantity of Materials Arising from the FDS Application Site Demolition Works

Material	Material Source	Tonnes Material
Concrete	Substructure, superstructure, floor slabs, roofs, walls and columns	72,496
Brick	External and internal walls and garages	2,110
Metal	Reinforcement, windows, plant, superstructure, sub-assemblies	1,498
Plaster	Partitions and ceilings	651
Glass	Windows	207
Pvc	Double glazed window units	2
Timber	Internal fittings and window frames	0
Total		**76,964**

Table 5.7: Summary of Estimated Quantity of Materials Arising from the Masterplan Application Site Demolition Works

Material	Material Source	Tonnes Material
Concrete	Substructure, superstructure, floor slabs, roofs, walls and columns	199,745
Brick	External and internal walls and garages	13,264
Metal	Reinforcement, windows, plant, superstructure, sub-assemblies	3,825
Plaster	Partitions and ceilings	1,814
Glass	Windows	666
Pvc	Double glazed window units	18
Timber	Internal fittings and window frames	17
Total		**219,349**

Excavation

5.6.3 The volume of general excavation associated with site clearance for the FDS Application site is estimated to be 73,350 m^3 based on an assumed excavation depth of 2 metres required to remove all extant

foundations abandoned services, drainage runs and the like. In addition, the volume of excavation for basement and attenuation storage tank construction is estimated to be 931 m^3.

5.6.4 The volume of general excavation for the Masterplan Application site is less clear as intrusive ground investigations have yet to be undertaken although it is likely to be of a similar order to the FDS Application site.

5.6.5 Excavated materials would be tested against the Waste Acceptance Criteria (WAC) to determine the classification of the materials in accordance with the Hazardous Waste Regulations. Where possible inert material would be reused on site for fill in other areas or reused outside of the site. Any contaminated material would be managed in accordance with relevant legislation.

Construction

5.6.6 Materials required for the construction of the FDS and Masterplan Application sites are expected to typically include the following:

- Aggregates;
- Bituminous material;
- Concrete;
- Steel;
- Glass;
- Timber and plasterboard;
- Brick and block.

5.7 Plant and Equipment

5.7.1 **Table 5.8** provides a schedule of anticipated typical construction plant to be used during the regeneration of the FDS and Masterplan Application sites:

Table 5.8: Typical Construction Plant to be used during Regeneration of the FDS and Masterplan Application Sites

Construction Plant and Equipment	Site Preparation and Demolition	Remediation	Foundations and Underground structures	Superstructure	Cladding works	MEP and Fit out Works	Roadworks, Public Realm and Landscaping
360° tracked excavators	✓	✓					✓
Concrete crushing plant	✓	✓					
Concrete ready-mix lorries			✓	✓			✓
Concrete splitters and concrete saws	✓						✓
Cranes and hoists	✓		✓	✓	✓	✓	✓
Lorries/vans	✓	✓	✓	✓	✓	✓	✓
Scaffolding and hydraulic platforms	✓			✓	✓		
Cranes and hoists	✓		✓	✓	✓	✓	
Temporary supports	✓		✓	✓	✓	✓	

Construction Plant and Equipment	Site Preparation and Demolition	Remediation	Foundations and Underground structures	Superstructure	Cladding works	MEP and Fit out Works	Roadworks, Public Realm and Landscaping
Mini excavators	✓						
High reach demolition rigs	✓						
Generators	✓	✓	✓	✓	✓	✓	✓
Concrete splitters and concrete saws	✓						
Cutters, drills and small tools	✓	✓	✓	✓	✓	✓	✓
Hydraulic benders and cutters	✓	✓	✓	✓	✓	✓	
Floodlights	✓	✓	✓	✓	✓	✓	
Fork lift trucks	✓		✓	✓	✓	✓	✓
Excavators and breakers	✓	✓	✓				✓
Concrete crushing plant	✓	✓					
Water bowsers	✓	✓	✓				✓
Piling rigs			✓				
Concrete ready-mix lorries			✓	✓	✓		✓
Concrete Pumps			✓	✓			✓
Mortar Silos					✓		
Tarmac laying equipment							✓
Tipper lorries	✓	✓	✓				✓
Road Brush /sweepers	✓	✓	✓	✓	✓	✓	✓
Wheelwashers	✓	✓	✓	✓	✓	✓	✓

5.7.2 Normal site working hours for the FDS and Masterplan Application sites will be agreed with LBS and are expected to be:

- Monday to Friday – 8am to 6pm
- Saturday – 8am to 1pm
- Sundays and Bank Holidays – No Working

5.7.3 In order to maintain the above working hours, Contractors may require up to one hour before and after normal working hours to start up and shut down activities.

5.7.4 Permission may be requested from time to time to undertake specialist construction operations and deliveries outside of normal working hours. If required, the hours of operation for such works would be agreed in advance with LBS except in response to emergency situations.

5.8 Demolition and Construction Traffic

5.8.1 As part of the application process a contractor has been engaged to provide advice on construction issues. The contractor has prepared an initial assessment of the FDS Application sites in terms of operatives on site and vehicle movements making deliveries. The assessment prepared by the contractor is provided at **Appendix 5.5**.

5.8.2 As the FDS Application sites will be the most densely developed part of the proposals it has been assumed that the peak of this phase represents a reasonable worst case in terms of construction traffic for use in assessment.

5.8.3 The assessment indicates that the peak movements will be in mid-June 2017 when the work on sub-plots 1, 2 and 5 is happening concurrently. At this time there is expected to be a total of 290 operatives on site and there will be 1,100 deliveries occurring in the month.

5.8.4 The vehicle movements have been converted to a daily flow by assuming each vehicle arrives and leaves during the day and there are four 5.5-day weeks in each month. This equates to 100 vehicle movements per day (50 in, 50 out).

5.8.5 Peak hour (AM + PM) movements are typically around one-sixth of a daily flow which would equate to 8 arrivals and 8 departures across the two peaks. For a robust assessment 8 arrivals and 8 departures in each peak have been assumed for assessment purposes.

5.8.6 For operatives, it is assumed that a similar mode share to the local census journey to work is appropriate where approximately 10% of work trips are made by car/van. It is expected that most vehicle based operative trips will be by minibus type vans. This would equate to 29 arrivals in the AM peak and 29 departures in the PM peak.

5.8.7 A summary of the trip generation for construction traffic is provided in **Table 5.9**.

Table 5.9: Construction Traffic Assessment

	Light Vehicles	Heavy Vehicles	Total
AM Peak (08:00-09:00)	29	16	45
PM Peak (17:00-18:00)	29	16	45
Daily	58	100	158

Construction Traffic Routes

5.8.8 The location of the site between two major north-south routes and north of Burgess Park means that there are limited routes for construction traffic to take. It is therefore proposed to limit construction traffic to the routes indicated on **Figure 5.1** comprising:

- Albany Road B214;
- Walworth Road / Camberwell Road A215;
- Old Kent Road A2; and
- Thurlow Street / Flint Street / Rodney Road / Heygate Street.
- Beyond these streets the construction traffic will be limited to major routes.

5.8.9 Due to the constraints around the site it is not considered appropriate to limit construction traffic to one particular route to, say, the A2 as it will focus all movements in a particular area. It is better to allow a number of main routes to be used to distribute the traffic.

5.8.10 The impact of the additional construction traffic on the network is assessed in the Transport Assessment.

Construction Logistics Plan

5.8.11 In order to assist the control of construction traffic during the development of the site, an Outline Construction Logistics Plan has been prepared and is provided in the Transport Assessment (Ref. 5.2).

5.9 Health and Safety Considerations

5.9.1 Health and safety issues are a primary factor in influencing the demolition and construction methods described in this Chapter. In accordance with the Construction (Design and Management) Regulations 2014 the construction teams will be required to prepare detailed written health and safety plans, specific fire and emergency procedures, risk assessments and method statements for each stage of demolition or phase of construction.

5.9.2 Compliance with all relevant health and safety legislation will be enforced including:

- Health and Safety at Work Act 1974;
- Management of Health and Safety at Work Regulations 1999;
- Construction (Design and Management) Regulations 2007;
- Control of Asbestos Regulations 2006;
- Air Quality Standards Regulations 2010;
- The Contaminated Land (England) Regulations 2000;
- Special Waste Regulations (amended 1997, 1997, 2001, 2001);
- Confined Spaces Regulations 1997;
- COSHH 1999;
- Lifting Operations and Lifting Equipment Regulations 1998;
- Manual Handling Operations Regulations 1992;
- Control of Noise at Work Regulations 2005;
- Personal Protective Equipment at Work Regulations 1992;
- Provision and Use of Work Equipment Regulations 1998;
- The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995;
- Control of Vibrations at Work Regulations 2005; and
- Work at Height Regulations 2005.

5.10 References

Ref. 5.1 London Borough of Southwark (2001), Code of Environmental Construction Practice

Ref. 5.2 WSP (2014), Aylesbury Estate - Transport Assessment

Ref. 5.3 ONS (2014), Annual Business Survey 2012, Revised Results

Ref. 5.3 Terrain Surveys Ltd (2014), Aylesbury Estate Topographical and Underground Services Survey

Ref. 5.4 Bactec International Ltd (2014), Explosive Ordnance Threat Assessment in respect of Aylesbury Estate

Ref. 5.5 WSP (2014), Aylesbury Estate - Site Wide Waste Management Strategy

6 Ecology and Nature Conservation

6.1 Introduction

6.1.1 This Chapter reports the likely significant environmental effects of both the Site Wide Development Option, and FDS Development Option upon the ecology and nature conservation in the context of the Site and the surrounding area. In particular it considers the likely effects upon non-statutory designated sites and effects upon fauna (nesting birds and bats) during both the construction and operational phases of development.

6.1.2 This Chapter (and its associated figures and appendices) should be read with together with **Chapters 1 – 5** as well as **Chapter 13 'Air Quality'** and **Chapter 17 'Cumulative Effects'**.

6.2 Appendices

Table 6.1: Appendices for Chapter 6

Appendix No.	Document
6.1	Greengage (2013). Aylesbury Estate: Ecological Extended Phase 1 Habitat and Protected Species Survey Report
6.2	Greengage (2013). Aylesbury Estate: Bat Emergence & Activity Survey Report
6.3	WSP UK Ltd. (2014). Aylesbury Regeneration Area: Extended Phase 1 Habitat Survey
6.4	WSP UK Ltd. (2014). Aylesbury Regeneration Area: Bat Survey

6.3 Legislation, Policy and Guidance

Legislative Framework

6.3.1 The applicable legislative framework is summarised as follows:

- Council Directive 2009/147/EC on the Conservation of Wildlife Birds 2009 (the EC Birds Directive) (Ref. 6.1);
- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora 1992 (the Habitats Directive) (Ref. 6.2);
- The Conservation of Habitats and Species Regulations 2010 (as amended) (Ref. 6.3);
- The Wildlife and Countryside Act 1981 (as amended) (Ref. 6.4); and
- The Natural Environment and Rural Communities Act 2006 (Ref. 6.5).

Planning Policy

6.3.2 Planning policy at the national, regional, and local level and its relevance to environmental design and assessment is discussed in (**Chapter 4 'Planning and Policy Context'**).

National Planning Policy

The National Planning Policy Framework (NPPF)

6.3.3 The National Planning Policy Framework (NPPF) (Ref. 6.6) was published on 27th March 2012 and is a key part of the reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth. There is an overarching presumption in favour of sustainable development that should be the basis of every plan and every decision.

6.3.4 The NPPF sets out, amongst other points, in Paragraph 109 how at an overview level the '*planning system should contribute to and enhance the national and local environment by:*

- *…recognising the wider benefits of ecosystem services;*
- *minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures…'*

6.3.5 The NPPF states that this should be achieved through local planning development frameworks and in Paragraph 113 gives recommendations for criteria based policies which recognise the hierarchy of designated sites which range from internationally important habitats, to sites of importance at a local level and ensure that protection is *'commensurate with their status and gives appropriate weight to their importance and the contribution that they make to wider ecological networks.'*

6.3.6 A list of principles which local planning authorities should follow when determining planning applications is included in Paragraph 118 which states the following:

- *'if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as last resort, compensated for, then planning permission should be refused;*
- *proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;*
- *…opportunities to incorporate biodiversity in and around developments should be encouraged;*
- *planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss…'*

6.3.7 Although the NPPF revokes Planning Policy Statement 9 (PPS9, Ref. 6.7), the ODPM circular 06/2005 (Ref. 6.8) originally prepared to accompany PPS9 remains current at the time of writing; this states that '*the presence of a protected species is a material consideration when a planning authority is considering a development proposal'.* The circular advises that local authorities should consult Natural England before granting planning permission if the proposals could adversely affect a protected species.

Regional Planning Policy

The London Plan: Spatial Development Strategy for Greater London (2011) (Revised October 2013)

6.3.8 The London Plan: Spatial Development Strategy for Greater London (2011) (the London Plan, (Ref. 6.9) is the overall strategic plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. It forms part of the development plan for Greater London. London boroughs' local plans need to be in general conformity with the London Plan, and its policies guide decisions on planning applications by councils and the Mayor.

6.3.9 The following policies relate to the natural environment:

- Chapter 7 of the London Plan is entitled 'London's Living Places and Spaces' and it is this chapter that contains the majority of policies of relevance to the natural environment.
  - Policy 7.19 Biodiversity and Access to Nature. This is the primary policy relating to the natural environment and states that the mayor will work with all relevant partners to ensure a proactive approach to the protection, enhancement, creation, promotion and management of biodiversity in support of the Mayor's Biodiversity Strategy (see below). The policy requires that there is planning for nature from the beginning of the development process and that steps are taken to secure positive gains for nature. The policy also states that proposals promoted by the London Plan will not adversely affect the integrity of a European site of nature conservation either alone or in combination with other plans or projects.
  - In relation to development proposals, policy 7.19 states that these should make a positive contribution to biodiversity, prioritising assisting achievement of biodiversity action plan (BAP) targets and ensuring there is no adverse impact on designated sites of nature conservation or the population or conservation status of a protected species, or a priority species or habitat identified in a UK, London or appropriate regional BAP or borough BAP.
  - Policy 7.19 gives specific consideration to Sites of Importance for Nature Conservation, stating that the highest protection should be afforded to sites with existing or proposed international and national designations. Development proposals should give strong protection to sites of metropolitan importance for nature conservation (SMIs), which are sites that have strategic nature conservation importance. Sites of borough and local importance for nature conservation should be given protection commensurate with their importance.
  - When considering proposals that would affect directly, indirectly or cumulatively a site of recognised nature conservation interest, the policy states that the following hierarchy will apply:

  i. avoid adverse impact to the biodiversity interest

  ii. minimise impact and seek mitigation

  iii. only in exceptional cases where the benefits of the proposal clearly outweigh the biodiversity impacts, seek appropriate compensation.

- Also within Chapter 7 are;
  - Policy 7.16: Green Belt, which states the Mayor's strong support of the extent and protection of London's existing green belt;
  - Policy 7.17: Metropolitan Open Land (MOL), which states the Mayor's strong support of the protection of existing MOL and its extension where appropriate; and
  - Policy 7.18: Protecting local open space and addressing local deficiency, which states the Mayor's support of the creation of new open space in London to ensure satisfactory levels of local provision to address areas of deficiency
- In addition to the policies within Chapter 7, there are a number of policies which are of relevance to the natural environment, reflecting the cross-cutting nature of this topic area. Specifically, there are policies within Chapter 3: London's People, which relate to health and social infrastructure and which identify the importance of access to green and open spaces (Policies 3.2 and 3.6). Within Chapter 5: Climate Change, there are policies which promote and protect biodiversity and green infrastructure in recognition of the important role these play in urban cooling and climate change adaptation. Of particular relevance are polices Policy 5.3: Sustainable design and construction, Policy 5.10: Urban greening and Policy 5.11: Green roofs and development site environs. There are also policies within this chapter which relate to flood risk and sustainable urban drainage which have a degree of overlap with ecology and nature conservation matters.
- Of further particular relevance to this Site is Policy 3D.10: Metropolitan Open Land which states that: '*The Mayor will and boroughs should maintain the protection of MOL from inappropriate development. Any alteration to the boundary of MOL should be undertaken by boroughs through the DPD process, in*

consultation with the Mayor and adjoining authorities… Essential facilities for appropriate uses will only be acceptable where they do not have an adverse impact on the openness of MOL.'

6.3.10 The 'Mayor's Biodiversity Strategy' (2002) outlines 14 policies for biodiversity, including its protection, management and enhancement, as well as its incorporation into new developments. It is within this chapter that Sites of Metropolitan Importance for Nature Conservation (SMINCs) are identified and are recommended to be protected in boroughs' Unitary Development Plans (UDPs).

Local Planning Policy

6.3.11 At a local level, multiple documents are used to set the strategy for development and inform determination of planning applications in Southwark, collectively referred to as the Development Plan. With respect to the Estate, three key documents are relevant:

- The Southwark Plan (Unitary Development Plan) (2007) Saved Polices (Updated 2013);
- The Southwark Core Strategy (2011); and
- The Aylesbury Area Action Plan (AAAP).

The Southwark Plan (Unitary Development Plan) (2007) Saved Polices (Updated 2013)

6.3.12 Saved policies from the Southwark Unitary Development Plan (Ref. 6.10) include Policy 3.28 – Biodiversity which states that: '*The LPA will take biodiversity into account in its determination of all planning applications and will encourage the inclusion in developments of features which enhance biodiversity, requiring an ecological assessment where relevant. Developments will not be permitted which would damage the nature conservation value of Sites of Importance for Nature Conservation (SINCs) and Local Nature Reserves (LNRs) and/or damage habitats, populations of protected species or priority habitats/species identified in the United Kingdom, London or the Southwark Biodiversity Action Plan. Where, exceptionally, such developments are permitted, the Council will seek mitigation and/or compensation for the damage to biodiversity.'*

The Southwark Core Strategy (2011)

6.3.13 The Core Strategy adopted on 6th April 2011 (Ref. 6.11) includes Strategic Policy 11 as follows:

- Open Spaces and Wildlife: '*We will improve, protect and maintain a network of open spaces and green corridors that will make places attractive and provide sport, leisure and food growing opportunities for a growing population. We will protect and improve habitats for a variety of wildlife. We will do this by:*
  - *Continuing to protect important open spaces from inappropriate development. These will include parks, allotments, sports grounds, green chains, sites of importance for nature conservation, and cemeteries. Large spaces of importance to all of London will be protected (Metropolitan Open Land (MOL) as well as smaller spaces of more borough wide and local importance (Borough Open Land and Other Open Spaces).*
  - *Protecting woodland and trees and improving the overall greenness of places, including through promoting gardens and local food growing.*
  - *Promoting and improving access to and links between open spaces.*
  - *Identifying and protecting open spaces that provide quiet areas and relative tranquillity.*
  - *Requiring new development to help meet the needs of a growing population by providing space for children's play, gardens and other green areas and helping to improve the quality of, and access to, open spaces and trees, particularly in areas deficient in open space.*
  - *Requiring new development to avoid harming protected and priority plants and animals and help improve and create habitat.*

London Borough of Southwark (2010), The Aylesbury Area Action Plan

6.3.14 The regeneration of the Estate is guided by the adopted 2010 Aylesbury Area Action Plan (Aylesbury AAP) (Ref. 6.12) which provides specific policies relevant to the local area.

6.3.15 The Aylesbury AAP contains policies relevant to the protection and enhancement of non-statutory designated sites in close proximity to the Estate as follows:

- Burgess Park located to the south of the Estate is highlighted in the Aylesbury AAP as an area to be revitalised as part of the Aylesbury Estate redevelopment, and whilst it lies beyond the Action Area Core redevelopment '*a redesigned and improved Burgess Park – a destination 'World Park' for South London'* is listed as a main feature of the masterplan, and Policy MP1 states clearly that '*Development proposals must be in compliance with the masterplan'*.
- Surrey Square SLINC is a small park located to the east of the Estate which includes the neighbouring school's former nature area. The Aylesbury AAP makes specific reference to this area under Policy PL1: Street Layout, confirming that '*Three green fingers will run from Burgess Park into the Aylesbury AAP area connecting with Surrey Square Park, the Missenden Play area and Faraday Gardens'*.

Guidance

UK Post-2010 Biodiversity Framework

6.3.16 The UK Post-2010 Biodiversity Framework was published by the JNCC and Defra in July 2012 on behalf of the country-specific Biodiversity Groups in the United Kingdom (Ref. 6.13). The framework sets out broad enabling structures for actions to conserve and enhance biodiversity across the UK, underpinned by country-specific action plans which continue delivering priorities building upon work completed under the UKBAP (although the UKBAP partnership no longer operates).

6.3.17 In England, the action plan which seeks to deliver within this framework is *'Biodiversity 2020: A strategy for England's wildlife and ecosystem services*' published by Defra on 19 August 2011. The overall mission of the '2020 Strategy' is to '*halt overall biodiversity loss, support healthy well-functioning ecosystems, and establish coherent ecological networks with more and better places for nature for the benefit of wildlife and people'*.

Planning Practice Guidance

6.3.18 Planning practice guidance provides supporting information for implementation of policies contained within the NPPF (Ref. 6.14). The guidance contains a section for the 'Natural Environment' which contains sections relevant to biodiversity, ecosystems and green infrastructure.

6.4 Assessment Methodology and Significance Criteria

Relevant Elements of the Comprehensive Development

6.4.1 The following components of the Comprehensive Development are relevant to the assessment:

- Planning application drawings (FDS Application site Detailed Plans and Masterplan Application site Parameter Plans);
- Design Code; and
- Development Specification.

Scope of the Assessment

6.4.2 The scope of this Chapter is to consider the likely effects of both the Site Wide Development Option, and FDS Development Option independently upon sensitive ecological receptors within the Site and in the wider area (where appropriate) identified during baseline survey and data collation.

6.4.3 An EIA Scoping Report was submitted to LBS in April 2014 which invited LBS and consultees to comment on the scope of this assessment (**Appendix 2.1**). The scope of this Chapter takes into account the LBS EIA Scoping Opinion, received in June 2014 (**Appendix 2.2**) and subsequent correspondence (Appendix 2.3), in the context of the evidence base for the potential effects as outlined below.

Extent of the Study Area

6.4.4 The baseline survey data used to inform this Chapter is collated from a number of sources; it includes data collected by another consultant in 2013 (**Appendix 6.1 and 6.2**) in support of redevelopment of the area, data collated by Greenspace Information for Greater London (GiGL), and survey information collected directly to support these planning applications. For each potential receptor the extent of the study area for which survey data are available is described in the Methods of Baseline Data Collection section.

6.4.5 For the purpose of the ecological desk study the following search radii were used:

- 2km radius of the Site in relation to records for protected species (excluding bats), species and habitats of conservation concern and all designated sites;
- 5km radius of the Site in relation to records of bat species; and
- 10km radius of the Site in relation to European designated sites.

Consultation

6.4.6 LBS was consulted regarding the scope of this Ecological Impact Assessment (EcIA), and their comments were considered in subsequent correspondence (letter dated 22nd July 2014, **Appendix 2.3**).

Method of Baseline Data Collation

Ecological Desk Study (incl. field survey completed pre-2014)

6.4.7 An ecological desk study was completed to collate existing records held by third parties for the Site and surrounding area. Data was requested from;

- Greenspace Information for Greater London (GiGL[1]); and
- London Bat Group.

6.4.8 The relevant search radii, and data sources contacted are shown in Table 6.2 below.

Table 6.2: Relevant Search Radii and Data Sources

Search Radius	Potential Ecological Constraints	Source of Data	Data Received / Extracted
Sites and Habitats			
10km	European designated Natura 2000 sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) and internationally designated RAMSAR sites.	Natural England corporate datasets	June 2014

[1] GiGL collate data from numerous species recording groups within London.

Search Radius	Potential Ecological Constraints	Source of Data	Data Received / Extracted
Sites and Habitats			
2km	UK Statutory Designated sites	Natural England corporate datasets	June 2014
2km	Non-statutory Designated sites	GiGL	June 2014
Sites and Habitats			
2km	Protected and Notable Species Records	GiGL / LBG	June 2014
5km	Bat Records		

6.4.9 Ecological survey data gathered prior to 2014, where available, was also reviewed; this included an extended Phase 1 habitat survey (Ref. 6.15), **Appendix 6.1** and bat survey (Ref. 6.16), **Appendix 6.2**.

6.4.10 The previous extended Phase 1 habitat survey was completed in August 2013, and is reported to have followed standard survey methods (Ref. 6.17) entailing a walkover survey of the Site to map habitats present and assess the potential for protected species or other species of conservation concern to be present. The survey included scoping of buildings present for their potential to support bat roosts.

6.4.11 The bat survey entailed two survey visits completed pre-dawn on 23rd and after dusk on 25th September respectively. On each survey visit, a team of six surveyors is reported to have attended the Site to complete a manual bat activity survey following pre-defined transect routes.

Extended Phase 1 Habitat Survey

6.4.12 To verify current baseline conditions, an updated extended Phase 1 habitat survey was completed on 23rd June and 2nd July 2014. The extended Phase 1 survey was completed in line with standard methods (Ref. 6.17), and further detail is described in technical reporting included as **Appendix 6.3**.

Bat Survey

6.4.13 The extended Phase 1 habitat survey identified buildings with potential to support bat roosts, set within otherwise low quality bat foraging habitat. To supplement existing survey information relating to bat activity on the Estate (Ref. 6.16) further survey in the form of automated surveys, and manual detector surveys were completed.

6.4.14 The automated detector survey entailed the deployment of up to five detectors for at least three consecutive nights during August and September 2014 respectively. Data recorded was then analysed to record the species active over the recording locations, and the level of activity.

6.4.15 The manual detector surveys were targeted to gather information about bat activity recorded near Arklow House (in the FDS Application site) during the August automated detector survey. These surveys involved four surveyors attending Site on two occasions on the 4th and 9th of September 2014 respectively. Each survey visit commenced 90 minutes before dawn and ceased at dawn. During the surveys the team of ecologists watched and listened for bat activity near to Arklow House, recording the time of bat passes and where possible the direction of travel and activity type (for example foraging or commuting behaviour).

Scoping of Receptors

6.4.16 The results from the above baseline surveys were used in conjunction with the responses from consultees, and information on the scheme design, to assess the likely significant ecological effects that both the Site Wide Development Option and FDS Development Option could have during both the construction and operational phases.

Evaluation of Receptor

6.4.17 The conservation value of each sensitive receptor was evaluated within a geographical context using the categories recommended in good practice (Ref. 6.18). The evaluation process took into account the results of the baseline surveys, the rarity of the receptor and sensitivity of each receptor to effects. The following geographic scales were used:

- International;
- UK;
- National;
- Regional;
- County (or Metropolitan e.g. London);
- District (or Unitary Authority, City or Borough);
- Local or Parish; and
- Site value.

6.4.18 In addition, in order to distinguish between habitats and species that are of value at the Site scale and those that have negligible value at any scale (i.e. lower than Site value), the latter have been assigned to be of negligible value.

Characterising the Potential Effect

6.4.19 Based on an understanding of the baseline conditions and of the two Development Options, potential effects on receptors scoped into the assessment have been considered, taking into account the site preparation (demolition), earthworks, construction and operational phases. Effects have been assessed against baseline conditions and have been characterised with reference to ecological structure and function of the feature in question, for instance the fragility/stability of an ecosystem and its connectivity to other features or resources. The duration of the effect has also been considered, including whether the effect is temporary or permanent and whether it is considered to be short-term, medium-term or long-term.

Assigning Significance

6.4.20 The geographical scale of significance has been used as specified within good practice guidelines both to evaluate the receptor and to assess the scale at which an effect is significant. An ecologically significant effect is defined as an effect (adverse or beneficial) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area.

6.4.21 The significance of effects upon receptors is determined considering their value at a geographic scale (as noted above); however any given effect may be significant at a reduced scale depending on the extent and magnitude of the effect. For example although a habitat type may represent 20% of the resource at a County level and hence be considered of value at this scale, the proposed works might affect only a portion of the

habitat representing 1% of the resource in the County hence the effect would not be considered significant at this scale. However, that 1% may represent 20% of the resource at a Local scale and therefore the effect at this geographic scale would be considered significant.

6.4.22 To facilitate relating these geographical scales to the significance terminology used within the rest of this ES, please refer to Table 6.3.

Table 6.3: Relating Geographic Scale (Ref: 6.18) to Significance

Geographic Scale	Signficance
International (European)	Major
National (England)	
Regional (South East)	Moderate
County (Greater London)	
District (Southwark)	Minor
Local (or Parish)	
Site (Application Site)	
Negligible	Negligible

Assigning a Threshold Value

6.4.23 In the process of EcIA, it is important to select the appropriate features for inclusion in the assessment. For the purpose of this assessment receptors have been scoped into the assessment where potential effects could be of significance at the Local scale or greater, or where there are legal and/or planning implications associated with effects.

Confidence in Prediction of Effect on Sensitive Receptor

6.4.24 The following four point scale has been adopted to describe the degree of confidence in the assessment of the effects on ecological structure and function. This confidence level relates to the likelihood that a construction or operational event or activity will lead to the described ecological effect on a sensitive receptor:

- Certain / near-certain – probability estimated at 95% chance or higher;
- Probable / likely – probability estimated above 50% but below 95%;
- Unlikely / possible but uncertain – probability estimated above 5% but below 50%; or
- Extremely unlikely – probability estimated at less than 5%.

Limitations and Assumptions

6.4.25 Survey information used to support the evaluation of baseline conditions is sourced from multiple locations as referenced within this report. Baseline data from third parties has not been verified specifically for the purpose of this ecological impact assessment, and has been taken to be an accurate reflection of conditions at the time each survey was conducted. Details relating to the personnel responsible for respective surveys undertaken by WSP UK Ltd. in 2014, and equipment used, are provided in the relevant reports referenced and appendices. Please note that whilst some equipment is relatively standard, for other survey types, for example bat survey, there are a range of detector types commonly used and data collected may not

be directly comparable between surveys in different years. In evaluating baseline conditions this has been taken into account and confidence levels adjusted accordingly.

6.5 Baseline Conditions

Off-Site Habitats

Statutory Designated Sites

6.5.1 No sites with statutory designation for their nature conservation value are situated within 2km of the Site. Two European designated sites lie within a 10km radius of the Site; Wimbledon Common Special Area of Conservation (SAC) and Lee Valley Special Protection Area (SPA) which is also a Ramsar site - these are located 9.9km to the southwest and 9.5km to the north respectively. A summary of the reasons for their designation are provided in Table 6.4 below. These sites are designated for their nature conservation value at the international scale.

Table 6.4: European Designated Sites within 10km of the Site

Site Name	Designation	Distance / Direction from Proposed Scheme	Description
Lee Valley	SPA, Ramsar	9530m N	**Qualifying features:** ■ Great bittern *Botaurus stellaris* (Non-breeding) ■ Gadwall *Anas strepera* (Non-breeding) ■ Northern shoveler *Anas clypeata* (Non-breeding) **Ramsar criterion 2** ■ The site supports the nationally scarce plant species whorled water-milfoil *Myriophyllum verticillatum* and the rare or vulnerable invertebrate *Micronecta minutissima* (a water-boatman). **Ramsar criterion 6** ■ Northern shoveler *Anas clypeata*, and Gadwall *Anas strepera strepera*
Wimbledon Common	SAC, SSSI	9900m SW	**Annex I habitats that are a primary reason for selection of this site** ■ N/A **Annex I habitats present as a qualifying feature but not a primary reason for selection of this site** ■ Northern Atlantic wet heaths with *Erica tetralix* ■ European dry heaths **Annex II species that are a primary reason for selection of this Site** ■ Stag beetle *Lucanus cervus* **Annex II species present as a qualifying feature, but not a primary reason for site selection** ■ N/A

Non-Statutory Designated Sites

6.5.2 Forty non-statutory designated sites area located within 2km of the Site (GiGL). These include:

- One Site of Metropolitan Importance for Nature Conservation (SMINC), The River Thames and tidal tributaries, located 1760 m to the north of the Estate, which is home to many fish and birds and creates a wildlife corridor running right across the capital.
- Three Sites of Borough Grade I Importance for Nature Conservation (SBINC I) the closest of which, Ruskin Park, is located 1685 m south of the Estate, and was originally the grounds of a Victorian house, with planted tree collection, ponds and dense shrubberies.
- 7 Sites of Borough Grade II Importance for Nature Conservation (SBINC II) the closest of which, Burgess Park, is located less than 10m from the southern edge of the Estate, and is a large park with several features of interest for nature conservation, including a lake and nature area; and
- 29 Sites of Local Importance for Nature Conservation (SLINC) the closest of which, Surrey Square Park, is located less than 10m east of the Estate and is a small park which includes the neighbouring school's former nature area.

6.5.3 These sites are designated for their nature conservation value at the county (SMINC), district (SBINC) and local (SLINC) scale.

On-Site Habitats

6.5.4 The Site comprises highly urbanised habitats, dominated by buildings and hardstanding with amenity grassland, scattered trees and introduced shrubs present in associated courtyard areas. Table 6.5 lists the habitat types present on Site, includes a summary description of each and an associated evaluation in the geographic frame of reference.

Table 6.5: Summary and Evaluation of Habitats on Site

Habitat Type	Conservation Value		Description and Justification
	Masterplan? Site	FDS Site	
Mixed scattered trees	Local	Site	Mature and semi-mature trees are present within the block courtyards and lining main streets including East Street and Thurlow Street of the Estate. Species include ornamentals such as Indian bean tree *Catalpa bignonioides*, acacia and wingnut *Pterocarya fraxinifolia* and varieties of maple *Acer* sp., cherry *Prunus* sp. and lime *Tilia* sp.. Native and naturalised species such as ash Fraxinus excelsior, sycamore *Acer pseudoplatanus*, and elder *Sambucus nigra* are also present and seedlings of these species occur within beds of introduced shrubs. The presence of groups of mature trees in the otherwise urban local context is of nature conservation value; given the scale of the Estate the overall resource is of Local value, with the FDS Site the smaller number of trees are considered to be of value at the Site scale.
Amenity grassland	Negligible	Negligible	Amenity grassland is present in many of the building courtyards, and along the frontage between blocks on Albany Road and Burgess Park. The grassland is actively managed. Botanical species present are typical of this habitat type; the grassland is dominated by perennial rye grass *Lolium perenne* with bent grasses *Agrostis* sp. also present. Herbs include common cat's-ear *Hypochoeris radicata*, common daisy *Bellis perennis*, spotted medick *Medicago Arabica*, ribwort plantain *Plantago lanceolata* and white clover *Trifolium repens*. The grassland is of negligible nature conservation value.
Introduced shrubs	Negligible	Negligible	Introduced shrubs are present planted within courtyard areas; these include tree of heaven *Ailanthus altissima* which has spread within courtyards associated with the Charlbury blocks. Species of cotoneaster are also present, as is typical of urban landscaping in the area.

Habitat Type	Conservation Value		Description and Justification
	Masterplan? Site	FDS Site	
			Whilst flowering shrubs have some value to invertebrates, and as habitat for nesting birds, this is readily recreated and the shrubs are of limited inherent nature conservation value.
Buildings and hard standing	-	-	Buildings and hard-standing (vehicular access and parking and pedestrian access) are present throughout the Estate. In a number of blocks, ground floor flats have gardens sectioned off from the main courtyard areas. Whilst built structures are not of inherent conservation value, they do provide varying levels of habitat quality for roosting bats and nesting birds. The conservation value of these features is considered separately with respect to the relevant species group.

Species

Bats

6.5.5 Records held by the London Bat Group and GiGL confirm the presence of at least seven species of bat within a 5km radius of the Estate, with common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *P. pygmaeus* recorded either within the Estate or less than 500m from the Estate.

6.5.6 Automated detector surveys completed on the Site in August and September 2014 confirmed the presence of five species:

- Leisler's bat *Nyctalus leisleri*;
- Noctule bat *Nyctalus noctula*;
- Common pipistrelle;
- Soprano pipistrelle; and
- Nathusius' pipistrelle *Pipistrellus nathusii.*

6.5.7 Activity levels recorded were low across the Site, with generally very few bat passes recorded in locations away from Burgess Park. Activity recorded was dominated by common pipistrelle, and at Locations 1 and 2 both foraging and social activity was recorded. The data recorded included only occasional passes (i.e. <5 per night, per location) of Leisler's and noctule bats, most likely representing individual bats commuting over the Site in these locations.

6.5.8 In August 2014, the detector positioned at Location 1 (Arklow House, within the FDS Application site) recorded common pipistrelle activity soon after dusk and consistently over a four day period within 20 minutes of sunrise, see Table 6.6. This pattern of behaviour indicates that common pipistrelles roost in close proximity to this location. Two manual detector surveys were completed in September 2014 at Arklow House with the objective of monitoring bat activity in this location; specifically watching for bats re-entering a roost location within the building. No bats were recorded re-entering the building, and a single common pipistrelle was recorded active in the area during the second dawn survey. Whilst the presence of a roost was not objectively confirmed, based on the automated detector data it is considered probable that a transitory, non-breeding common pipistrelle roost used by small numbers of bats (i.e. <5) is located in part of the roof structure of Arklow House. In this area there are very few features on surrounding buildings which could be used by this species.

Table 6.6 Earliest / Latest Bat Activity recorded at Location 1 in August (Arklow House)

Date	Earliest / Latest bat recording (mins) – all relate to common pipistrelle	
	Time after sunset	Time before sunrise
4th August	12	NA
5th August	22	18
6th August	17	16
7th August	68	15
8th August	58	14

6.5.9 Patterns of bat activity recorded in the other detector locations are less consistent, whilst individual common pipistrelle bats were recorded within typical emergence periods at Locations 2, 4 and 6 in September 2014 these appear to be isolated occurrences rather than occurring on consecutive days.

6.5.10 Table 6.7 below shows the relative frequency recorded overall (all survey locations combined), and evaluates the likely value of habitats on Site for respective species based on the activity survey.

Table 6.7: Evaluation of Importance of Study Area Components to Bat Species Recorded

Species	UK Status[2]	Est UK Pop.[3]	Relative Frequencey Recorded	Likely Value of Habitats on Site based on Automated Detector Data
Noctule	Uncommon	50,000	Very Infrequent	Site
Leisler's	Scarce	10,000	Very Infrequent	Site
Common pipistrelle	Common	2.4 million	Infrequent	Local
Soprano pipistrelle	Common	1.3 million	Very frequent	Site
Nathusius' pipistrelle	Rare (but widespread)	16,000	Very Infrequent	Site

6.5.11 Collectively, the assemblage of bat species active on the Site is considered to be of conservation value at the Local scale primarily due to the size of the Site and function as connecting habitat between other greenspaces. The roost resource present is of conservation value at the Site scale.

Birds

6.5.12 Common and widespread species of birds, typical of the urban environment, were recorded on the Site during the ecological survey work completed in 2014.

6.5.13 Three species of principal importance as listed on Schedule 41 of the NERC Act 2006 were recorded; starling *Sturnus vulgaris*, house sparrow *Passer domesticus* and dunnock *Prunella modularis*. An active starling nest was recorded associated with Arklow House (within the FDS Application site) and fledgling house sparrows were recorded elsewhere within the Site. It is probable that dunnock nests within denser introduced shrub planting present on the Site.

[2] UK Status is based on the National Bat Monitoring Programme (NBMP) Population Trends 2012 (BCT, August 2012).

[3] Estimated UK Population based on Battersby (2005) or Harris *et al* (1995)

6.5.14 The Site provides limited suitable habitat for birds listed as Schedule 1 species under the Wildlife and Countryside Act 1981, with the exception of peregrine *Falco peregrinus.* Taller buildings present could be used as vantage points by peregrine, however given the availability of taller, more prominent buildings in the vicinity (to the north) on balance it is considered unlikely that this species would nest on the Estate. No current records were identified during the desk study completed earlier in 2014. The most recent record of peregrine falcon held by GiGL within the search area is dated 2006; a total of seven breeding pairs were recorded in Inner London in 2011 (LNHS, 2011).

6.5.15 Overall the breeding bird community present within the Site is considered to be of conservation value at the Local scale. This is partly due to the area of the Site as a whole, which contains pockets of suitable habitat for breeding birds partially connecting larger green spaces in the local area.

Other Species of Principal Importance (SPI)

6.5.16 In addition to species described above, habitat present on the Site provides suitable conditions for other SPI including; hedgehog *Erinaceus europaeus.* No records were returned during the desk study exercise confirming the presence or otherwise of this species, however given the presence of suitable habitat it is reasonable to assume this species occurs for the purpose of considering potential effects upon it. The habitat on Site, in the context of surrounding land, is considered likely to be of Site value to hedgehog primarily due to the scale and parcels of semi-natural grassland present.

Future Baseline

6.5.17 In the absence of development habitats on the Site are unlikely to change substantially; however, in time, without maintenance buildings would be likely to become dilapidated, and parts of the Site where vigorous plant species are present would likely become dominated by these species to the exclusion of others.

6.6 Sensitive Receptors and Potential Effect Pathways

6.6.1 Table 6.8 below lists potentially sensitive receptors identified during the baseline assessment, and summarises the scoping of effects which are taken forward in this EcIA.

Table 6.8: Scoping of Ecological Receptors for Inclusion in EcIA

Receptor	Nature Conservation Value of Receptor	Scoping (In/Out)	Potential Effect Pathways to be Considered
Habitats and Flora			
Statutory Sites (Wimbledon Common SAC, and Lee Valley SPA and RAMSAR)	Up to International	Out	Wimbledon Common SAC and Lee Valley SPA, are located 9.9km to the southwest and 9.5km to the north of the Estate respectively. It is considered unlikely that future redevelopment of the Estate will have an impact on upon these sites due to their distance from the Estate and the urban nature of the intervening land; which, by its nature will contain a number of factors more likely to influence the sites.
Non-statutory Sites (Burgess Park SBINC II and Surrey Square SLINC)	District and Local	In	Burgess Park and Surrey Square are located immediately adjacent to the north and eastern boundaries of the Estate respectively. Burgess Park is highlighted in the Aylesbury AAP as an area to be revitalised as part of the Aylesbury Estate regeneration and a number of measures have already been taken here to generate both enhanced recreational facilities and biodiversity benefits. Surrey Square SLINC to the east is a small park which includes the neighbouring school's former nature area. Given the proximity of the sites there is scope for detrimental effects during the construction phase, and enhancement during the operational phase therefore potential effects upon these receptors are scoped into the EcIA via the following pathways: ■ Degradation resulting from air quality changes (i.e. dust deposition)

Receptor	Nature Conservation Value of Receptor	Scoping (In/Out)	Potential Effect Pathways to be Considered
			during the construction and operational phase; and ■ Enhancement resulting from increased habitat connectivity during the operational phase.
On-Site Habitat	Site	In	The Estate comprises highly urbanised habitats, dominated by buildings and hard standing with amenity grassland, scattered trees and introduced shrubs present in associated courtyard areas. The habitats present are of limited inherent value and their removal is not anticipated to lead to significant effects at above Site scale. Due to the size of the Estate, however, enhanced and expanded habitat creation has potential to have positive effects of greater significance. For this reason, potential effects associated with this receptor are scoped into the EcIA via the following pathway: ■ Enhancement resulting from the establishment of newly created habitat during the operational phase.
Fauna			
Bats	Local	In	Five species of bat are known to be active over the Estate, with a small, non-breeding roost used by common pipistrelle considered likely to be present within Arklow House. Overall, the highly urbanised habitats present on the Estate offer low quality bat foraging / commuting habitat, however pockets of scattered trees and introduced shrub planting offer foraging resource in proximity to Burgess Park and Surrey Square which offer larger parcels of suitable habitat. Given scope for enhancement of habitat on the Estate for bats, and in light of the high level of legal protection afforded to this species group potential effects associated with this receptor are scoped into the EcIA via the following pathways: ■ Direct loss (mortality and injury) during the construction phase; ■ Direct habitat loss (roost destruction) and fragmentation during the construction phase; ■ Disturbance (noise and light) during the construction and operational phase; and ■ Habitat creation and future management during the operational phase.
Birds (breeding)	Site	In	An assemblage of breeding birds typical of the habitat types present on Site is most likely present, in light of relevant planning policy and the legal protection afforded to all nesting birds potential effects associated with this receptor are scoped into the EcIA via the following pathways: ■ Direct loss (mortality and injury) during the construction phase; ■ Direct habitat loss (land take) and fragmentation during the construction phase; and ■ Habitat creation and future management during the operational phase.
Other species of principal importance (hedgehog)	Site	In	Habitat on Site is suitable for hedgehog and this species is likely to be present, therefore the following are assessed: ■ Direct habitat loss during the construction phase; ■ Disturbance (noise/vibration and light) during the construction and operational phase; and ■ Habitat fragmentation during the construction phase.

6.7 Assessment of Effects, Mitigation and Residual Effects

Demolition and Construction

Site Wide Development Option

Non-statutory Sites (Burgess Park SBINC II and Surrey Square SLINC)

6.7.1 Both Burgess Park SBINC II and Surrey Square SLINC are located in close proximity to the Site, and in the absence of mitigation dust deposition during demolition of nearby buildings could affect the nature conservation value of these sites.

6.7.2 As set out in **Chapter 13 'Air Quality'** of this ES, demolition of buildings on Site has the potential to be a significant source of dust pollution during the construction phase. In the absence of mitigation, dust deposition has the potential to alter soil conditions (pH and nutrient levels), and prevent or disrupt vegetation growth through blocking effective photosynthesis. The habitats present within Burgess Park and Surrey Square are already subject to a degree of nutrient enrichment through existing NO_x deposition and recreational use (for example through soil disturbance and dog fouling). For this reason, it is probable that a temporary increase in dust deposition, whilst undesirable, would be unlikely to have significant effects upon their overall conservation value affecting only the zones closest to the demolition areas. Due to the phased nature of the Comprehensive Development, any dust deposition would be temporary, relating to demolition of individual buildings over the course of the Site-wide redevelopment (medium term). In the absence of mitigation, it is anticipated that a relatively narrow band of habitat within Burgess Park and Surrey Square would be subject to deposition sufficient to cause direct, temporary, **negative** effects significant at the Site scale (minor).

Mitigation

6.7.3 To minimise the release of dust during the construction phase specific measures will be incorporated into the Construction Environmental Management Plan (CEMP). This will include the restriction of certain activities (for example no incineration of materials), and manage the location of dust-generating activities and methods for these activities (for example maintenance of plant and management of stockpiles) in addition to measures designed to manage surface water (see also **Chapter 13 'Air Quality'** of this ES).

Residual Effect

6.7.4 The above measures will reduce the probability, and extent, of effects associated with dust deposition. Therefore, providing the measures are implemented properly it is considered likely that any dust deposition would result in direct, temporary, negative effects upon Burgess Park and Surrey Square of **negligible** significance.

Bats

6.7.5 In the absence of mitigation, removal of built structures occupied by roosting bats carries the risk of killing and/or injury of individual bats. Whilst no roosts have been objectively confirmed on the Site, a proportion of buildings exhibit features suitable for use by a small number of crevice roosting species such as common pipistrelle. This species has been recorded at Locations 2 (Gaitskell House) and 6 (East Street 184A-F) in small numbers within the normal emergence period (when bats usually leave the roost after sunset), and close to dawn when they typically return to roost. The data from recording periods in August and September 2014 does not confirm the presence of roosts, but indicates that small (i.e. 1-5 bats) non-breeding roost sites

cannot be ruled out. Therefore for the purpose of this assessment it is assumed a roost of this type is present on a precautionary basis.

6.7.6 This species may use features periodically, and the identification of roost locations used by small numbers of individual bats infrequently can be difficult. In the absence of mitigation, demolition of buildings containing bat occupied bat roosts could lead to direct killing and injury of small numbers of individual bats, and permanent loss of roosting opportunities on the Estate.

6.7.7 Overall, the Comprehensive Development will lead to the removal of:

- 23 buildings with negligible to low potential to support bat roosts, exhibiting features with potential to be suitable for individual crevice dwelling bats, relatively near to suitable foraging habitat (Burgess Park), but for which the presence of a roost is considered improbable;
- 17 buildings with low potential to support bat roosts;
- 3 buildings with low – moderate potential to support bat roosts, assessed on a precautionary basis due to access restrictions; and
- 7 buildings with moderate potential to support roosting bats, exhibiting multiple features (hanging tiles, and slipped roof tiles) suitable for transitional / summer roosts of crevice roosting species; and
- 1 building (Arklow House) initially assessed to have moderate potential to support roosting bats, and considered likely to support a small, non-breeding roost used occasionally by common pipistrelle bats.

6.7.8 In addition, in the absence of mitigation foraging/commuting habitat in the form of scattered trees on the Site would be removed during the demolition and construction phase. It is probable that higher flying species recorded (such as noctule, and Leisler's bat) will be less affected by habitat removal and fragmentation during the construction phase than generally lower flying species such common pipistrelle.

6.7.9 Generally, construction activities will not occur during the night-time period when bat foraging occurs, therefore after-dark lighting will not be required. For discrete work tasks, however, for example tasks associated with junction installation, occasional night-time working may be required. Therefore localised lighting may still be required, and low level security lighting will also be required around construction compound areas. The change in light levels anticipated during the construction period is not considered to be substantial for the majority of the Site, given existing light levels.

6.7.10 In the absence of mitigation, activities during the construction phase as described above are likely to have direct, permanent and temporary, **negative** effects upon the bat population of significance at the Local scale (minor).

Mitigation

6.7.11 Direct effects upon individual bats will be avoided through appropriate seasonal timing and working methods during removal of buildings required. It is anticipated that appropriate methods will be detailed within the Construction Environmental Management Plan.

6.7.12 The demolition and construction period will span 20 years. Baseline data collected to inform this assessment indicates that the probability of a bat roost of elevated conservation value occurring on Site is very low, however the presence of small (i.e. 1-5 bats) non-breeding roost sites cannot be ruled out. Therefore, within one year prior to demolition, where buildings that exhibit features with potential to contain bat roosts must be removed these will be surveyed to establish the presence or likely absence of roosts. If roosts are confirmed to be present, mitigation may then be implemented under licence from Natural England; ensuring measures are taken to protect the conservation status of bats locally. This would comprise the installation of similar alternative roosting opportunities, removal of existing roost features prior to demolition during the seasonal period when roosts are least likely to be occupied, and removal following appropriate methods selected to avoid effects upon individual bats in the unlikely scenario that they are present (for example the soft-stripping of hanging tiles).

6.7.13 Although it is probable, that there will be a temporary net loss in semi-natural habitat area during the construction phase, prior to the operational phase landscaping will be completed to enable regeneration of habitats suitable for foraging bats thus minimising the period during which habitat will not be available.

Residual Effect

6.7.14 The character of roosts which may be present, is such that effective mitigation for roost removal is highly likely to be successful, therefore residual effects based on the implementation of mitigation can be concluded with reasonable confidence.

6.7.15 Through appropriate working measures direct effects upon individual bats will become negligible, however there will remain temporary loss of both roosting and foraging habitat in the short-term (i.e. for part of the construction period). Due to the phased nature of the redevelopment, and relatively long construction period, landscaping of plots completed early in the construction period will have become established prior to removal of habitat from latter phases. Overall, this will lead to a net gain in habitat available to foraging and commuting bats and possible, negative effects will be limited to a short-term period at the very beginning of the demolition and construction phase.

6.7.16 Following the implementation of mitigation, the effects upon the bat population during the demolition and construction phase should be of negligible significance. Towards the latter part of the demolition and construction period, newly created, enhanced habitat areas should become sufficiently established to provide foraging habitat for bat species which alongside provision of new roosting opportunities will result in a direct, permanent, **positive** effect upon the bat population at the Local scale (minor) in the medium-term.

Birds (Breeding)

6.7.17 In the absence of mitigation, it is likely that demolition and construction activities during the main breeding season would lead to injury and/or mortality of individual birds occupying nests within the Estate. This could result through destruction of active nests containing eggs and hatchlings, and direct contact between adult birds brooding nests and construction machinery during demolition. Specifically, it is also possible that works could disturb peregrine if this species uses taller buildings during the 20 year demolition and construction phase.

6.7.18 During the demolition and construction phase the removal of buildings and vegetation will reduce the area of suitable habitat for nesting birds, and visual disturbance may reduce the suitability of adjacent habitat for nesting birds although it is recognised that birds presently using the Site are likely to be tolerant to relatively high levels of disturbance. Habitat loss and degradation will fragment parcels of retained habitat, and it is likely that this will effectively increase the area of habitat no longer suitable for some species to nest.

6.7.19 Although habitat reduction on Site and disturbance may displace individual birds, thereby resulting in effects that would be significant at Site level, should effects upon species such as peregrine occur during the demolition and construction phase, the effects could be significant at a greater scale. In the absence of mitigation, it is likely that construction activities would have direct, permanent and temporary, **negative** effects upon the bird population present significant at the Site scale (minor).

Mitigation

6.7.20 To avoid direct effects upon birds, works requiring vegetation removal will be seasonally timed to avoid the main nesting season, and/ or checks will be completed by a suitably experienced ecologist to confirm the absence of active nests prior to removal.

6.7.21 Although it is likely that there will be a temporary net loss in semi-natural habitat area during the construction phase, prior to the operational phase landscaping will be completed to enable regeneration of

habitats suitable for nesting birds, thus minimising the period during which habitat will not be available. Additional features, suitable for nesting birds will be incorporated into newly constructed buildings such as boxes/bricks for common swifts *Apus apus,* house sparrow and starling.

6.7.22 During construction, standard measures will be employed to prevent and control air pollution (dust), and noise and visual disturbance to nearby residents. These measures will also limit some effects upon nesting birds in so far as dust screening, and noise barriers installed to reduce effects upon residents will also reduce the area temporarily made unsuitable for bird occupation.

Residual Effect

6.7.23 Through appropriate seasonal timing, and implementation of appropriate working measures direct mortality and injury of individual birds will be avoided during the demolition and construction phase by the employment of the mitigation measures referred to above. Therefore, effects associated with direct loss (mortality and injury) will be negligible.

6.7.24 Habitat loss will occur as a result of demolition and construction; however the period during which there will be a net reduction in suitable nesting habitat will be of limited duration. Due to the phased nature of the redevelopment, and relatively long construction period, landscaping of plots completed early in the construction period will have become established prior to removal of habitat from later phases. Overall, this will lead to a net gain in habitat available to nesting birds and possible, negative effects will be limited to a short-term period at the very beginning of the demolition and construction phase.

6.7.25 Following the implementation of mitigation measures, the effects upon the nesting bird population during the demolition and construction phase are assessed to be of negligible significance. Towards the later part of the demolition and construction period, newly created, enhanced habitat areas should become sufficiently established to provide foraging habitat for a variety of bird species which alongside provision of artificial nesting opportunities will result in a direct, permanent, **positive** effect upon the nesting bird population present of significance at the Local scale (minor) in the medium-term.

Other Species of Principal Importance

6.7.26 In the absence of mitigation, construction activities have potential to lead to the killing and/ or injury of Species of Principal Importance (SPI) such as hedgehog through vegetation clearance required to facilitate development. Depending on the number of animals affected, this could lead to the disappearance of species from the majority of the Estate

Mitigation

6.7.27 Vegetation clearance contractors will be briefed prior to works, to be vigilant for mammals including hedgehog and fox which may be present on the Site. These species are mobile, and therefore over the course of the 20 year construction period they could move between locations or expand their range into the Site. If and where encountered during clearance hedgehogs will be removed from the construction area to retained, or newly created habitat areas (providing these are sufficiently established). In addition, the risk of hedgehogs becoming trapped in excavations will be reduced through the covering of excavations during the night time period.

Residual Effect

6.7.28 Through translocation of individuals, if encountered during works, the direct mortality and injury to hedgehog will be minimised during the construction phase. Therefore, for the duration of the construction phase it is assessed that the effects resulting from direct loss (mortality and injury) will be negligible.

6.7.29 Habitat loss will occur as a result of demolition and construction; however the period during which there will be a net reduction in habitat suitable for hedgehog (and other SPIs?) will be of limited duration. Due to the phased nature of the redevelopment, and relatively long construction period, landscaping of plots completed early in the construction period will have become established prior to removal of habitat from later phases. Overall, this will lead to a net gain in habitat available to hedgehog and other SPI and possible, negative effects will be limited to a short-term period at the very beginning of the demolition and construction phase.

6.7.30 Following the implementation of mitigation measures, the effects upon SPI such as hedgehog during the demolition and construction phase are assessed to be of negligible significance. Towards the later part of the demolition and construction period, newly created, enhanced habitat areas should become sufficiently established to provide habitat for a variety of species which will result in a direct, permanent, positive effect upon a variety of SPI species of significance at the Site scale (minor) in the medium-term.

FDS Development Option

Non-statutory Sites (Burgess Park SBINC II and Surrey Square SLINC)

6.7.31 Given the distance between the FDS Application site and Surrey Square, effects upon Surrey Square resulting from the demolition and construction phase are considered highly unlikely.

6.7.32 The FDS Application site does, however, lie in close proximity to Burgess Park and, as for the Site Wide Development Option, in the absence of mitigation dust deposition during demolition of nearby buildings could affect the nature conservation value of this site. The smaller scale of the FDS Application site means that the zone in which dust deposition may occur would be smaller, and, as for the Site Wide Development Option this would be temporary over the course of the redevelopment (short term). In the absence of mitigation, it is anticipated that a relatively narrow band of habitat within Burgess Park will be subject to deposition sufficient to cause direct, temporary, **negative** effects significant at the Site scale (minor).

Mitigation

6.7.33 To minimise the release of dust during the construction phase specific measures will be incorporated into the CEMP. This will include the restriction of certain activities (for example no incineration of materials), and management of the location of dust-generating activities and methods for these activities (for example maintenance of plant and management of stockpiles) in addition to measures designed to manage surface water (see also **Chapter 13 'Air Quality'** of this ES).

Residual Effect

6.7.34 The above measures will reduce the probability and extent of effects associated with dust deposition. Therefore, providing the measures are implemented properly it is considered that dust deposition will result in effects upon Burgess Park of **negligible** significance.

Bats

6.7.35 In the absence of mitigation, removal of built structures occupied by roosting bats carries the risk of killing and/ or injury of individual bats. Whilst no roosts have been objectively confirmed within the FDS Application Site; automated bat surveys near to Arklow House recorded bat activity consistent with the present of a small, non-breeding roost used by common pipistrelle. This species may use features periodically, and the identification of roost locations used by small numbers of individual bats infrequently can be difficult. Whilst the automated surveys recorded activity pre-dawn over a period of nights, manual detector surveys did not record evidence of roosting bats.

6.7.36 In the absence of mitigation, demolition of buildings containing bat occupied bat roosts could lead to direct killing and injury of small numbers of individual bats, and permanent loss of roosting opportunities from the FDS Application site.

6.7.37 Overall, development within the FDS Application site alone will lead to the removal of:

- 8 buildings with negligible to low potential to support bat roosts, exhibiting features with potential to be suitable for individual crevice dwelling bats, relatively near to suitable foraging habitat (Burgess Park), but for which the presence of a roost is considered improbable; and
- 1 building (Arklow House) initially assessed to have moderate potential to support roosting bats, and considered likely to support a small, non-breeding roost used occasionally by common pipistrelle bats.

6.7.38 In addition, in the absence of mitigation foraging/commuting habitat in the form of scattered trees and introduced shrub present within courtyards in the FDS Application site would be removed during the demolition and construction phase. It is probable that higher flying species recorded (such as noctule, and Leisler's bat) will be less affected by habitat removal and fragmentation during the construction phase than generally lower flying species such common pipistrelle.

6.7.39 Generally, construction activities will not occur during the night-time period when bat foraging occurs, therefore after-dark lighting will not be required. For discrete work tasks, however, for example tasks associated with linking the new development with Albany Road, occasional night-time working may be required. Therefore localised lighting may still be required, and low level security lighting will also be required around construction compound areas. The change in light levels anticipated during the construction period is not considered to be significant given existing light levels.

6.7.40 In the absence of mitigation, activities during the demolition and construction phase as described above are likely to have direct, permanent and temporary, **negative** effects upon the bat population of significance at the Site scale (minor).

Mitigation

6.7.41 Direct effects upon individual bats will be avoided through appropriate seasonal timing and working methods during removal of buildings required.

6.7.42 Features which may be used by roosting common pipsitrelle bats, on a precautionary basis, will be removed either during the Spring or Autumn period when bats are least likely to be negatively affected by works. Tiling and any other features which could be used by bats will be soft-stripped under an ecological watching brief to minimise the risk of harm to individual bats in the event that they are present at the time of works. Based on the information available, it is proposed that these works should occur under class licence from Natural England. Licences of this type allow derogation from legislation that otherwise prevents works to bat roosts, and are suitable where works involve roosts of low conservation value.

6.7.43 Although it is likely that there will be a temporary net loss in semi-natural habitat area during the construction phase, prior to the operational phase landscaping will be completed to enable regeneration of habitats suitable for foraging bats thus minimising the period during which habitat will not be available.

Residual Effect

6.7.44 The character of roost which may be present is such that effective mitigation for roost removal is highly likely to be successful therefore residual effects based on the implementation of mitigation can be concluded with reasonable confidence.

6.7.45 Through appropriate working measures direct effects upon individual bats will become negligible, however there will remain temporary loss of both roosting and foraging habitat in the short-term (i.e. for part of the construction period). The installation of replacement roost opportunities and new landscaping which will

provide replacement foraging and commuting habitat once it becomes established during the operational period, will in the medium-long term provide a net increase in the extent and quality of habitat available to bats. For this reason, negative effects will be limited to a short-term period at the very beginning of the demolition and construction phase.

6.7.46 Following the implementation of mitigation measures the likely effects upon the bat population during the demolition and construction phase are assessed to be of **negligible** significance.

Birds (Breeding)

6.7.47 In the absence of mitigation, the demolition and construction activities during the main breeding season would be likely to lead to injury and/or mortality of individual birds occupying nests within the FDS Application site. This could result through destruction of active nests containing eggs and hatchlings, and direct contact between adult birds brooding nests and construction machinery during demolition.

6.7.48 During the demolition and construction phase the removal of buildings and vegetation, will reduce the area of suitable habitat for nesting birds, and visual disturbance may reduce the suitability of adjacent habitat for nesting birds although it is recognised that birds presently using the FDS Application site are likely to be tolerant to relatively high levels of disturbance.

6.7.49 Although habitat reduction on the FDS Application site and disturbance may displace individual birds, given the scale of the FDS Application site it is considered unlikely that effects would be significant at above Site scale. In the absence of mitigation, the construction activities are likely to have direct, permanent and temporary, **negative** effects upon the bird population at the Local scale (minor).

Mitigation

6.7.50 To avoid direct effects upon birds, works requiring vegetation removal will be seasonally timed to avoid the main nesting season, and/ or checks completed by a suitably experienced ecologist to confirm the absence of active nests prior to removal.

6.7.51 Although it is likely that there will be a temporary net loss in semi-natural habitat area during the construction phase, prior to the operational phase landscaping will be completed to enable regeneration of habitats suitable for nesting birds thus minimising the period during which habitat will not be available. Additional features suitable for nesting birds will be incorporated into newly construction buildings such as boxes/bricks for common swifts, house sparrow and starling.

6.7.52 During construction, standard measures will be employed to prevent and control air pollution (dust), and noise and visual disturbance to nearby residents. These measures will also limit some effects upon nesting birds as dust screening and noise barriers installed to reduce effects upon residents will also reduce the area temporarily made unsuitable for bird occupation.

Residual Effect

6.7.53 Through appropriate seasonal timing, and implementation of appropriate working measures, direct mortality and injury of individual birds will be avoided during the demolition and construction phase. Therefore, effects associated with direct loss (mortality and injury) will be negligible.

6.7.54 Habitat loss will occur as a result of demolition and construction; however the period during which there will be a net reduction in suitable nesting habitat will be of limited duration. The installation of nest boxes and landscaping which will provide replacement nesting habitat, will in the medium-long term provide a net increase in the extent and quality of habitat available to birds. For this reason, negative effects will be limited to a short-term period at the very beginning of the demolition and construction phase.

6.7.55 Following the implementation of mitigation, it is probable that effects upon the breeding birds during the demolition and construction phase will be of **negligible** significance.

Other Species of Principal Importance

6.7.56 In the absence of mitigation, construction activities have the potential to lead to the killing and/ or injury of SPI, such as hedgehog, through vegetation clearance required to facilitate development. Depending on the number of animals affected, this could lead to the disappearance of species from the FDS Application site.

Mitigation

6.7.57 Vegetation clearance contractors will be briefed prior to works, to be vigilant for mammals including hedgehog and fox which may be present on the Site. If and where encountered during clearance hedgehogs will be removed from the construction area to retained, or newly created habitat areas (providing these are sufficiently established). In addition, the risk of hedgehogs becoming trapped in excavations will be reduced through the covering of excavations during the night time period.

Residual Effect

6.7.58 Through translocation of individuals, if encountered during works, direct mortality and injury to hedgehog will be minimised during the construction phase. Therefore, for the duration of the construction phase effects resulting from direct loss (mortality and injury) are assessed to be negligible.

6.7.59 Habitat loss will occur as a result of demolition and construction; however the period during which there will be a net reduction in habitat suitable for hedgehog will be of limited duration. In the medium-longer term there will be a net gain in habitat available to hedgehog and other SPI meaning that possible, negative effects will be limited to a short-term period at the very beginning of the demolition and construction phase.

6.7.60 Following the implementation of mitigation measures, the effects upon SPI such as hedgehog during the demolition and construction phase should be of **negligible** significance.

Operation

Site Wide Development Option

Non-statutory Sites (Burgess Park SBINC II and Surrey Square SLINC)

6.7.61 As set out in **Chapter 13 'Air Quality'** of this ES, during the operational phase there will be very few pathways for potential negative effects upon air quality. For this reason effects upon non-statutory sites resulting from changes in air quality during the operational phase are considered to be negligible.

6.7.62 The Site Wide Development Option includes a comprehensive landscaping strategy as described in the Aylesbury Regeneration Masterplan Landscape Design Statement. Green links have been designed into the scheme responding to the requirement to include green fingers (PL1, Aylesbury AAP) and functional 'green' pedestrian and cycle routes. As described in relation to the FDS Development Option a series of three parks have been designed into this phase of the development, in addition to key green links along Bagshot Street (creation of a park) and Portland Street. The strategy includes a well-defined, landscaped park edge marking the interface between the Site and Burgess Park. The park edge will combine retained mature trees, new tree planting and newly created amenity space including a variety of planting.

6.7.63 Effects resulting from the establishment and future management of newly landscaped areas on the Estate are assessed to result in direct and indirect, permanent, **positive** effects upon surrounding non-statutory designated sites of significance at the Local scale (minor).

Mitigation

6.7.64 Consequently, no further mitigation is proposed.

Residual Effect

6.7.65 Effects resulting from the establishment and future management of newly landscaped areas on the Estate are likely to result in direct and indirect, permanent, **positive** effects upon surrounding non-statutory designated sites of significance at the Local scale (minor).

Other habitat occurring on Site

6.7.66 Overall there will be a net increase in green space, and enhanced habitat connectivity across the Site resulting from the development proposed as required under Policy PL1 of the AAAP. The landscaping strategy includes tree retention and new tree planting, creation of rain gardens, planting beds, shrubs and perennial planting. Key principles of planting design are that it should:

- Create interest and vary with the seasons;
- Be appropriate to the site conditions;
- Be low maintenance; and
- Enhance the ecological and biodiversity value of the site.

6.7.67 The strategy includes new green spaces both at ground level and at height in the form of courtyard gardens and green roofs. Depending on their position and future use, flat roofed buildings will support a combination of accessible roof gardens (intensive planting), extensive green roofs and/or be used to site photovoltaic arrays. Effects resulting from the establishment and future management of newly landscaped areas are assessed to result in direct and indirect, permanent, **positive** effects of significance at the Local scale (minor).

Mitigation

6.7.68 Consequently, no further mitigation is proposed.

Residual Effect

6.7.69 Effects resulting from the establishment and future management of newly landscaped areas will result in direct and indirect, permanent, positive effects of significance at the Local scale (minor).

Bats

6.7.70 Existing levels of after dark lighting on the Site are relatively high; therefore alterations in lighting are unlikely to have negative effects upon existing bat activity levels - the species recorded are generally light tolerant as shown by their occurrence in this central London location. However, where possible the opportunity will be taken to reduce after dark light levels to enhance the habitat available for bats especially in sections of the Site near to Burgess Park, and soft landscaping which will become the 'green fingers' across the Site linking Burgess Park to Surrey Square Park the Missenden Play area and Faraday Gardens (as required under Policy PL1 of the AAAP).

6.7.71 During the operational phase, in the absence of a sensitive lighting strategy, new lighting could result in negative effects upon bat activity in certain parts of the Site. Overall, however, it is considered unlikely that any direct, permanent, negative effects would be significant at above Site scale.

Mitigation

6.7.72 External lighting will generally be kept to a minimum fit for function, particularly in the vicinity of retained and newly created areas of soft landscaping. Street lighting will follow Southwark's adoptable standards and will be designed and installed in accordance with Southwark's Public Realm Exterior Lighting Guide. Directional lighting will be selected as appropriate, to avoid light spillage, particularly onto the adjacent park, tree lines and areas of proposed planting/landscaping. The schemes include three areas of architectural lighting within the public realm.

Residual Effect

6.7.73 During the operational phase, providing a sensitive lighting scheme is implemented, there will be an overall reduction in dark lighting across the Site enhancing the habitat available for bats. In combination with the creation of new landscaping designed specifically to enhance habitat connectivity across the Site, the effects upon this species group during the operational phase are assessed to be direct, permanent, positive effects of significance at the Local scale (minor).

Birds (Breeding)

6.7.74 During the operational phase no further direct habitat loss is anticipated, and newly established habitats will be managed to provide habitat suitable for a variety of nesting bird species. Newly created habitat includes shrub and tree planting which will comprise native specimens in the more naturalistic planted areas, specimen trees within more formal amenity species and street tree planting.

6.7.75 Overall, considering the net increase in landscaping proposed, and designs to enhance connectivity across the Site linking nearby larger areas of green space, it is assessed that direct, permanent positive effects upon the breeding bird population will result during the operational phase of significance at the Site scale (minor).

Mitigation

6.7.76 Consequently, no further mitigation is proposed.

Residual Effect

6.7.77 Effects resulting from the establishment and future management of newly landscaped areas on the Estate are likely to result in direct, permanent, positive effects on the breeding bird population present of significance at the Site scale (minor).

Other Species of Principal Importance

6.7.78 During the operational phase, landscaping incorporated in the Comprehensive Development designs will become established replacing habitat removed during the construction period. Hedgehogs are known to occur in urban areas, benefitting from a network of vegetated community spaces and gardens. As newly created habitat becomes established, it is reasonable to assume that hedgehogs, if present in the local area, will re-colonise these areas. Overall, considering the net increase in landscaping proposed, and designs to enhance connectivity across the Site linking nearby larger areas of green space, it is likely that direct,

permanent positive effects upon SPI including hedgehog will result during the operational phase of significance at the Site scale (minor).

Mitigation

6.7.79 Consequently, no further mitigation is proposed.

Residual Effect

6.7.80 Overall, considering the net increase in landscaping proposed, and designs to enhance connectivity across the Site linking nearby larger areas of green space, it is probable that direct, permanent positive effects upon SPI including hedgehog will result during the operational phase of significance at the Site scale (minor).

FDS Development Option

Non-statutory Sites (Burgess Park SBINC II and Surrey Square SLINC)

6.7.81 As set out in **Chapter 13 'Air Quality'** of this ES, during the operational phase there will be very few pathways for potential negative effects upon air quality. For this reason effects upon non-statutory sites resulting from changes in air quality during the operational phase are considered to be negligible.

6.7.82 Designs for the FDS Development Option include street tree planting, creation of rain gardens, planting beds, shrubs and perennial planting. Specifically, proposals include amenity green space along Albany Road totalling 400Sqm and three north-to-south green corridors that link park spaces to be created within the FDS Application site to Burgess Park (further detail is provided in the FDS – Landscape Design and Access Statement). The scheme includes tree planting along Albany Road comprising species such as London Plane *Platinus x hispanica*, small leaved lime *Tilia cordata '*Green Spire' and fern leaved beech *Fagus sylvatica* 'Asplenifolia' in addition to retention of category A and B trees where appropriate along Albany Road and Portland Street (see FDS – Tree Strategy). Overall there will be a net increase in green space, and enhanced connectivity both across the FDS Application site and the adjacent Burgess Park compared to the relatively isolated courtyard planting currently present. Effects resulting from the establishment and future management of newly landscaped areas on the FDS Application site are assessed to result in direct and indirect, permanent, positive effects upon surrounding non-statutory designated sites of significance at the Site scale (minor).

Mitigation

6.7.83 Consequently, no further mitigation is proposed.

Residual Effect

6.7.84 Effects resulting from the establishment and future management of newly landscaped areas on the FDS Application site are likely to result in direct and indirect, permanent, positive effects upon Burgess Park of significance at the Site scale (minor).

Other habitat occurring on the FDS Application Site

6.7.85 Designs for the FDS Application site include street tree planting, creation of rain gardens, planting beds, shrubs and perennial planting. Proposals include three main public open spaces; Westmoreland Park, Portland Park and Westmoreland Square which together total 3,360Sqm, communal amenity space including courtyard gardens and communal roof terraces totalling 5,869Sqm, and amenity green space including the

Albany Road frontage and roadside green space totalling 1,041Sqm. A comprehensive strategy for the creation of green spaces is described in the FDS – Landscape Design and Access Statement. The strategy includes:

- Public and private realm tree planting to include 215 new trees across the FDS Application site area. Species have been selected to contribute towards local biodiversity and in relation to the street hierarchy further to consultation with relevant LBS officers. The species palette include varieties of native species including small leaved lime, silver birch *Beula pendula*, and beech, and fruit bearing species of apple *Malus* spp., pear *Pyrus* spp. and cherry *Prunus* spp.
- Soft landscaping and the rain garden / bio-retention areas will be seeded with mixes selected to be compatible with local conditions. Species will include native varieties and non-natives selected to suit conditions and provide an extended flowering and fruiting season both for amenity and biodiversity benefits;
- Extensive green roofs have been incorporated into designs for medium rise flat blocks (comprising sedum based matting tolerant of drier, exposed conditions), with lower roofs treated with wildflower seed mix selected for prolonged flowering period.

6.7.86 Overall there will be a net increase in green space, and enhanced connectivity across the FDS Application site compared to the relatively isolated courtyard planting currently present. Effects resulting from the establishment and future management of newly landscaped areas on the FDS Application site are assessed to result in direct and indirect, permanent, positive effects of significance at the Site scale (minor).

Mitigation

6.7.87 Consequently, no further mitigation is proposed.

Residual Effect

6.7.88 Effects resulting from the establishment and future management of newly landscaped areas on the FDS Application site are likely to result in direct, permanent, positive effects of significance at the Site scale (minor).

Bats

6.7.89 Existing levels of after dark lighting on the FDS Application site are relatively high; therefore alterations in lighting are unlikely to have negative effects upon existing bat activity levels - the species recorded are generally light tolerant as shown by their occurrence in this central London location. However, where possible the opportunity will be taken to reduce after dark light levels to enhance the habitat available for bats. During the operational phase, in the absence of a sensitive lighting strategy, new lighting could result in negative effects upon bat activity on the FDS Application site. Overall, however, it is considered unlikely that direct, permanent, negative effects would be significant at above Site scale.

Mitigation

6.7.90 External lighting will generally be kept to a minimum fit for function, particularly in the vicinity of retained and newly created areas of soft landscaping. Street lighting will follow Southwark's adoptable standards and will be designed and installed in accordance with Southwark's Public Realm Exterior Lighting Guide. Directional lighting will be selected as appropriate, to avoid light spillage, particularly onto the adjacent park, tree lines and areas of proposed planting/landscaping. The schemes include three areas of architectural lighting within the public realm.

Residual Effect

6.7.91 During the operational phase, providing a sensitive lighting scheme is implemented, overall there will be a reduction in after-dark lighting, enhancing the habitat available for bats. In combination with the creation of new landscaping designed specifically to enhance habitat connectivity, it is likely that effects upon this species group during the operational phase will be direct, permanent, positive effects of significance at the Site scale.

Birds (Breeding)

6.7.92 During the operational phase no further direct habitat loss is anticipated, and newly established habitats will be managed to provide habitat suitable for a variety of nesting bird species. Newly created habitat includes shrub and tree planting which will comprise native specimens in the more naturalistic planted areas, specimen trees within more formal amenity species and street tree planting.

6.7.93 Overall, considering the net increase in landscaping proposed, and designs to enhance habitat connectivity, permanent positive effects upon the breeding bird population will result during the operational phase of significance at the Site scale (minor).

Mitigation

6.7.94 Consequently, no further mitigation is proposed.

Residual Effect

6.7.95 Effects resulting from the establishment and future management of newly landscaped areas within the FDS Application Site, are likely to result in direct, permanent, positive effects on the breeding bird population present of significance at the Site scale (minor).

Other Species of Principal Importance

6.7.96 During the operational phase, landscaping incorporated in the FDS Application designs will become established replacing habitat removed during the construction period. Hedgehogs are known to occur in urban areas, benefitting from a network of vegetated community spaces and gardens. As newly created habitat becomes established, it is reasonable to assume that hedgehogs, if present in the local area, will re-colonise these areas. Overall, considering the net increase in landscaping proposed, and designs to enhance connectivity across the Site linking nearby larger areas of greenspace, it is likely that direct, permanent positive effects upon SPI including hedgehog will result during the operational phase of significance at the Site scale (minor).

Mitigation

6.7.97 Consequently, no further mitigation is proposed.

Residual Effect

6.7.98 Overall, considering the net increase in landscaping proposed, and designs to enhance connectivity across the Site linking nearby larger areas of green space, it is likely that direct, permanent positive effects upon SPI including hedgehog will result during the operational phase of significance at the Site scale (minor).

6.8 Summary

Site Wide Development Option

6.8.1 The Site comprises a highly urbanised environment with limited habitat of inherent nature conservation value. A proportion of the buildings present have features suitable for use by a small number of crevice roosting bats such as common pipistrelle, and introduced shrub and mature trees provide suitable foraging and commuting habitat which is used by five species of bat (as shown by automated detectors surveys completed in August and September 2014). A proportion of the buildings and shrubs and trees located within courtyard areas also provide suitable nesting habitat for common and widespread nesting bird species, including those of conservation concern such as house sparrow and starling. Taller buildings present could be used as vantage points by peregrine, however given the availability of taller, more prominent buildings in the vicinity (to the north) on balance it is considered unlikely that this species would nest on the Site.

6.8.2 In the absence of mitigation, removal of habitat could have direct effects upon bats in so far as there would be a reduction in potential roost resource, and temporary reduction in foraging and commuting habitat availability. Should small numbers of common pipistrelle occupy non-breeding, transitional roosts within buildings in the absence of mitigation legislation protecting this species group could be contravened. Mitigation entailing a combination of seasonal timing of works, appropriate working methods and replacement of roosting opportunities is proposed to avoid negative effects upon this species group. It is considered that as a consequence, effects upon bats during the demolition and construction phase will be of negligible significance.

6.8.3 Similarly, in the absence of mitigation habitat removal during the breeding bird season could result in direct, negative effects upon nesting birds of significance at the Local scale and contravention of the Wildlife and Countryside Act 1981. To avoid this, appropriate seasonal timing and working methods are proposed; through their implementation the effects should be negligible.

6.8.4 In the medium to long-term, landscaping created during the demolition and construction phase will become established and deliver overall ecological enhancement. Due to the 20 year construction period, positive effects should occur during the latter stages of construction and continue into the operational phase. Direct, permanent positive effects of significance at the Local scale are anticipated with respect to bats, breeding birds and habitats present within the Site.

6.8.5 The Estate is located in close proximity to two non-statutory designated Burgess Park, to the south, and Surrey Square to the east. To avoid negative effects upon these areas during the construction phase measures to control changes to air quality (dust deposition) will be implemented. Through implementation of this mitigation, it the residual effects upon these areas during the demolition and construction phase should be negligible. In the medium to long-term, habitat creation within landscaping on the Estate and enhanced habitat connectivity as required under Policy PL1 of the Aylesbury AAP, will enhance the ecological value of these sites by creating a better connected habitat network able to support a greater diversity of species, and more resilient to future change.

FDS Development Option

6.8.6 The FDS Application site generally comprises a highly urbanised environment with limited habitat of inherent nature conservation value. A total of nine buildings are present, the majority of which have low-negligible potential to support roosting bats. One building, Arklow House, has features assessed to have moderate potential to support roosting bats. Automated detector survey completed near to this building in August 2014 recorded common pipistrelle activity within 20 minutes of sunrise consistently over a period of four days, suggesting these bats are roosting very nearby. Manual detector surveys completed in September however, recorded very low bat activity and no bats returning to roost in the building. In isolation, the results would enable the likely absence of a roost from Arklow House to be concluded with reasonable confidence,

however the results of the automated survey cannot be discounted. On a precautionary basis the presence of a small, non-breeding roost sporadically used by common pipistrelle was assumed. A proportion of the buildings and shrubs and trees located within courtyard areas also provide suitable nesting habitat for common and widespread nesting bird species, including those of conservation concern such as house sparrow and starling.

6.8.7 In the absence of mitigation, removal of habitat could have direct effects upon bats in so far as there would be a reduction in potential roost resource, and temporary reduction in foraging and commuting habitat availability. Considering the likely presence of a small, non-breeding common pipistrelle roost in Arklow House, removal of this building could contravene legislation protecting bats and their roosts Mitigation entailing a combination of seasonal timing of works, appropriate working methods and replacement of roosting opportunities is proposed to avoid negative effects upon this species group. It is considered that as a consequence, effects upon bats during the demolition and construction phase will be of negligible significance.

6.8.8 Similarly, in the absence of mitigation habitat removal during the breeding bird season could result in direct, negative effects upon nesting birds of significance at the Site scale and contravention of the Wildlife and Countryside Act 1981. To avoid this, appropriate seasonal timing and working methods are proposed; through their implementation it is any effects should be negligible.

6.8.9 In the medium to long-term, landscaping created during the demolition and construction phase will become established and deliver overall ecological enhancement. Direct, permanent positive effects of significance at the Site scale are anticipated with respect to bats, breeding birds and habitats present within the FDS Application site.

6.8.10 The FDS Application site is located in close proximity to Burgess Park. To avoid negative effects upon this area during the construction phase measures to control changes to air quality (dust deposition) will be implemented as described in Chapter 13. Through implementation of this mitigation, residual effects upon Burgess Park during the demolition and construction phase should be negligible. In the medium to long-term, habitat creation within landscaping of the FDS Application site will enhance the ecological value of Burgess Park through expanding the area of habitat available to species populations here.

Table 6.9: Summary of Ecological Impact Assessment – Site Wide Development Option

Receptor	Description of Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Effects					Relevant Policy	Relevant Legislation
		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		
Construction														
None-Statutory Sites (Burgess Park SBINC II and Surrey Square SLINC)	■ Degradation resulting from air quality changes (i.e. dust deposition) during the construction phase.	Minor	N	T	D	LT	■ Measures to reduce dust generation as set out in AQ chapter.	Negligible	NA	-	-	-	NPPF	NA
Bats	■ Direct loss (mortality and injury) during the construction phase; ■ Direct habitat loss (roost destruction) and fragmentation during the construction phase; and ■ Disturbance (noise and light) during the construction phase.	Minor	N	P	D	LT	■ Seasonal timing of works and working methods to avoid direct effects ■ Provision of replacement roosting opportunities	Negligible	NA	-	-	-	Southwark Unitary Development Plan include (Policy 3.28)	Habitat Regs 2010 W&C Act 1981 NERC Act 1996
Birds (breeding)	■ Direct loss (mortality and injury) during the construction phase; and ■ Direct habitat loss (land take) and fragmentation during the construction phase.	Minor	N	P	D	LT	■ Seasonal timing / appropriate working method to reduce direct effects ■ Provision of replacement nesting habitat	Negligible	NA	-	-	-	Southwark Unitary Development Plan include (Policy 3.28)	W&C Act 1981 NERC Act 1996

Other species of principal importance (hedgehog)	■ Direct habitat loss during the construction phase; ■ Disturbance (noise/vibration and light) during the construction phase; and ■ Habitat fragmentation during the construction phase.	Minor	N	P	D	LT	■ Measures to translocate individuals animals during construction if encountered	Negligible	NA	-	-	-	Southwark Unitary Development Plan include (Policy 3.28)	NERC Act 1996
Operation														
None-Statutory Sites (Burgess Park SBINC II and Surrey Square SLINC)	■ Enhancement resulting from increased habitat connectivity during the operational phase.	Minor	P	P	D	LT	■ Habitat creation within landscaping proposals, and management of newly created habitats	Minor	P	P	D	LT	NPPF	N/A
On Site Habitat	■ Enhancement resulting from the establishment of newly created habitat during the operational phase.	Minor	P	P	D	LT	■ Habitat creation within landscaping proposals, and management of newly created habitats	Minor	P	P	D	LT	NPPF Southwark Unitary Development Plan include (Policy 3.28)	N/A
Bats	■ Disturbance (noise and light) during the operational phase; and ■ Habitat creation and future management during the operational phase.	Minor	P	P	D & I	LT	■ Sensitive lighting scheme ■ Habitat creation within landscaping proposals, and management of newly created habitats	Minor	P	P	D & I	LT	NPPF Southwark Unitary Development Plan include (Policy 3.28)	Habitat Regs 2010 W&C Act 1981 NERC Act 1996
Birds (breeding)	■ Habitat creation and future management during the operational	Minor	P	P	D	LT	■ Habitat creation within landscaping proposals, and management of newly created habitats	Minor	P	P	D	LT	Southwark Unitary Development Plan include	W&C Act 1981 NERC Act 1996

	phase.												(Policy 3.28)	
Other species of principal importance (hedgehog)	■ Habitat creation and future management during the operational phase.	Minor	P	P	D	LT	■ Habitat creation within landscaping proposals, and management of newly created habitats	Minor	P	P	D	LT	Southwark Unitary Development Plan include (Policy 3.28)	NERC Act 1996

Key to table:

P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

Table 6.10: Summary of Ecological Impact Assessment – FDS Development Option

Receptor	Description of Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Effects					Relevant Policy	Relevant Legislation
		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		
Construction														
None-Statutory Sites (Burgess Park SBINC II)	■ Degradation resulting from air quality changes (i.e. dust deposition) during the construction phase.	Minor	N	T	D	ST	■ Measures to reduce dust generation as set out in AQ chapter.	Negligible	NA	-	-	-	NPPF	NA
Bats	■ Direct loss (mortality and injury) during the construction phase; ■ Direct habitat loss (roost destruction) and fragmentation during the construction phase; and ■ Disturbance (noise and light) during the construction phase.	Minor	N	P	D	ST	■ Seasonal timing of works and working methods to avoid direct effects ■ Provision of replacement roosting opportunities	Negligible	NA	-	-	-	Southwark Unitary Development Plan include (Policy 3.28)	Habitat Regs 2010 W&C Act 1981 NERC Act 1996
Birds (breeding)	■ Direct loss (mortality and injury) during the construction phase; and ■ Direct habitat loss (land take) and fragmentation during the construction phase.	Minor	N	P	D	ST	■ Seasonal timing / appropriate working method to reduce direct effects ■ Provision of replacement nesting habitat	Negligible	NA	-	-	-	Southwark Unitary Development Plan include (Policy 3.28)	W&C Act 1981 NERC Act 1996
Other	■ Direct habitat	Minor	N	P	D	ST	■ Measures to translocate	Negligible	NA	-	-	-	Southwark	NERC Act 1996

Receptor	Description of Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Effects					Relevant Policy	Relevant Legislation
		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		
species of principal importance (hedgehog)	loss during the construction phase; ■ Disturbance (noise/vibration and light) during the construction phase; and ■ Habitat fragmentation during the construction phase.						individuals animals during construction if encountered						Unitary Development Plan include (Policy 3.28)	
Operation														
None-Statutory Sites (Burgess Park SBINC II)	■ Enhancement resulting from increased habitat connectivity during the operational phase.	Minor	P	P	D	LT	■ Habitat creation within landscaping proposals, and management of newly created habitats	Minor	P	P	D	LT	NPPF	N/A
On Site Habitat	■ Enhancement resulting from the establishment of newly created habitat during the operational phase.	Minor	P	P	D	LT	■ Habitat creation within landscaping proposals, and management of newly created habitats	Minor	P	P	D	LT	NPPF Southwark Unitary Development Plan include (Policy 3.28)	N/A
Bats	■ Disturbance (noise and light) during the operational phase; and ■ Habitat creation and future management during the operational phase.	Minor	P	P	D & I	LT	■ Sensitive lighting scheme ■ Habitat creation within landscaping proposals, and management of newly created habitats	Minor	P	P	D & I	LT	NPPF Southwark Unitary Development Plan include (Policy 3.28)	Habitat Regs 2010 W&C Act 1981 NERC Act 1996
Birds (breeding)	■ Habitat creation and future	Minor	P	P	D	LT	■ Habitat creation within landscaping proposals, and	Minor	P	P	D	LT	Southwark Unitary	W&C Act 1981

Receptor	Description of Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Effects					Relevant Policy	Relevant Legislation
		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		
	management during the operational phase.						management of newly created habitats						Development Plan include (Policy 3.28)	NERC Act 1996
Other species of principal importance (hedgehog)	■ Habitat creation and future management during the operational phase.	Minor	P	P	D	LT	■ Habitat creation within landscaping proposals, and management of newly created habitats	Minor	P	P	D	LT	Southwark Unitary Development Plan include (Policy 3.28)	NERC Act 1996

Key to table:

P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

6.9 References

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Ref 6.9 Greater London Authority (2011), *London Plan: Spatial Development Strategy for Greater London (2011)*

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7 Socio-Economics and Population Effects

7.1 Introduction

7.1.1 This Chapter assesses the likely significant environmental effects of the Site Wide Development Option and FDS Development Option on socio-economics and population. In particular it considers job provision, housing supply and the provision of community facilities. It also identifies proposed mitigation measures to prevent, minimise or control likely negative significant socio-economic effects arising from the Comprehensive Development and the subsequent anticipated residual effects.

7.1.2 This chapter should be read together with the introductory chapters of this ES (**Chapters 1 – 5**) as well as **Chapter 17 'Cumulative Effects'**.

7.2 Legislation, Policy and Guidance

Legislation

7.2.1 There is no applicable legislation of relevance to this assessment.

Planning Policy

7.2.2 Planning policy at the national and local level and its relevance to environmental design and assessment is discussed in **Chapter 4 'Planning Policy Context'** and policies of particular relevance to socio-economic effects are discussed below.

National Policy

National Planning Policy Framework (NPPF) (2012)

7.2.3 Paragraph 70 of the National Planning Policy Framework (NPPF) (Ref. 7.1) relates to the promotion of healthy communities and states that planning policies and decisions should:

- "*Plan positively for the provision and use of shared space, community facilities (such as local shops, meeting places, sports venues, cultural buildings, public houses and places of worship) and other local services to enhance the sustainability of communities and residential environments;*
- *Guard against the unnecessary loss of valued facilities and services, particularly where this would reduce the community's ability to meet its day-to-day needs;*
- *Ensure that established shops, facilities and services are able to develop and modernise in a way that is sustainable, and retained for the benefit of the community; and*
- *Ensure an integrated approach to considering the location of housing, economic uses and community facilities and services.*"

Regional Policy

The London Plan: Spatial Development Strategy for Greater London (2011) (Revised October 2013)

7.2.4 The *London Plan: Spatial Development Strategy for Greater London (2011)* (the *London Plan*) (Ref. 7.2) came into force in July 2011 and provides the overall strategic plan for Greater London and sets out

an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. It provides the spatial strategy and policy context to guide development in London.

7.2.5 Amongst the key themes of the London Plan are London's Places, London's People, London's Economy, London's Response to Climate Change, London's Transport and London's Living Places and Spaces. The objective of the London Plan is to plan for continued growth.

7.2.6 The Mayor has stated that his intentions are increasing housing supply (Policy 3.3), optimising the development of land to secure the maximum benefits (Policy 3.4), ensuring housing developments are of the highest quality (Policy 3.5) and promoting complimentary non-residential uses as part of large residential developments (Policy 3.7).

7.2.7 Notable policies relevant to the application for the Comprehensive Development include:

> "*Policy 3.3 'Increasing Housing Supply' – the Mayor recognises the pressing need for more homes in London" and seeks maximum provision of additional housing.*
>
> *Policy 3.4 'Optimising Housing Potential' – seeks that development should optimise housing output for different types of location, taking into account local context and character, high quality design principles and public transport capacity. Table 3.2 within Policy 3.4 sets out a site density matrix.*
>
> *Policy 3.5 'Quality and Design of Housing Developments' – seeks to ensure that housing developments are of the highest quality both internally and externally, enhance the quality of local places, taking into account physical context, local character, density, tenure and land use mix.*"

7.2.8 On October 11th 2013 the Mayor published Revised Early Minor Alterations to the London Plan (REMA) (Ref. 7.3). From this date, the REMA are operative as formal alterations to *The London Plan* and form part of the development plan for Greater London. However, the REMA make no alterations to Policies relevant to this Chapter.

7.2.9 On 15th January 2014, the Mayor published Draft Further Alterations to the London Plan (FALP) (Ref. 7.4) which are to be examined at an Examination in Public (EiP) commencing on 1st September 2014. The FALP proposes amendments to Policy 3.3 of the London Plan, but these do not affect the strategic aims of the Policy.

Local Planning Policy

Southwark Core Strategy (2011)

7.2.10 The Core Strategy sets out how Southwark will change up to 2026 to be the type of place set out in the Southwark's Sustainable Community Strategy (Ref. 7.5). Those policies of most relevance to the Comprehensive Development are:

- Strategic Policy 4 – Places for learning, enjoyment and healthy lifestyles: This policy seeks to promote a borough-wide network of community facilities in Southwark.
- Strategic Policy 5 – Providing New Homes: This policy requires 4,200 new homes, including approximately 1,450 net new homes, in the Aylesbury Action Area.
- Strategic Policy 6 – Homes for People on Different Incomes: This policy requires 50% affordable housing and 50% private housing in the Aylesbury Action Area core
- Strategic Policy 7 – Family Homes: This policy seeks to promote housing appropriate for families by setting minimum percentages of 3, 4 and 5 bedroom homes in developments of 10 units or more.
- Strategic Policy 10 – Jobs and Businesses: This policy seeks to increase the number of jobs in Southwark and in particular ensure that local residents and businesses benefit from the opportunities created by new development.

Southwark Council Unitary Development Plan (2007) Saved Policies (Updated 2013)

7.2.11 A number of plan policies from the *Southwark Council Unitary Development Plan* (2007) (Ref. 7.6) have been saved and remain adopted policy. Those policies of most relevance to the Comprehensive Development are:

- Policy 2.2 Provisions of new community facilities: This policy states that planning permission will be granted for new community facilities provided that the facility will be accessible to all, will not be detrimental to local amenity and is accompanied by a Transport Assessment where more than 20 vehicle trips will be generated at any one time.
- Policy 3.2 Protection of amenity: This policy states that planning permission will not be granted where there will be a loss of amenity for existing and/or future occupiers.

Aylesbury Area Action Plan (2010)

7.2.12 The *Aylesbury Area Action Plan* (AAAP) (2010) (Ref. 7.7) provides a blueprint for the regeneration of the Aylesbury Estate over the next 20 years. It proposes replacing the existing 2,700 properties with around 4,200 new homes. The policies of most relevance to the Comprehensive Development are:

- BH3 - Tenure Mix: This policy provides the tenure breakdown for the Area Action Plan core. The overall targeted tenure split is for 50% private and 50% affordable. The affordable housing should be split between 75% social rented and 25% intermediate.
- BH4 – Size of Homes: This policy requires that developments provide for a range of housing sizes, specifying the percentages of certain housing types.
- PL5 – Public Open Space: This policy requires that new development must provide a high quality network of public open spaces of different sizes and uses.
- PL6 – Children's Play Space: This policy requires that all new developments must provide 10 sqm of children's play space per child bed space.
- COM1 – Location of Social and Community Facilities: This policy identifies five locations for new social and community facilities, namely The Amersham Site, Thurlow Street, East Street, Westmoreland Road and the Michael Faraday Primary School and Community Learning Centre.
- COM2 – Opportunities for new businesses: Provides for approximately 2,500 sqm of employment floorspace at the junction of Thurlow Street and East Street.
- COM3 – Health and Social Care: Provides for approximately 2,500sqm of health care floor space in the Area Action Plan Core, preferably at the Amersham site although it may be provided in more than one location.
- COM4 – Education and Learning: Provides for approximately 1,150 sqm of pre-school facilities to be provided in three or four unspecified locations.
- COM5 – Community Space and Arts and Culture: Provides for 500sqm of flexible community space (Use Class D1) in the Area Action Plan Core.
- COM6 – Provides for 1,750 sqm of Use Class A floorspace to be provided across the Area Action Plan Core.

Guidance

Planning Practice Guidance (2014)

7.2.13 On 6th March 2014, the Department for Communities and Local Government (DCLG) launched the Planning Practice Guidance (PPG) web-based resource (Ref. 7.8).

7.2.14 The section on design sets out what makes for a well-designed place, which includes ensuring the community has easy access to facilities such as shops, schools, clinics, workplaces, parks, play areas, pubs or

cafés. Well-designed public spaces are also considered important as they help bring neighbourhoods together and provide space for social activities and civic life.

7.2.15 The Planning Practice Guidance also states that well designed new or changing places should be functional; support mixed uses and tenures; including successful public spaces; being adaptable and resilient; have a distinctive character; be attractive; and encourage ease of move.

7.3 Assessment Methodology and Significance Criteria

Relevant Elements of the Comprehensive Development

7.3.1 The assessment in this chapter is been based on the application plans submitted with the applications and the associated parameter plans submitted with the Masterplan Application.

Scope of the Assessment

7.3.2 WSP submitted an EIA Scoping Report to LBS on 28th March 2014 (**Appendix 2.1**) to confirm the nature, scope and approach that will be taken to the EIA. The EIA scoping opinion (**Appendix 2.2**) was received from LBS on 5th June 2014. The Scoping Opinion requested that the Socio-Economic Chapter take into account existing businesses on the FDS and Masterplan Application sites and that the Healthy Urban Development Unit (HUDU) approach to health assessment be taken into account. A response to the Scoping Opinion was submitted by WSP to LBS on the 22nd July 2014 (**Appendix 2.3**). This stated that where possible, the socio-economic chapter would include the size of economic floor space and numbers of existing employees.

Extent of the Study Area

7.3.3 The extent of the study area covers the FDS and Masterplan Application sites, the AAAP area, the Ward (Faraday), the LBS and Greater London, where appropriate. Please refer to **Chapter 3 'The Comprehensive Development'**.

7.3.4 In terms of the geographical extent of effects, the following definitions have been adopted:

- **Local level:** Effects within the immediate area of the Comprehensive Development and wider AAAP area;
- **Borough level:** Effects within LBS and neighbouring areas; and,
- **Regional level:** Effects within Greater London.

Consultation

7.3.5 **Table 7.1** provides a summary of the consultation activities undertaken in support of the preparation of this Chapter.

Table 7.1: Summary of Consultation Undertaken to Date

Body / Organisation	Individual/s at Body / Organisation	Meeting Dates and Other Forms of Consultation	Summary of Outcome of Discussions
London Borough of Southwark	Adeyemi Tiamiyu Information and Records Officer Southwark Childrens Services and	Email received from Adeyemi Tiamiyu dated 01 August 2014. A copy of the email is attached in **Appendix 7.1**.	Schools capacity data for the LBS received.

Body / Organisation	Individual/s at Body / Organisation	Meeting Dates and Other Forms of Consultation	Summary of Outcome of Discussions
	Southwark Adults Social Care Services		
London Borough of Southwark	Alex Cossins Project Manager (Technical) – Regeneration South	Email recieved from Alex Cossins dated 19 September 2014. A copy of the email is attached in **Appendix 7.2**.	Employment floorspace for employers on site recieved where known.

Method of Baseline Data Collation

Desk Study

7.3.6 The following were undertaken:

- A review of the socio-economic policies relating to the area, location and nature of the Comprehensive Development; and
- A desk-top review of available baseline information on current socio-economic conditions in the study area primarily using data from Online National Statistics (ONS 2011).

Identification of Sensitive Receptors

7.3.7 The sensitive receptors are the people who live and work within the Site and the surrounding area and users of existing and planned facilities. Particularly sensitive receptors include residents and workers within the Comprehensive Development.

Significance Criteria

7.3.8 The assessment of potential effects as a result of the Comprehensive Development has taken into account both the construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the development proposals, and the sensitivity of the affected receptor / receiving environment to change, as well as a number of other factors that are outlined in more detail in **Chapter 2 'Approach to the Assessment'** of this ES. Magnitude of change and the sensitivity of the affected receptor / receiving environment are both assessed on a scale of high, medium, low and negligible (as shown in **Table 2.2** in **Chapter 2 'Approach to the Assessment'**).

Significance of Effects

7.3.9 The following terms have been used to define the significance of the effects identified:

- **Major effect:** where the Comprehensive Development (or the FDS Development alone) could be expected to have a very significant effect (either positive or negative) on the existing socio-economic climate and community in LBS and Greater London;
- **Moderate effect:** where the Comprehensive Development (or the FDS Development alone) could be expected to have a noticeable effect (either positive or negative) on the existing socio-economic climate and community in LBS and Greater London;
- **Minor effect:** where the Comprehensive Development (or the FDS Development alone) could be expected to result in a small, barely noticeable effect (either positive or negative) on the existing socio-economic climate and community in LBS and Greater London; and

- **Negligible:** where no discernible effect is expected as a result of the Comprehensive Development (or the FDS Development alone) on the existing socio-economic climate and community in LBS and Greater London.

Limitations and Assumptions

7.3.10 This assessment has been based on the quantum of the Comprehensive Development and proposed uses as described in **Chapter 3 'The Comprehensive Development'** and shown on the application plans. It has been assumed that the new open space and community facilities will be used by the new residents of the Comprehensive Development, existing residents in the surrounding area and the public.

7.3.11 When calculating the existing employment numbers on site, the employment areas for all extant employment uses were not known. This is because there were gaps in the data provided by LBS. As such, reasonable assumptions on the number of staff employment had to be made based on professional judgement.

7.4 Baseline Conditions

7.4.1 The Comprehensive Development is within the Faraday Ward. This section describes the current socio-economic characteristics for the Ward. It also compares these to the socio-economic characteristics in LBS, Greater London and England as a whole.

7.4.2 The 2001 (Ref. 7.9) and 2011 (Ref. 7.10) Census population for Faraday and LBS are presented below in **Table 7.2**. The estimated population change for Faraday in the ten years from 2001 equates to approximately 1.1% growth (142 persons). This figure is very low in comparison to the high levels of population growth in LBS, London and national growth.

Table 7.2: 2001 and 2011 Census Population Data

	2001	2011	Percentage Change
Faraday Ward	12,697	12,839	+1.1
London Borough of Southwark	244,866	288,283	+15.1%
London	7,172,091	8,173,941	+12.2%
England	49,138,831	53,012,456	+7.3%

7.4.3 **Table 7.3** shows the population structure in Faraday Ward and the Borough compared to London and England. The figures show that the Ward has a relatively high number of young people compared to the Borough and England.

Table 7.3: 2011 Census Population Data

Age Range	Faraday	London Borough of Southwark	London	England
Under 16	23.2%	18.5%	19.8%	18.9%
16-19	4.6%	4.5%	4.6%	5.1%
20-29	18.9%	21.7%	17.8%	13.7%
30-59	42.9%	44.3%	42.3%	40%
60-74	7.1%	7.3%	9.9%	14.6%

Age Range	Faraday	London Borough of Southwark	London	England
75+	3.0%	3.5%	5.2%	7.8%
Average Age	32.5	33.7	35.6	39.3
Total Number	12,839	288,283	8,173,941	53,012,456

Deprivation

7.4.4 The Indices of Multiple Deprivation 2010 use a combination of information relating to income, employment, education, health, skills and training, barriers to housing and services, and crime to create an overall score of deprivation. A low score indicates greater deprivation; hence the most deprived area is indicated by a rank of 1. In 2010, the London Borough of Southwark had a rank of 41 out of 326 local authorities in England. This places the district as one of the most deprived local authorities in England, see **Table 7.4**. This is a relative improvement from previous rankings of 26th in 2007 and 17th in 2004. Southwark has also moved up to being the 12th most deprived borough in London in 2010, from 6th in 2004 and 9th in 2007 (Ref. 7.11). Southwark has 126 Lower Super Output Area's (LSOA's), the number of LSOAs in the 20% most deprived category fell from 79 (48%) in 2007 to 54 (33%) in 2010.

Table 7.4: Deprivation in LBS

Topic	Rank
Rank of Average Score	41
Rank of Average Rank	25
Rank of Extent	46
Rank of Local Concentration	138
Rank of Income Scale	25
Rank of Employment Scale	33

7.4.5 **Table 7.5** outlines the economic activity in Faraday, LBS, London and England (Ref. 7.12). The table indicates that the percentage of people in full time employment is lower in the Faraday Ward (34.2%), than the Borough and London.

Table 7.5: 2011 Economic Activity

Economic Activity by Group	Faraday (%)	LBS (%)	London (%)	England (%)
People aged 16-74: Economically active: Employees Full-time	34.2	42.1	39.8	38.6
People aged 16-74: Economically active: Employees Part -time	13	9.8	10.8	13.7
People aged 16-74: Economically active: Self-employed	8.3	9.9	11.6	9.8
People aged 16-74: Economically active: Unemployed	8.4	6	5.2	4.4
People aged 16-74: Economically active: Full-time student	5.6	4.9	4	3.4

Economic Activity by Group	Faraday (%)	LBS (%)	London (%)	England (%)
People aged 16-74: Economically inactive: Retired	6	5.7	8.3	13.7
People aged 16-74: Economically inactive: Student	9.8	9.9	7.8	5.8
People aged 16-74: Economically inactive: Looking after home / family	5	3.7	5.2	4.4
People aged 16-74: Economically inactive: Permanently sick / disabled	4.6	4.2	3.7	4
People aged 16-74: Economically inactive: Other	4.6	3.2	3.2	2.2

7.4.6 As shown in **Table 7.6**, in May 2014 it was estimated that 3.6% of the working age population within Southwark claimed Jobseekers Allowance (JSA). This is higher than the national average of 2.6% and the London average of 2.7% (Ref 7.13). This figure though is the lowest since November 2008.

7.4.7 During 2013 the average gross weekly pay for full time workers who live in Southwark was £673.50, this is higher than the London (£657.70) and national (£517.80) averages (Ref 7.13).

Table 7.6: Job Seekers Allowance Claimants

	Southwark (%)	London (%)	Great Britain (%)
November 2011	5.3	4.1	3.8
February 2012	5.2	4.2	4.1
May 2012	5.1	4.0	3.9
August 2012	4.9	3.8	3.8
November 2012	5.0	3.9	3.7
February 2013	5.0	4.0	3.9
May 2013	4.7	3.7	3.6
August 2013	4.4	3.5	3.3
November 2013	4.0	3.1	2.9
February 2014	3.9	3.0	3.0
May 2014	3.6	2.7	2.6

7.4.8 **Table 7.7** summarises the occupations of the population of Faraday Ward, LBS, London and England (Ref. 7.14). People living in Faraday are well represented by 'Elementary Occupations', the proportions employed in this sector is significantly larger than the England average.

Table 7.7: Occupational Profiles

	Faraday	LBS	London	England
Managers, Directors and Senior Officials	6.7	10.5	11.6	10.8
Professional Occupations	14.7	25.8	22.4	17.4

	Faraday	LBS	London	England
Associate Professional and Technical Occupations	11.2	17.4	16.2	12.7
Administrative and Secretarial Occupations	10	9.8	11.6	11.4
Skilled Trade Occupations	8.3	6.5	8.3	11.3
Caring, Leisure and Other Service Occupations	12.6	8.2	7.8	9.3
Sales and Customer Service Occupations	9.5	6.5	7.4	8.4
Process, Plant and Machine Operatives	5.6	3.4	4.7	7.1
Elementary Occupations	21	11.5	9.6	11.0

7.4.9 **Table 7.8** shows the extant employers on site as identified by LBS (**see Appendix 7.2**), including the use and approximate size.

Table 7.8: Extant Employers on Site

Site Name	Use	Approximate Size (sqm)
BACC 84	Community Facility (D1)	57
Bradenham Council Office*	Office (B1a)	3,214
Ellison House	Probation Hostel (C2)	590
67-68 Chartridge	Storage (B8)	43
Chiltern Council Office*	Office (B1a)	2,737
Taplow Housing Office	Office (B1a)	486
Aylesbury Early Years Centre	Nursery (D1)	365
Aylesbury Health Centre	Health Centre (D1)	Not known
Medipharmacy	Pharmacy (A1)	132
Taplow Nursery	Nursery (D1)	63
Taplow Medical Centre	GP (D1)	790
Aylesbury Youth Centre	Community Facility (D1)	133
Chaplin Centre	Offices (B1a)	1,515
Retail units	Retail (A1)	130
Barrow Stores	Retail (A1)	16
Aylesbury Access Centre	Community Facility (D1)	160
Taplow Retail Units (12)	Retail (A1)	730
Tykes Corner	Nursery (D1)	300
Creation Trust Office	Office (B1a)	127

Site Name	Use	Approximate Size (sqm)
2 Inspire	Community Facility (D1)	158
Aylesbury Childminding Unit	Nursery (D1)	127
Wendover Meeting Room	Community Facility (D1)	Not known
Aylesbury Learning Centre	Training facility (D1)	650
Thurlow Lodge Community Hall	Community facility	Not known
The Hour Glass	Public House (A4)	730
Wendover Council Offices	Office (B1a)	913

7.4.10 The 2011 Census asked people to describe their health over the preceding 12 months (Ref. 7.15), as set out in **Table 7.9** below. The percentage of people describing their health as 'Very Good' in the Ward is 3% higher in comparison to the percentages for London and England.

Table 7.9: Health in the Locality

Status of Groups	Faraday (%)	Southwark (%)	London (%)	England (%)
Very Good Health	52.2	53.4	50.4	47.2
Good Health	31.2	31.2	33.3	34.2
Fair Health	11.1	10.3	11.1	13.1
Bad Health	4.0	3.6	3.7	4.2
Very Bad Health	1.2	1.2	1.2	1.2

7.4.11 The Health Profile for Southwark published by the Department of Health (2013) (Ref 7.16) outlines the following key facts in relation to health matters for Southwark. Equivalent data relating solely to Faraday Ward is not available:

- The health of people in Southwark is varied compared with the England average. Deprivation is higher than average and about 16,700 children live in poverty. Life expectancy for men is lower than the England average;
- Life expectancy is 10.4 years lower for men and 8.6 years lower for women in the most deprived areas of Southwark than in the least deprived areas;
- Over the last 10 years, all-cause mortality rates have fallen. Early death rates from cancer and from heart disease and stroke have fallen but remain worse than the England average;
- In Year 6, 28.5% of children are classified as obese, worse than the average for England. The level of teenage pregnancy is worse than the England average. Levels of alcohol-specific hospital stays among those under 18, breast feeding and smoking in pregnancy are better than the England average;
- Estimated levels of adult 'healthy eating' and obesity are better than the England average. Rates of sexually transmitted infections, road injuries and deaths and smoking related deaths are worse than the England average. The rate of hospital stays for alcohol related harm is better than the England average; and
- Priorities in Southwark include alcohol, childhood obesity and improving the detection and management of long term health conditions.

7.4.12 The Site lies within an area covered by King's College Hospital NHS Foundation Trust. The nearest hospital with an Accident and Emergency (A&E) department is Kings College Hospital which is 3 miles from the Site (Ref. 7.17).

7.4.13 The following GP surgeries are within 500m of the Site:

- Aylesbury Partnership: The Dun Cow Surgery
- Dr Bradford & Partners
- Old Kent Road Surgery
- The Trafalgar Surgery; and
- The Villa Street Medical Centre

7.4.14 **Table 7.10** sets out the additional medical facilities within 500m - 2km of the site boundary (Ref 7.18).

Table 7.10: GP Facilities

GP Facility	Location	GP Facility	Location
Akerman Medical Practice	SW9 6AF	Lister Primary Care Centre (Dr Arumugaraasah)	SE15 5LJ
Artesian Health Centre (Main Site Decima Street)	SE1 4QX	Lister Primary Care Centre (Dr Hossain)	SE15 5LJ
Avicenna Health Centre	SE16 3HA	Manor Place Surgery	SE17 3BD
Aylesbury Partnership: Commercial Way Surgery	SE15 6DB	Myatts Field Medical Practice	SW9 6AF
Bermondsey & Landowne MM (Branch Site at Artesian)	SE1 4QX	New Mill Street Surgery	SE1 2BP
Bermondsey Spa Medical Practice	SE16 4BN	Park Medical Centre	SE16 2PE
Borough Medical Centre (Dr Misra)	SE1 6ED	Parkside Medical Centre	SE5 7AQ
Borough Medical Centre (Dr Sharma)	SE1 6ED	Penrose Surgery	SE17 3DW
Camberwell Green Surgery	SE5 7AF	Princess Street Group Practice	SE1 6JP
Dr Sinha & Partner	SE17 3NH	Queens Road PHS Practice	SE15 2PT
Falmouth Road Group Practice	SE1 4JW	Sir John Kirk Close Surgery	SE5 0BB
Hurley Clinic	SE11 4HJ	St Giles Surgery (Dr Patel)	SE5 7RF
Hurley Group Practice at the Lister	SE15 5LJ	St Giles Surgery (Dr Virji)	SE5 7RF
Iveagh House Surgery	SW9 6AF	St James Church Surgery	SE16 4AA
The Grange Road Practice	SE1 3BW	The Acorn Surgery	SE15 2UA
The Vauxhall Surgery	SE11 5NH	The Corner Surgery	SE5 9NS
Vassall Medical Centre	SW9 6NA	The Gaumont House Surgery	SE15 5SL
Lambeth Walk Group Practice	SE11 6SP		

7.4.15 Walworth Dental Care is within 500m of the site. **Table 7.11** sets out those dental facilities within a 500m – 2km range (Ref. 7.18).

Table 7.11: Dentist Facilities

Dentist Facility	Location	Dentist Facility	Location
Akinsola	SE5 0TJ	Lacey Dental Practice	SE15 1LA
Bailie & Associates	SE15 5EG	Marway & Patel	SE16 4RT

Dentist Facility	Location	Dentist Facility	Location
Blankendaal	SE15 6ND	Mint Dental Care	SW9 0JD
Borough Dental Practice	SE1 1JH	Patel, J	SE5 8QU
Dr GK Ooi & Associates	SE11 4LD	PH Dental Practice	SE15 4RX
Elephant & Castle Dental Clinic	SE1 6TJ	Portelly Dental Surgery	SE1 6EU
Eyrumlu - Peckham Dental Centre	SE15 5RS	Smile @ SE11 Dental Surgery	SE11 4PP
Ho	SE1 8XH	South Bank Dental Care	SE16 4RT
Kennington Dental Surgery	SE11 4DA	St. James Road Dental Practice	SE1 3GF
Kings Dental Clinic	SE5 8QZ	Talbot Dental Clinic - Owen	SE1 1NH
Watson	SE5 0DL	Tower Bridge Dental Surgery	SE1 4TL
Talb	SE5 0TJ		

7.4.16 **Table 7.12** shows the number of community and leisure facilities within 2km of the Proposed Development (Ref 7.18).

Table 7.12: Community and Leisure Facilities

Facility	Location	Facility	Location	Facility	Location
109 Lambeth Walk Day Centre	SE11 6EE	Costcutter	Southwark x21	Maddock Pharmacy	SE17 3NH
37 Degrees Tower Bridge	SE1 2AP	LONDIS	Lambeth x1	Medica Ltd	SE16 3RW
Archbishop's Park	SE1 7LE	MARKS & SPENCER-SIMPLY FOOD	Southwark x4	Medimex Pharmacy	SE11 4DA
Bankside Health Club; The	SE1 0SU	NISA-TODAY'S	X5	Fourways Chemists	SE5 8RZ
Bede House Association - Learning Disability Services	SE16 2JW	PREMIER	Southwark x3	Millennium Pharmacy	SW9 6HX, SW9 7SB, SW9 6BH, SW9 6HX, SW9 6TS
Bede House Keep Fit Classes	SE16 2JW	SAINSBURY'S-LOCAL	Southwark x2	Morrisons Pharmacy	SE15 5EW
Beormund Community Centre	SE1 2AN	TESCO-EXPRESS	x7	Paterson Heath and Co Ltd	SE11 6EE
Brunswick Park	SE5 7RG	Morrisons	X3	Peace Pharmacy	SE5 9PU
Burgess Park	SE5 0RN	LIDL	X2	Day Lewis Pharmacy	SW9 7BJ
Camberwell Leisure Centre	SE5 8TS	CO-OPERATIVE FOOD (THE)	X2	Dp and Sp Ltd	SE17 2SX
Circle Spa Health Club	SE1 2JE	SPAR	X2	East Street Chemist	SE17 2DN
Colombo Sports Centre	SE1 8DP	SSP CONVENIENCE STORE (Vars)	Southwark	Abc Pharmacy	SE5 8TR, SE15 5SL
Damilola Taylor Youth Centre	SE15 6DR	WHISTLESTOP FOOD & WINE	Southwark	Harfleur Chemist	SE1 4TW
Darwin Court	SE17	ALDI	Southwark	Amadi's Chemist	SE1 3NP

Facility	Location	Facility	Location	Facility	Location
	1AD				
Disability Tennis Club	SE5 7JZ	ASDA	Southwark	Bonamy Pharmacy	SE16 3HF
Downside Fisher Youth Club	SE1 2EZ	SOMERFIELD	Southwark	Boots	SE1 6TB, SE17 2TG, SE1 2HD, SE15 5BS, SE1 6TB, SE1 2HD.
Fitness First Health Club (London Bridge Cottons)	SE1 2QN	TESCO	X2	Butterfly Pharmacy	SE5 8RP
Fitness First Health Club (London Bridge)	SE1 9SG	TESCO-METRO	Southwark	Cam Pharmacy	SE1 7BL
Fitness4Less (London Southwark)	SE1 0UG	MARKS & SPENCER	Southwark	Cambelle Chemist	SE1 5TJ
Flaxman Sports Centre	SE5 9DF	Boots-Peckham	SE15 5BY	City Pharmacy	SE1 1LZ
Girls in Gloves	SE1 3JB	Churchills of London Ltd	SE17 1JE	Classic Pharmacy	SE1 6ER
Glendinning Fitness Centre	SE1 9RT	G F Barnes	SE1 1HR	Day Lewis Duncans Pharmacy	SE15 5LJ
Harris Academy Peckham	SE15 5DZ	Hattons Opticians	SE11 6EE	Hills Pharmacy	SE11 4HQ x2
Horizons Health & Fitness Club (Stockwell)	SW9 0RD	Institute of Optometry	SE1 6DS	Sainsbury's Pharmacy	SE1 9RT
Kennington Park Pitch	SE11 4AU	J G Bentley	SE16 3RW	Jamaica Road Pharmacy	SE16 4RT
Lilian Baylis Technology School	SE11 5QY	L A Sackwild	SE1 4TP	Junction Pharmacy	SE5 9QH
London South Bank University Sports Centre	SE1 0AA	Nash Opticians	SE16 3RN	Kembers and Lawrence	SE5 7AF
Marcus Lipton Youth Centre	SW9 7UH	Pro-Vision Opticians	SE1 5LU	Lings Chemist	SE1 5LU
Miami Health Club Ltd	SE1 5TY	R & J Optical	SE17 2DJ	Lloydspharmacy	SE15 5JZ
Myatts Fields Park	SE5 9RA	Rodney Opticians	SE5 7AF	Lloydspharmacy	SE1 6AD
No1 Studio Training	SE1 3LJ	South London Resource Centre	SE1 9RT	The Downside Fisher Youth Club	SE1 2EZ
Orchard Lisle Swimming Pool at Guys	SE1 3RB	Specsavers Opticians	SE15 5EW x3	The Gym (London Stockwell)	SW9 0HP
Peckham Pulse Healthy Living Centre	SE15 5QN	Tesco In-Store Pharmacy	SE11 5QU	The Salmon Youth Centre	SE16 4TE
Pure Gym (London Oval)	SW9 6DE	Ve Lettsom Chemist	SE5 8PQ	Thirtysevendegrees (Tower Bridge)	SE1 2AP
Riding for the Disabled Association (RDA) - Vauxhall City Farm	SE11 5JE	Vitelow Pharmacy	SW9 0JG	Tokei Martial Arts & Fitness Centre	SE1 2EN
Soho Gyms (Borough)	SE1 4NL	Walworth Pharmacy	SE17 1JJ	Vauxhall Park	SW8 1LA
Soho Gyms (Waterloo)	SE1 8TG	A & I Lask	SW9 6BS	A R Chemist	SE1 5TY

Facility	Location	Facility	Location	Facility	Location
Southwark Council - Community Sports Team	SE1 2TZ	Boots-London - Walworth Rd	SE17 2TG	Tesco Instore Pharmacy	SE1 5HG
Southwark Park	SE16 2UA	Sheel Pharmacy	SE5 0BB	Pyramid Pharmacy	SE16 3TS
Tabard Gardens	SE1 4WY	Superdrug Pharmacy	SE1 6TB x2, SE5 8RW	Qrystal Pharmacy	SE1 6ED
The Bankside Health Club	SE1 0SU	Superdrug Stores Plc	SE17 2AL	The City of London Academy	SE1 5LA
The Biscuit Factory	SE16 4DG	The Bridge	SE1 0NQ		

7.4.17 **Table 7.13** shows the current accommodation types in Faraday Ward in 2011 (Ref. 7.19). Table 9.12 shows that the Ward is well represented by flats, maisonettes and apartments, totalling 87% (4,365) of the total housing stock, which is considerably greater than the London and England average. The Ward is least represented by stationary/temporary structures (0.08%) and detached whole houses or bungalows at 0.8%.

Table 7.13: Dwellings and Accommodation Type in 2011

	Faraday	Southwark	London	England
All Households	5,018	120,422	3,266,173	22,063,368
Whole House or Bungalow; Detached	38	2,590	205,088	4,949,216
Whole House or Bungalow; Semi-Detached	89	7,777	617,324	6,889,935
Whole House or Bungalow; Terraced (Including End-Terrace)	418	19,266	756,596	5,396,459
Flat, Maisonette or Apartment; Total	4,365	89,430	1,649,118	4,668,839
Flat, Maisonette or Apartment; Purpose-Built	3,995	74,797	1,211,075	3,624,359
Flat, Maisonette or Apartment; (Including Bed-Sits)	288	12,899	382,826	834,083
Flat, Maisonette or Apartment; In Commercial Building	82	1,734	55,217	210,397
Caravan or Other Mobile or Temporary Structure	4	143	2,539	80,964

7.4.18 The average house price for Southwark in July 2014 was £521,154, as compared to an average house price for London of £457,072 (Ref. 7.20).

Existing Educational Facilities

7.4.19 There are currently 104 schools within 3 km of the Comprehensive Development. There are 5 nurseries, 79 Primary Schools and 20 Secondary Schools. Table 9.13 shows the capacity of local schools (excluding independent fee-paying schools) within a 3km radius of the Site. 54 schools are operating at under capacity, with the remaining schools within the 3 km buffer operating at above capacity.

7.4.20 **Table 7.14** shows the schools within a 500m buffer of the Comprehensive Development. In particular it should be noted that the Michael Faraday School and the Sacred Heart Secondary School are directly adjacent the site boundary (Ref. 7.18).

Table 7.14: Primary Schools within 500m

Name	Postcode	Number Of Pupils on Roll 2011	School Capacity	Difference

Name	Postcode	Number Of Pupils on Roll 2011	School Capacity	Difference
Cobourg Primary School	SE5 0JD	410	420	10
John Ruskin Primary School and Language Classes	SE5 0PQ	505	409	-96
Michael Faraday School	SE17 2HR	395	420	25
Robert Browning Primary School	SE17 1DQ	350	315	-35
Townsend Primary School	SE17 1HJ	270	315	45
Victory School	SE17 1PT	220	210	-10
English Martyrs Roman Catholic Primary School	SE17 1QD	460	420	-40
St George's Church of England Primary School	SE5 7TF	185	210	25
St John's Walworth Church of England Primary School	SE17 1NQ	205	210	5
St Peter's Church of England Primary School	SE17 2HH	230	210	-20
Surrey Square Primary School	SE17 2JY	465	420	-45
			Net difference	-136

7.4.21 It can be seen that as of 2011, there was a deficit of Primary School places in the local area.

7.4.22 **Table 7.15** shows the secondary schools capacity data for the more local secondary schools within 2km of the site. This is a larger radius than for Primary Schools as secondary pupils travel borough-wide to schools.

Table 7.15: Secondary Schools within 2km

Name	Postcode	School Capacity	Number Of Pupils	Current Capacity
Saint Gabriel's College	SW9 6UL	912	355	557
St Saviour's and St Olave's Church of England School	SE1 4AN	658	775	-117
Harris Academy Bermondsey	SE16 3TZ	1025	932	93
City of London Academy (Southwark)	SE1 5LA	1200	1130	70
Harris Academy Peckham	SE15 5DZ	1150	874	276
Walworth Academy	SE1 5UJ	1140	1040	100
ARK Globe Academy	SE1 6AG	1320	1165	155
Sacred Heart Catholic School	SE5 0RP	750	755	-5
ARK All Saints Academy	SE5 0UB	800	112	688
University Engineering Academy, South Bank	SE17 2TP	1150	300	850

7.4.23 Set out in **Table 7.16** is the predicted future demand for Year 7 places in Southwark based on data provided by LBS (**Appendix 7.1**).

Table 7.16: Predicted Year 7 secondary school demand in Southwark

	Sept 2013	Sept 2014	Sept 2015	Sept 2016	Sept 2017	Sept 2018	Sept 2019	Sept 2020
Pupil Place Demand	2444	2567	2653	2899	2940	3140	3403	3280
Available Places	2636	2876	2876	2876	2876	2876	2876	2876
Difference	192	309	223	-23	-64	-264	-527	-404

Future Baseline

7.4.24 In the absence of the Comprehensive Development it is likely that similar applications would come forward on the Site to provide a similar quantum and mix in line with the aspirations of the AAAP. In the event of no development taking place at the Site the anticipated future baseline will remain as outlined above.

7.5 Assessments of Effects, Mitigation and Residual Effects

Demolition and Construction

Site Wide Development Option

Generation of Construction Employment

7.5.1 **Chapter 5 'Demolition and Construction'** of this ES identified that the Site Wide Development Option would generate an expected 6,331 person-years of construction employment, which equates to 316 temporary construction jobs per year. Following the convention adopted by the Treasury that 10 person years of employment can be taken as equivalent to one permanent full-time job created, this would equate to 616 new Full Time Equivalent (FTE) construction jobs being created.

7.5.2 Effects on levels of employment associated with the construction phase are judged to be a direct, long-term temporary **moderate to major positive** effect at the borough level.

Mitigation

7.5.3 A construction workplace coordinator will be provided along with a management fee for monitoring the associated employment and skills initiatives.

Residual Effects

7.5.4 The residual effect of the construction phase on employment will remain a direct, long-term, temporary **major positive** effect at the borough level.

Indirect and Induced Employment

7.5.5 Housing construction also involves purchases from a range of suppliers who, in turn, purchase from their own suppliers via the supply-chain. The relationship between the initial direct spending and total economic impacts is known as the 'multiplier effect', which demonstrates that an initial investment can have much wider economic benefits as this expenditure is diffused through the economy.

7.5.6 Research undertaken for the National Housing Federation (Ref. 7.21) has identified that the construction industry has an indirect and induced employment multiplier of 2.51. **Table 7.18** applies the 2.51 multiplier to the temporary construction jobs per year for each phase of the Site Wide Development Option.

Table 7.18: Indirect and induced employment

	Temporary Construction Jobs Per Year	Employment Multipiler	Indirect and induced jobs
Site Wide Development Option	316	2.51	793

7.5.7 The Site Wide Development Option would be expected to create 793 indirect or induced jobs per year of construction in sectors throughout the UK economy.

7.5.8 Effects on levels of indirect and induced employment associated with the construction phase are judged to be an indirect, long-term, temporary **moderate positive** effect at the borough level.

Mitigation

7.5.9 The effect of the Site Wide Development Option in terms of indirect and induced employment will be positive and therefore no further mitigation measures are required.

Residual Effects

7.5.10 The residual effect of the construction phase on indirect and induced employment will remain a direct, long-term, temporary **moderate positive** effect at the borough level.

FDS Development Option

Generation of Construction Employment

7.5.11 **Chapter 5 'Demolition and Construction'** of this ES identified that the FDS Development Option would generate an expected 1,847 person-years of construction employment, which equates to 307 temporary construction jobs per year. Following the convention adopted by the Treasury that 10 person years of employment can be taken as equivalent to one permanent full-time job created, this would equate to 184 new Full Time Equivalent (FTE) construction jobs being created. Note that these jobs are a part of, rather than in addition to, those jobs being created as a part of the Site Wide Development Option. Effects on levels of employment associated with the construction phase are judged to be a direct, short-term temporary **minor to moderate positive** effect at the borough level.

7.5.12 Mitigation

7.5.13 A construction workplace coordinator will be provided along with a management fee for monitoring the associated employment and skills initiatives.

Residual Effects

7.5.14 The residual effect of the construction phase on employment will remain a direct, long-term, temporary **moderate positive** effect at the borough level.

Indirect and Induced Employment

7.5.15 Housing construction also involves purchases from a range of suppliers who, in turn, purchase from their own suppliers via the supply-chain. The relationship between the initial direct spending and total economic impacts is known as the 'multiplier effect', which demonstrates that an initial investment can have much wider economic benefits as this expenditure is diffused through the economy.

7.5.16 Research undertaken for the National Housing Federation (Ref. 7.21) has identified that the construction industry has an indirect and induced employment multiplier of 2.51. **Table 7.20** applies the 2.51 multiplier to the temporary construction jobs per year for each phase of the FDS Development Option.

Table 7.20: Indirect and induced employment

	Temporary Construction Jobs Per Year	Employment Multipiler	Indirect and induced jobs
Site Wide Development Option	307	2.51	770

7.5.17 The FDS Development Option would create 770 indirect or induced jobs per year of construction in sectors throughout the UK economy. Note that these jobs are a part of, rather than in addition to, the jobs being created as a part of the Site Wide Development Option.

7.5.18 Effects on levels of indirect and induced employment associated with the construction phase are judged to be an indirect, short-term, temporary **moderate positive** effect at the borough level.

Mitigation

7.5.19 The effect of the FDS Development Option in terms of indirect and induced employment will be positive and therefore no further mitigation measures are required.

Residual Effects

7.5.20 The residual effect of the construction phase on indirect and induced employment will remain a direct, long-term, temporary **moderate positive** effect at the borough level.

Operation

Site Wide Development Option

Changes to employment during operation

7.5.21 In order to establish the changes to employment during operation it is first necessary to establish the existing level of employment across the Site. Through the application of 'employment densities[1]' it is possible to estimate the number of employees for each employer based on the floorspace (Ref. 7.22). Consultation with LBS (**Appendix 7.2**) has given the approximate size of each employer currently on-Site in square metres, but doesn't state whether this is the plot size, the gross external area of the building or the net internal area. For the purposes these calculations it has been assumed that the areas given are net internal areas. This will yield the highest possible number of employees on-Site at present and it represents a worst case scenario as it will minimise the employment increase benefits resulting from the Site Wide Development Option.

7.5.22 **Table 7.21** shows the known data for extant employers within the Site. Not all floorspaces are given and these have been supplemented with additional information from LBS **(Appendix 7.2)** and in the case of the Aylesbury Early Years Centre, updated with information available online.

Table 7.21: Extant Employees within the Site

[1] The term 'employment density' refers to the average floorspace per person in an occupied building. It is therefore a measure of intensity of use and indicates how much space each person occupies within the workplace.

Site Name	Use	Approximate Size (sqm)	Area per FTE	Employees
BACC 84	Community Facility (D1)	57	36	1
Bradenham Council Office*	Office (B1a)	3,214	12	Currently Vacant
Ellison House	Probation Hostel (C2)	590	N/A	
67-68 Chartridge	Storage (B8)	43	80	1
Chiltern Council Office*	Office (B1a)	2,737	12	Currently Vacant
Taplow Housing Office	Office (B1a)	486	12	20
Aylesbury Early Years Centre	Nursery (D1)	365	36	24 (Ref. 7.23)
Aylesbury Health Centre	Health Centre (D1)	Not known	36	
Medipharmacy	Pharmacy (A1)	132	19	7
Taplow Nursery	Nursery (D1)	63	36	2
Taplow Medical Centre	GP (D1)	790	36	22
Aylesbury Youth Centre	Community Facility (D1)	133	36	4
Chaplin Centre	Offices (B1a)	1,515	12	127
Retail units	Retail (A1)	130	19	7
Barrow Stores	Retail (A1)	16	19	1
Aylesbury Access Centre	Community Facility (D1)	160	36	4
Taplow Retail Units (12)	Retail (A1)	730	19	Currently Vacant
Tykes Corner	Nursery (D1)	300	36	8
Creation Trust Office	Office (B1a)	127	12	11
2 Inspire	Community Facility (D1)	158	36	5
Aylesbury Childminding Unit	Nursery (D1)	127	36	4
Wendover Meeting Room	Community Facility (D1)	Not known	36	
Aylesbury Learning Centre	Training facility (D1)	650	36	18
Thurlow Lodge Community Hall	Community facility	Not known	36	

Site Name	Use	Approximate Size (sqm)	Area per FTE	Employees
The Hour Glass	Public House (A4)	730	N/A	5
Wendover Council Offices	Office (B1a)	913	12	76

7.5.23 Therefore there are 357 jobs currently within the Site that are either known to exist or can be estimated based on floor space. This leaves the following commercial premises that it is not possible to account for (as outlined in the Table above):

- Ellison House;
- Aylesbury Health Centre;
- Wendover Meeting Room; and
- Thurlow Lodge Community Hall.

7.5.24 The Site Wide Development Option will provide for a range of employment floorspace and associated job creation. The floorspaces for the FDS Application site are fixed. For the Masterplan Application Site the Planning Application is for an upper and lower limit of floorspace as shown in **Chapter 3 'The Comprehensive Development'**. Both the upper and lower limits have been used to assess the effects on employment generation as shown in **Table 7.22**.

Table 7.22: Employment Generation on the Masterplan Application Site

Use	Use Class	Floorspace (sqm)*	Area Per FTE (sqm)	Employees FTE
Business Space/Employment	B1	420 – 1,750 sqm NIA	12	35 - 145
Retail	A1	140 – 350 sqm NIA	17	8 - 20
Heath/Community/Early Years	D1	2,790 – 4,275 sqm GIA	36	77 - 118
Retail or Workspace	A1, A3 or A4 or B1	180 - 2100 NIA	19	9 - 110

* GIA has been based on a 10% reduction from the GEA. NIA has been estimated based on a 30% reduction from the GEA. This is the most conservative reduction recommended by guidance.

7.5.25 The FDS Application site has a fixed amount of commercial floorspace as shown in **Table 7.23**.

Table 7.23: Employment Generation on the FDS Application Site

Use	Use Class	Floorspace (sqm)	Area Per FTE (sqm)	Employees FTE
Community Facility	D1 or D2	263 sqm GIA	65	4
Extra Care Facility	C2	6,669 sqm GIA	N/A	40*
Learning Disability Unit	D1	782 sqm GIA	36	21

*Figure provided by the Applicant.

7.5.26 Based on the Table above the Site Wide Development Option will provide for between 194 and 458 new jobs. Compared to the 357 estimated extant jobs on the FDS and Masterplan Application sites combined, the lower estimate would represent a net loss of jobs on site and the upper estimate would represent a net gain. This doesn't take into account any existing additional jobs that it was not possible to identify.

7.5.27 Based on the generated workspaces shown in Table 7.22 and 7.23, the estimated effect of the Site Wide Development Option on indirect employment can be calculated as shown in **Table 7.24** below (Ref. 7.24).

Table 7.24: Indirect Employment Effects

		Minimum areas	Maximum areas
A	Workspaces	194	458
B=Ax25%	Estimated leakeage (medium 25%)	49	115
C= A-B	Gross local direct effects	145	343
D=C*50%	Displacement (50%)	73	172
E=C-D	Net local direct effects	72	171
F=Ex(1.1)	Multiplier (Medium 1.1)	79	188
G=E+F)	Total net local effects	151	359

7.5.28 A similar indirect employment benefit would also be currently realised from the extant jobs provided on site, so the indirect employment effects can't be added on to the direct jobs created. Therefore there are two potential effect scenarios, a minimum area scenario and a maximum area scenario.

7.5.29 It is recognised that some local businesses currently present on the Site will be displaced by the Comprehensive Development. It is understood that this displacement will be satisfactorily managed by LBS.

7.5.30 With regards to effects of the Comprehensive Development on shops off-site but in the local area, the intention is to provide sufficient retail space on-Site to meet the demand of new residents. Therefore the net effect on the number of customers for off-site stores would be minimised as the Comprehensive Development will be largely self-sufficient.

7.5.31 The Site Wide Development Option includes a 200-500 sqm convenience store/pharmacy and potential for a further 3,000 sqm of flexible retail space. Given this range of floorspaces the Site Wide Development Option could represent an increase or decrease in the retail provision on-Site. Given that the Site Wide Development Option represents a 25% increase in the number of residential units on-Site, there is potential for additional retail space with minimal effect on site.

Minimum Floorspace Scenario

7.5.32 The significance of changes to employment levels during the operational phase is judged to be a direct, long term, permanent **moderate negative** effect at the borough level.

Mitigation

Steps will be taken to accommodate existing employers within the Comprehensive Development wherever possible in accordance with the site decanting program.

Residual effect

7.5.33 Following mitigation measure, the residual effect of the Site Wide Development operation is considered to be a long term, permanent **minor negative** at the borough level.

Maximum Floorspace Scenario

7.5.34 The significance of changes to employment levels during the operational phase is judged to be a direct, long term, permanent **moderate positive** effect at the borough level.

Mitigation

Although the effect identified is positive steps will still be taken to accommodate existing employers within the Comprehensive Development Site wherever possible in accordance with the site decanting program.

Residual effect

7.5.35 The residual effect of the Site Wide Development Option will remain a long term, permanent **moderate positive** at the borough level.

Local Spend

7.5.36 The Site Wide Development Option will include up to 3,560 residential units and this is likely to have a significant impact on local businesses and services due to the increase in population in the area in respect of present uses.

7.5.37 Increased levels of local spending would be expected as a result of the introduction of the new residential population. The latest data from the ONS identifies that the average weekly household spend for London is £571.60 per week (Ref. 7.25). This equates to a total spend of £105.8m. At present there are 2,647 dwellings within the Site, which equates to a current local spend of £78.6m. Therefore, the projected net increase in local spend is £27.2m. The increased spend of new residents in LBS is likely to have a direct, long-term, permanent **moderate positive** effect at the borough level.

Mitigation

7.5.38 The effect of the Site Wide Development Option on local spend will be positive and therefore no mitigation measures are required.

Residual Effect

7.5.39 The residual effect of the Site Wide Development Option on Local Spend will remain a direct, long-term, permanent **moderate positive** effect at the borough level.

Effect on Schools

7.5.40 Child yield figures have been provided by the project architect based on the Mayor of London's *Shaping Neighbourhoods: Play and Informal Recreation Supplementary Planning Guidance* (2012) (Ref. 7.26). The full calculations are provided in **Appendix 7.3**. In total the Site Wide Development Option is anticipated to accommodate 2,583 children. Of these, approximately 35-37% will be under 5, 36-38% between 5 and 11 and a further 27-28% over 12 years old.

7.5.41 Baseline data shows the there is an existing shortfall in capacity at the primary school level, with a predicted future shortfall at the secondary school level from 2015 onwards. It should be noted however that the majority of the housing in the Masterplan Application Site is expected to be first occupied at a future point beyond that for which schools trend data exists. The *AAAP* states that:

> *'We will ensure that there will be provision for existing pre-school facilities to keep running through the course of the redevelopment.' (Policy COM4)*

7.5.42 It also states that:

> *'The educational needs of the new population of the AAP area will be met by new school places that are already planned. Significant progress is being made in improving education and learning facilities in the AAP area through the redevelopment of Michael Faraday school and Community Learning Centre as well as the*

Walworth Academy, which has six forms of entry (1080 places) and will open a sixth form as soon as the new buildings are completed.' (Paragraph 6.1.6).

7.5.43 Therefore, the relatively low net child yield combined with the planned school capacity would be expected to lead to a direct, long-term, permanent, **negligible** effect at the borough level on both primary and secondary schools.

Mitigation

7.5.44 As the effect is negligible, no mitigation is considered necessary.

Residual Effects

11.6.38 The residual effect on the availability of primary and secondary school places is considered to be an indirect, long-term, permanent **negligible** effect at the borough level.

Effect on Health

7.5.45 The area surrounding the Site is well served by dentists and GPs. The Site Wide Development Option will lead to an increase in the number of patients registered with local health practices in the area. In addition, there is provision for a new health centre of approximately 2,800 sqm within the Masterplan Application Site that will improve the availability of local medical facilities over that currently available to extant residents. A pharmacy is also to be provided as a part of the Site Wide Development Option that will replace the existing pharmacy on the Masterplan Application Site. The HUDU approach to calculating developer contributions was considered, however in light of the new health centre being provided in lieu of a developer contribution, it does not effect this assessment. Please refer to the Planning Statement submitted in support of this application for further details.

7.5.46 It is therefore considered that the Site Wide Development Option will have a direct, long-term, permanent **minor positive** effect on the current capacity of healthcare facilities.

Mitigation

7.5.47 As the effect is positive no mitigation is considered to be required.

Residual Effect

7.5.48 The residual effect of the Site Wide Development Option on the capacity of healthcare facilities remain a direct, long-term, permanent **minor to moderate positive** effect**.**

Effect on Housing Needs

7.5.49 The Site Wide Development Option will provide for up to 3,560 dwellings, which represents an increase of 913 over the 2,647 provided at present. This is in accordance with the AAAP which includes a residential limit of 3,656. If planning permission is granted in 2015, it is anticipated that the first dwelling completions would take place in 2018.

7.5.50 Within the FDS Application site, 96 dwellings will be wheelchair units (11%).This includes the 50 Extra Care Dwellings, including three built out to SELHP standards, six units within the building containing dwellings for people with learning disabilities (LD Building), plus 17 homes within the Target Rent dwellings, four within the Shared Ownership dwellings and 19 homes within the private sale dwellings. Within the Target Rent, Shared Ownership and Private sale, half of these will be adaptable.

7.5.51 For the Masterplan Application, at the reserved matters stage, 10% of all dwellings will be designed to be capable of adaptation for wheelchair users. 100% of the dwellings will be designed to meet the Mayor's Lifetime Homes standards. The detailed design will aim for a high degree of compliance with the Mayor's Housing Design Guide and all units will meet the minimum floorspace requirements.

7.5.52 The effect of the Site Wide Development Option on housing need will be direct, long-term, permanent and **moderate positive** at the borough level.

Mitigation

7.5.53 As the effect is positive, no mitigation is considered necessary.

Residual Effect

7.5.54 There will be a direct, long-term permanent **moderate positive** residual effect at the borough level in relation to the provision of new homes, including affordable homes, as a result of the Site Wide Development Option.

FDS Development Option

Changes to employment during operation

7.5.55 In order to establish the changes to employment during operation it is first necessary to establish the existing level of employment across the FDS Application site. The known data for these employers is set out in **Table 7.26**.

Table 7.26: Current Employment on the FDS Application Site

Site Name	Use	Approximate Size (sqm)	Area per FTE	Employees
BACC 84	Community Facility (D1)	57	36	1
Bradenham Council Office*	Office (B1a)	3,214	12	Currently Vacant
Ellison House	Probation Hostel (C2)	590	N/A	
67-68 Chartridge	Storage (B8)	43	80	1
Chiltern Council Office*	Office (B1a)	2,737	12	Currently Vacant

7.5.56 Both BACC 84 and 67-68 Chartridge have very low floorspaces and as such they have been identified as having the potential to support 1 FTE job each. Ellison House is a larger floorspace at 590sqm, however no suitable employment ratio exists to be able to estimate the associated job numbers (Ref. 7.22).

7.5.57 The FDS Development Option will provide for a range of employment floorspace and associated job creation, as set out in **Table 7.27**.

Table 7.27: Employment Generation

Use	Use Class	Approximate size	Area Per FTE (sqm)	Employees FTE
Community Facility	D1 or D2	263sqm GIA	65	4
Extra Care Facility	C2	6,669 sqm GIA	N/A	40
Learning Disability Unit	D1	782 sqm GIA	36	21

7.5.58 **Table 7.27** shows that the FDS Development Option will provide for 65 new jobs. The Learning Disability Unit and the Community Facility represent 1,045 sqm of employment space. Whilst the Extra Care Facility is a substantially larger employment floorspace, the overall job numbers are considered to be relatively low. For Ellison House to provide an equivalent number of jobs to the FDS Development Option, it would have to have an employment ratio of 1 job for every 9.4 sqm. This is a higher than any ratio provided by guidance (Ref. 7.22) and as such it is reasonable to assume that the FDS Development Option would lead to an increase in jobs on the Site.

7.5.59 Based on the generated workspaces shown in Table 7.27, the estimated effect of the Site Wide Development Option on indirect employment can be calculated as shown in **Table 7.28** below (Ref. 7.24).

Table 7.28: Indirect Employment Effects

		FDS Development Option
A	Workspaces	25
B=Ax25%	Estimated leakeage (medium 25%)	6
C= A-B	Gross local direct effects	19
D=C*50%	Displacement (50%)	9
E=C-D	Net local direct effects	9
F=Ex(1.1)	Multiplier (Medium 1.1)	10
G=E+F)	Total net local effects	19

7.5.60 A similar indirect employment benefit would also be currently realised from the extant jobs provided on site, so the indirect employment effects can't be added on to the direct jobs created.

7.5.61 It is unlikely that the FDS Development option would adversely affect businesses off site. The current community facility will be replaced. It is understood that 67-68 Chartridge and Ellison House will be displaced and that this will be satisfactorily managed by LBS.

7.5.62 The significance of changes to employment levels during the operational phase is judged to be a direct, long term, permanent **negligible to minor positive** effect at the borough level.

Mitigation

As the effect is positive, not mitigation is required.

Residual effect

7.5.63 Following mitigation measure, the residual effect of the FDS Development Option is considered to be a long term, permanent **negligible to minor positive** effect at the borough level.

Local Spend

7.5.64 The FDS Development Option will include 815 residential units and this is likely to have a significant impact on local businesses and services due to the increase in population in the area in respect of present uses.

7.5.65 Increased levels of local spending would be expected as a result of the introduction of the new residential population. The latest data from the ONS identifies that the average weekly household spend for London is £571.60 per week (Ref. 7.25). This equates to a total spend of £24.2m. At present there are 566 dwellings within the FDS Development Site, which equates to a current local spend of £16.8m. Therefore, the

projected net increase in local spend is £7.4m. The increased spend of new residents in LBS is likely to have a direct, long-term, permanent **minor positive** effect at the borough level.

Mitigation

7.5.66 The effect of the FDS Development Option on local spend will be positive and therefore no mitigation measures are required.

Residual Effect

7.5.67 The residual effect of the FDS Development Option on Local Spend will remain a direct, long-term, permanent **minor positive** effect at the borough level.

Effect on Schools

7.5.68 Child yield figures have been provided by the project architect, based on the Mayor of London's *Shaping Neighbourhoods: Play and Informal Recreation Supplementary Planning Guidance* (2012) (Ref. 7.26). The full calculations are provided in **Appendix 7.3**. In total the FDS Development Option is anticipated to yield 407 children. Of these, approximately 37% will be under 5, 36% between 5 and 11 and a further 27% over 12 years old.

7.5.69 Baseline data shows the there is an existing shortfall in capacity and the primary school level, with a predicted future shortfall at the secondary school level from 2015 onwards. The *Aylesbury AAP* states that:

> *We will ensure that there will be provision for existing pre-school facilities to keep running through the course of the redevelopment. (Policy COM4)*

7.5.70 It also states that:

> *'The educational needs of the new population of the AAP area will be met by new school places that are already planned. Significant progress is being made in improving education and learning facilities in the AAP area through the redevelopment of Michael Faraday school and Community Learning Centre as well as the Walworth Academy, which has six forms of entry (1080 places) and will open a sixth form as soon as the new buildings are completed.'* (Paragraph 6.1.6).

7.5.71 Therefore, the relatively low net child yield combined with the planned school capacity would be expected to lead to a direct, long-term, permanent, **negligible** effect at the borough level on both primary and secondary schools.

Mitigation

7.5.72 As the effect is negligible, no mitigation is considered necessary.

Residual Effects

7.5.73 The residual effect on the availability of primary and secondary school places is considered to be an indirect, long-term, permanent **negligible** effect at the borough level.

Effect on Health

7.5.74 The area surrounding the FDS Application Site is well served by dentists and GPs. The FDS Development Option will lead to an increase in the number of patients registered with local health practices in the area. Given the relatively small increase in population over the number of residents currently living at the FDS Application Site and the fact that NHS GPs and Dentists in the local area are accepting new patients it is considered that the FDS Development Option will have a direct, long-term, permanent **negligible to minor negative** effect on the current capacity of healthcare facilities.

Mitigation

7.5.75 In the event that the FDS Development Option proceeds alone, it is expected that a financial contribution will be made to local healthcare facilities.

Residual Effect

7.5.76 The residual effect of the FDS Development Option on the capacity of healthcare facilities is considered to be a direct, long-term, permanent **negligible** effect**.**

Effect on Housing Needs

7.5.77 The FDS Development Option will provide for 815 dwellings, which represents an increase of 249 over the 566 provided at present. This is in accordance with the Aylesbury AAP, which includes a residential limit of 3,656 for the action plan area. If planning permission is granted in 2015, it is anticipated that the first dwelling completions would take place in 2018.

7.5.78 Within the FDS Application Site, 96 dwellings will be wheelchair units (11%).This includes the 50 Extra Care Dwellings, including three built out to SELHP standards, six units within the LD Building, plus 17 homes within the Target Rent dwellings, four within the Shared Ownership dwellings and 19 homes within the private sale dwellings. Within the Target Rent, Shared Ownership and Private sale, half of these will be adaptable.

7.5.79 The effect of the FDS Development Option on housing need will be direct, long-term, permanent and **minor positive** at the borough level.

Mitigation

7.5.80 As the effect is positive, no mitigation is considered necessary.

Residual Effect

7.5.81 There will be a direct, long-term permanent **minor positive** residual effect at the borough level in relation to the provision of new homes, including affordable homes, as a result of the FDS Development Option.

7.6 Summary

7.6.1 A review of the local baseline data found that Faraday Ward a low rate of population growth compared to LBS and London. Whilst LBS is a relatively deprived borough, it is becoming less so year-on-year, having risen from being London's 6th most deprived borough in 2004 to the 6th most in 2010. Employment levels are higher in Faraday Ward than the LBS, with a relatively high proportion of these jobs in elementary occupations. The levels of health in Faraday Ward are in keeping with LBS and London

Site Wide Development Option

7.6.2 During the construction works, it is anticipated that the Site Wide Development Option will provide approximately 616 Full Time Equivalent jobs, which would be expected to be filled in part by workers in the local area. Additional jobs are expected to also be created through induced employment. The presence of these workers in the area is likely to boost the local economy through the increase in spending. Further jobs will be created through indirect spend in the local community.

7.6.3 The level of commercial floorspace to be provided once the Site Wide Development Option is operational is currently set out within upper and lower parameters. An assessment of the extant level of employment within the Site was undertaken; however limitation in the data available meant that not all jobs associated with known employment space could be accounted for. Taking into account this limitation, the analysis showed that utilising the upper limits of commercial floorspace would be likely to lead to an increase in the number of jobs on the Comprehensive Development Site. Utilising the lower limits of commercial floorspace would lead to a decline in job numbers on the Comprehensive Development Site.

7.6.4 The expected child yield from the Site Wide Development Option was calculated to in order to understand the likely effects on local schools capacity. The anticipated child yield is expected to be similar to, albeit more than, the number of children already living within the Site as a result of the increased number of houses. As a part of the broader AAAP there are already planned increases in schools capacity in the area to meet the net increase in demand for schools places, so the overall effect would be negligible.

7.6.5 The local area was found to be well served by dentists and GPs. The Site Wide Development Option includes provision for both a health centre and a pharmacy to replace the extant pharmacy on the Site. As such the Site Wide Development Option was considered to be an overall improvement in the accessibility of local healthcare.

7.6.6 The Site Wide Development Option will provide a range of housing, including affordable housing that will help to meet housing needs in London and LBS. In addition, the new residents of the Site Wide Development Option will increase the spending in the local area by a net £27.2m over current spending levels, providing a positive economic uplift for LBS.

7.6.7 A summary of the likely effect of the Site Wide Development Option on socio-economic conditions is provided in **Table 7.30**.

FDS Development Option

7.6.8 During the construction works, it is anticipated that the FDS Development Option will provide approximately 184 Full Time Equivalent jobs, which would be expected to be filled in part by workers in the local area. Additional jobs are expected to also be created through induced employment. The presence of these workers in the area is likely to boost the local economy through the increase in spending. Further jobs will be created through indirect spend in the local community.

7.6.9 It was not possible to fully assess the number of extant jobs on the FDS Application Site. However, based on like floor like floor spaces and the known jobs numbers associated with the FDS Development option, it was found that the extant employment level would reasonably be expected to result in an increase in jobs from the FDS Development Option.

7.6.10 The expected child yield from the FDS Development Option was calculated to in order to understand the likely effects on local schools capacity. The anticipated child yield is expected to be similar to, albeit more than, the number of children already living on the FDS Application site as a result of the increased number of houses. As a part of the broader AAAP there are already planned increases in schools capacity in the area to meet the net increase in demand for schools places, so the overall effect would be negligible.

7.6.11 The local area was found to be well served by dentists and GPs. As a result of the relatively small increase in population over the number of residents currently living at the FDS Application site and the fact that NHS GPs and Dentists in the local area are accepting new patients, it was considered that the FDS Development Option would have a negligible effect on the availability of local healthcare.

7.6.12 The FDS Development Option will provide a range of housing, including affordable housing that will help to meet housing needs in London and LBS. In addition, the new residents of the FDS Development Option will increase the spending in the local area by a net £7.4m over current spending levels, providing a positive economic uplift for LBS.

7.6.13 A summary of the likely effect of the FDS Development Option on socio-economic conditions is provided in **Table 7.31**.

Table 7.30: Summary of Socio-Economic Effects

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
Generation of employment during construction	Moderate to Major	Positive	T	D	LT	■ Construction workplace coordinator and management fee	Major	Positive	T	D	LT	N/A	N/A
Indirect and induced employment	Moderate	Positive	T	I	LT	■ None required	Moderate	Positive	T	I	LT	N/A	N/A
Operation													
Changes to employment during operation	Moderate	Positive	P	D	LT	■ Accommodation of existing employers	Moderate	Positive	P	D	LT	N/A	N/A
Local Spend	Moderate	Positive	P	D	LT	■ None required	Moderate	Positive	P	D	LT	N/A	N/A
Effect on Schools	Negligible	Positive	P	D	LT	■ None required	Negligible	Positive	P	D	LT	N/A	AAAP
Effect on Health	Minor to moderate	Positive	P	D	LT	■ None required	Minor to moderate	Positive	P	D	LT	N/A	N/A
Effect on Housing needs	Moderate	Positive	P	D	LT	■ None required	Moderate	Positive	P	D	LT	N/A	N/A

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

Table 7.31: Summary of Socio-Economic Effects

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
Generation of employment during construction	Minor to Moderate	Positive	T	D	ST	■ Construction workplace coordinator and management fee	Moderate	Positive	T	D	ST	N/A	N/A
Indirect and induced employment	Moderate	Positive	T	I	ST	■ None required	Moderate	Positive	T	I	ST	N/A	N/A
Operation													
Changes to employment during operation	Negligible to minor	Positive	P	D	LT	■ None required	Negligible to minor	Positive	P	D	LT	N/A	N/A
Local Spend	Minor	Positive	P	D	LT	■ None required	Minor	Positive	P	D	LT	N/A	N/A
Effect on Schools	Negligible	Positive	P	D	LT	■ None required	Negligible	Positive	P	D	LT	N/A	AAAP
Effect on Health	Minor to Negligible	Negative	P	D	LT	■ Financial contribution if FDS Option proceeds without masterplan	Negligible	Positive	P	D	LT	N/A	N/A
Effect on Housing needs	Minor	Positive	P	D	LT	■ None required	Minor	Positive	P	D	LT	N/A	N/A

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

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8 Telecommunications

8.1 Introduction

8.1.1 This Chapter assesses the likely significant environmental effects of the Site Wide Development Option and the FDS Development Option on transmitted radio and television (TV) reception. In particular it considers the likely significant effects on properties in the survey area surrounding the Site due to interference with TV and radio signals.

8.1.2 This Chapter should be read together with the Introductory Chapters of this ES (**Chapters 1 – 5**) as well as **Chapter 17 'Cumulative Effects'**.

8.2 Legislation, Policy and Guidance

Legislation Framework

8.2.1 The applicable legislative framework is summarised as follows:

Communications Act (2003)

8.2.2 This detailed Act of Parliament spells out technical aspects of regulation, implementing and enforcing the law with regard to communications and ensures the transmission medium for high-quality television and radio is protected (Ref. 8.1).

Wireless Telegraphy Act (2006)

8.2.3 Under the *Wireless Telegraphy Act 2006* (Ref 8.2), the Comprehensive Development must satisfy the requirements that electromagnetic and physical interference to telecommunication have been fully taken into account and appropriate mitigation measures provided where necessary. These requirements were considered in assessing the effect of the Comprehensive Development on radio and TV reception.

The Radio Equipment and Telecommunications Terminal Equipment (Amendment No. 2) Regulations (2003)

8.2.4 These Regulations detail the enforcement provisions relating to the protection and management of the radio spectrum (Ref 8.3).

Planning Policy

8.2.5 Planning policy at the national, regional, and local level and its relevance to environmental design and assessment is discussed in **Chapter 4** '**Planning Policy Context'.** A summary of the effects of the Comprehensive Development with regards to telecommunications has been included in **Table 8.1**.

National Policy

National Planning Policy Framework (NPPF) (2012)

8.2.6 The NPPF was adopted on 27th March 2012 (ref 8.4). The following NPPF paragraph is considered relevant to this assessment:

8.2.7 "44. Local planning authorities…should ensure that:

They have considered the possibility of the construction of new buildings or other structures interfering with broadcast and telecommunications services"

Regional Policy

The London Plan 2011

8.2.8 Policy 7.7D of *The London Plan: Spatial Development Strategy of Greater London* (Ref 8.5), on 'Location and design of tall and large buildings' states that,

"D. Tall buildings:

a) Should not affect their surroundings adversely in terms of microclimate, wind turbulence, overshadowing, noise, reflected glare, aviation, navigation and telecommunication interference…"

8.2.9 On 11th October 2013 the Mayor published Revised Early Minor Alterations to the London Plan (REMA) (Ref. 8.6). From this date, the REMA are operative as formal alterations to *The London Plan* and form part of the development plan for Greater London. The REMA do not alter Policy 7.7D.

8.2.10 On 15th January 2014, the Mayor published Draft Further Alterations to the London Plan (FALP) (Ref. 8.7) which commenced an Examination in Public on 1st September. The FALP also do not alter Policy 7.7D.

Local Policy

The Southwark Plan (2007)

8.2.11 There are no TV or radio interference requirements pertinent in the Southwark Plan adopted July 2007 relevant to telecommunications interference caused by buildings. (Ref. 8.8)

Southwark Core Strategy (2011)

8.2.12 There are no TV or radio interference requirements pertinent in the Southwark Council Core Strategy April 2011 (Ref 8.9).

Aylesbury Area Action Plan 2010

8.2.13 There are no TV or radio interference requirements pertinent in the Aylesbury Action Plan adopted 27th January 2010 (Ref 8.10).

Guidance

Planning Practice Guidance

8.2.14 On 6th March 2014, the Department for Communities and Local Government (DCLG) launched the Planning Practice Guidance web-based resource (Ref. 8.11). There are no specific policies or guidance pertaining to TV and radio reception interference.

Other Guidance

8.2.15 Guidance on assessing the effects of new developments on telecommunications and broadcast transmissions is provided by the British Broadcasting Corporation (BBC) and Office of Communications (Ofcom) and includes:

- BBC information on 'Transmitters' (Ref 8.12);
- The Impact of Large Buildings and Structures (including Wind Farms) on Terrestrial Television Reception (Ref 8.13);
- Tall structures and their impact on broadcast and other wireless services (Ref 8.14); and
- 'Information for Viewers' in the Ofcom website (Ref 8.15).

8.3 Assessment Methodology and Significance Criteria

Relevant Elements of the Comprehensive Development

8.3.1 The following components are relevant to the assessment of the development proposed by both the FDS Application and the Masterplan Application in relation to the assessment of telecommunications:

- Application Plans;
- Parameter Plans for the Masterplan Application

Scope of the Assessment

8.3.2 The scope of the assessment was identified in the EIA Scoping Report (**Appendix 2.1**) and takes into account the comments within the LBS EIA Scoping Opinion (**Appendix 2.2**). The scope of potentially significant effects included within the assessment is outlined below.

8.3.3 The assessment consists of a desktop review of published telecommunications data together with a visual assessment of the Comprehensive Development and its surroundings to determine:

- The baseline conditions of the Comprehensive Development and the surrounding areas;
- Likely significant effects of the Comprehensive Development, sensitive receptors to the effects, the magnitude of change and significance of the effects;
- Mitigation measures and assessment of the likely significance of the residual effects following mitigation;
- Potential effects identification for domestic TV, radio and satellite reception; and
- Cumulative effects with other proposed developments.

Potentially Significant Effects

8.3.4 There are two mechanisms that can affect the reception of broadcast transmissions:

- Attenuation that is caused by a physical obstruction; and
- Structures that reflect and refract transmitted signals.

Extent of the Study Area

8.3.5 Assessment consists of a desktop review of published telecommunications data together with a visual assessment of the Comprehensive Development and its surroundings.

8.3.6 The study area consists of the Site, and the likely infringement area caused by the Comprehensive Development along with the local transmitters of broadcast radio and TV.

Consultation

8.3.7 Consultation undertaken in support of the preparation of this Chapter was through the EIA scoping report.

Method of Baseline Data Collation

Desk Study

8.3.8 Baseline characterisation was determined from a desk study which included information gathered from the following sources:

- Transmitter locations and elevations from BBC; and
- Satellite details from Dish Pointer (ref 8.15).

Site Visit / Other Assessment

8.3.9 A Site visit was undertaken on 13th August 2014 to obtain information on the following:

- Adjacent building uses;
- Approximate heights of neighbouring buildings; and
- Presence of TV receiving equipment (aerials and face mounted dishes on buildings).

Identification of Sensitive Receptors

8.3.10 The receptor sensitivity level is used to define how easily affected the users around the Site would be to any changes to television and radio reception. The definitions of each sensitivity level and magnitude of change are detailed below:

- **High**: users surrounding the Comprehensive Development can only receive television and radio signals from a single source and already suffer from weak signal strength;
- **Medium**: users surrounding the Comprehensive Development can receive television and radio signals from multiple sources and have medium to weak signal strength;
- **Low**: users surrounding the Comprehensive Development can receive television and radio signals from multiple sources and have medium to strong signal strength; and
- **Negligible**: users surrounding the Comprehensive Development can receive television and radio signals from multiple sources and have strong signal strength.

8.3.11 The magnitude of change level is used to define how large an effect the Comprehensive Development has on the existing telecommunications reception in the surrounding area. The definitions of each magnitude of change level are detailed below:

- **High**: where the Comprehensive Development would cause a substantial permanent change (either positive or negative) to the existing telecommunications signal strength and end user reception. Therefore once the Comprehensive Development is in place, the situation will be fundamentally changed;
- **Medium**: where the Comprehensive Development would cause a measurable but not substantial change (either positive or negative) to the existing telecommunications signal strength and end user reception. Therefore once the Comprehensive Development is in place, the situation will be partially changed;
- **Low**: where the Comprehensive Development would cause a slight permanent change (either positive or negative) to the existing telecommunications signal strength and end user reception. Therefore once the Comprehensive Development is in place, the situation will be similar to the baseline; and
- **Negligibl**e: change to telecommunications signal strength and end user reception will be barely or not perceptible.

Significance of Effects

8.3.12 The following terms have been used to define the significance of the effects identified:

- **Major effect**: where the Comprehensive Development could cause a substantial permanent change (either positive or negative) to the existing telecommunications signal strength and end user reception. Once the Comprehensive Development is in place, the situation will be fundamentally changed;
- **Moderate effect**: where the Comprehensive Development would cause a substantial temporary change (either positive or negative) to the existing telecommunications signal strength and end user reception. Once the Comprehensive Development is in place, the situation will be partially changed;
- **Minor effect**: where the Comprehensive Development could cause a slight permanent change (either positive or negative) to the existing telecommunications signal strength and end user reception. Once the Comprehensive Development is in place, the situation will be similar to the baseline; and be expected to result in a small, barely noticeable effect (either positive or negative); and
- **Negligible**: where no discernible effect is expected as a result of the Comprehensive Development on telecommunications signal strength and end user reception will be barely or not perceptible.

Assessment Modelling

8.3.13 The baseline conditions were determined from the visual site inspection and desk study information. Additional topographical data was obtained from Ordnance Survey (OS). The assessments consider potential 'worst-case' scenarios in terms of the behaviour of radio (electromagnetic waves) signals such as reflection, refraction and diffraction depending on factors such as the materials to be used within the Comprehensive Development and are based on information available at the time of the assessment.

8.3.14 The technical assessment involved using wave propagation theory to estimate direct line of sight shadows caused by the Comprehensive Development and the potential for signal reflections off building façades. Assessing the reception quality based on a direct line of sight approach highlights a worst case scenario where the Comprehensive Development is situated in a city or large town. TV and radio signals diffract around and reflect off buildings and others objects. The more built-up an area the more likely that there would be secondary signals present which enable residents to receive a signal.

Significance Criteria

8.3.15 The assessment of potential effects as a result of the Comprehensive Development has taken into accounts both the construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the development proposals, and the sensitivity of the affected receptor / receiving environment to change, as well as a number of other factors that are outlined earlier within this Chapter and also in **Chapter 2 'Approach to the Assessment'** of this ES. Magnitude of change and the sensitivity of the affected receptor / receiving environment are both assessed on a scale of high, medium, low and negligible (as shown in **Table 2.3** in **Chapter 2 'Approach to the Assessment')**.

Limitations and Assumptions

8.3.16 It has been assumed that none of the transmitters will change during the period to which this Chapter relates, up until completion of the Comprehensive Development.

8.3.17 This assessment is made on the data available at the time of publication and the information available. Satellite shadows are particularly sensitive to any infringement upon the transmission path and building size alteration will affect positivity or negatively the shadow area. Additional items added to the building are likely to have a negative impact.

8.3.18 This study highlights a worst case scenario based on information available at the time. It is assumed that all information provided, including plans and models, is accurate.

8.3.19 The assessment is based on the FDS and the Masterplan Applications as being accurate for the details supplied at time of writing.

8.4 Baseline Conditions

8.4.1 There are four platforms in the UK by which users receive TV services to their homes: satellite and terrestrial which are covered by this report and Cable and Asymmetric Digital Subscriber Line (ADSL). Cable and ADSL TV services are received via cables connected directly into a receiver, are not subject to signal interference caused by the blocking of signals by buildings and therefore are not considered further within this report. Although still in wide use, the use of terrestrial TV (also known as over-the-air) or broadcast TV is decreasing in many densely-populated areas. Terrestrial TV works via radio waves transmitted through open space which are received by (roof mounted) aerials, usually unencrypted (commonly known as 'free-to-air' TV). Satellite services are received via a satellite dish connected to a receiver, e.g. a digital set-top-box.

8.4.2 The UK TV transmission network comprises many transmitters, rebroadcast links, microwave links and landlines.

8.4.3 Not all households and other buildings in the area are dependent on terrestrial TV as their primary source of TV. In general it can be assumed that large commercial establishments are less likely to depend on terrestrial TV reception and are more likely to have cable and satellite TV services. The increasing uptake of cable and satellite TV services is likely to further reduce the number of households affected by shadows to terrestrial TV caused by a development.

Broadcast Television

8.4.4 Within the UK, broadcast TV is currently transmitted in digital format. The Crystal Palace transmitter is the main transmitter covering the Site and the surrounding area.

8.4.5 The Crystal Palace TV transmitter provides BBC1, BBC2, ITV, Channel 4 and 5 as well as other 'free view' digital broadcasts to this area of London, and is located approximately 6km south of The Applications at TQ 339 712.

8.4.6 The quality of terrestrial TV reception achieved is dependent on the equipment used at the receiving site. In many cases, a standard roof-top wide gain aerial is sufficient to obtain adequate signal reception in strong reception areas. In weak reception areas high gain, more directional antenna, and / or masthead amplifiers are employed.

8.4.7 The observed existing TV aerials located on residential properties within 1km of the north as indicated to be within the theoretical shadow zone and immediately surrounding Site, shown in **Figure 8.1** are mainly aligned with the Crystal Palace transmitter to the south. A small number face in a different direction. It is likely that these aerials have not been realigned since analogue transmissions have ceased (during 2012,) and are either not in use or receiving adequate but not ideal signals.

Broadcast Radio

8.4.8 BBC digital radio broadcasts to the London area are provided by the Crystal Palace transmitter and the Alexandra Palace transmitter at TQ 296 900. The transmitter at Wrotham TQ595 604 also supplies services to the area.

8.4.9 BBC FM radio broadcasts to this area of London are provided by the Crystal Palace transmitter to the south of the Site at TQ 339 712. Radio is also broadcast from Wrotham and a number of other transmitters.

8.4.10 Radio transmissions are less affected by broadcast shadowing from buildings. This is because the lower frequency radio signals can more easily refract around buildings and hills, although some loss of signal strength can occur.

Satellite (TV and Radio)

8.4.11 Satellite TV broadcast services are provided largely by the ASTRA 2 satellite located at a geo-stationary orbital location of 28.2 degrees east. For properties located in this area of London, optimum reception is obtained by aligning dishes to the south east on a compass bearing of 146 degrees and an elevation to the horizontal of 25 degrees.

8.4.12 A number of the surrounding residential properties were observed to have externally mounted satellite TV dishes. Satellite dish orientations were generally southerly at a bearing of 140 to 160 degrees and inclined at approximately 25 degrees to the horizon.

8.4.13 It was noted that Southborough House (Kinglake Street) located to the eastern boundary of the Site has dishes mounted at various heights with them pointing in many directions from south-east east, through to south-west west. It is possible the dishes may be able to receive signals due to the relative low massing of a small number of buildings adjacent to the large flat expanse of parkland in the line of sight to the satellite.

8.4.14 Generally existing buildings and structures (other than Southborough House) located on the existing Site are not sufficiently high to interrupt the direct line of sight of the neighbouring satellite dish users.

Future Baseline

8.4.15 The baseline condition is likely to change over the next 10 years with a greater uptake of satellite, cabled and internet services and a corresponding reduction in the use of through air transmitted signals.

8.5 Assessments of Effects, Mitigation and Residual Effects

Demolition and Construction

Site Wide Development Option

TV Reception

8.5.1 The sensitivity of reception for residents to the north of the Comprehensive Development is medium and the magnitude of change, prior to any required mitigation, is low. Therefore taking this into account and for the reasons set out below, there is likely to be a direct, temporary, long-term effect on reception of **minor negative** significance prior to the implementation of mitigation measures.

8.5.2 The main potential effects associated with demolition and construction on telecommunications would be the temporary use of cranes and temporary works which may cause:

- Shadowing / signal blocking associated with the physical size of the crane(s) and buildings under construction; and
- Signal reflection caused by the metallic structure of the crane(s) or reflective building façades.

8.5.3 Broadcast reception may be affected for properties located to the north and north-west of Comprehensive Development in areas adjacent to the crane use. This impact would occur during the demolition and construction period during which signal interference would be intermittent as the crane moves across the Comprehensive Development.

Mitigation

8.5.4 The effects of cranes and temporary works on television signals during working hours are fairly minimal and cannot realistically be mitigated. The effect is minimal because cranes and other plant have low mass compared to a more permanent structure and their effect is transient and temporary. The effects are short term and will not cause any lasting detrimental effects.

Residual Effects

8.5.5 There is not considered to be any significant residual effects to TV and radio due to the low massing of the construction equipment.

Radio Reception

8.5.6 The sensitivity of reception for residents to the north of the Comprehensive Development is low and the magnitude of change, prior to any required mitigation, is low. There is likely to be a direct, temporary, medium-term effect on reception of **Negligible to minor negative** significance prior to the implementation of mitigation measures.

8.5.7 Radio reception may be affected from the Crystal Palace transmitter to areas directly north of the Comprehensive Development. However, radio services to the London area can be received from more than one transmitter, which would enable radio reception to the end user in this area to be maintained.

8.5.8 Medium wave, long wave and short wave transmissions are less affected by broadcast shadowing than broadcast TV. This is because low frequency signals can more easily diffract around buildings and hills, although some loss of signal strength can occur.

8.5.9 Very high frequency radio (FM) transmissions are more susceptible to broadcast shadowing effects because diffraction effects are less significant.

Mitigation

8.5.10 Little can be done to 'design out' the effects on broadcast radio caused by the development of the Site. Most of the mitigation measures would remain the responsibility of the end users, and could include one of, or a combination of, the following:

- Realigning end-user reception aerials in to an alternative transmitter; and
- Realigning end-user aerials to ensure maximum reception strength.

Residual Effect

8.5.11 The receptor sensitivity can be classed as **negligible** because residents can access radio services from more than one transmitter which would enable radio reception to the end user to be maintained. Therefore the potential residual effects would be of **negligible** significance following the implementation of mitigation measures.

Satellite Reception (TV and Radio)

8.5.12 The sensitivity of reception for residents to the north-west of the Comprehensive Development is low and the magnitude of change, prior to any required mitigation, is medium. Therefore taking this into account and for the reasons set out below], there is likely to be a direct, temporary, long-term effect on reception of **minor negative** significance prior to the implementation of mitigation measures.

8.5.13 The main potential effects associated with demolition and construction on telecommunications would be the temporary use of cranes and temporary works which may cause:

- Shadowing / signal blocking associated with the physical size of the crane(s) and buildings under construction; and

- Signal reflection caused by the metallic structure of the crane(s) or reflective building façades.

8.5.14 The demolishing of the properties to the south west of Southborough House located on the north east of the Site could cause current weak or poor signals to improve temporarily until such time as the new buildings are in place, at which time the signal strength will return to the current level. This could result in dishes that currently receive inadequate signals becoming operational. There is also a risk that if a property was to have a satellite dish installed during this period any received signal could subsequently become blocked once the new structure is in place.

8.5.15 Crane use on-site may affect broadcast TV and radio during the construction period for properties located to the north-west the Comprehensive Development and Southborough House.

8.5.16 Broadcast reception may be affected for properties located to the north and north-west. This impact would occur during the demolition and construction period during which signal interference would be intermittent as the crane moves across the Comprehensive Development.

Mitigation

8.5.17 Generally, little can be done to mitigate the effects of cranes and temporary works on satellite reception during working hours; however effects are fairly minimal due to the open structure and low massing of the plant, and would therefore not cause any lasting detrimental effects.

Residual Effects

8.5.18 There is not considered to be any residual effects to satellite due to the low massing of the construction equipment.

FDS Development Option

TV Reception

8.5.19 The sensitivity of reception for residents to the north of the FDS Application site is medium and the magnitude of change, prior to any required mitigation, is low. Therefore with this in mind and for the reasons set out below, there is likely to be a direct, temporary, short-term effect on reception of **minor negative** significance prior to the implementation of mitigation measures.

8.5.20 The main potential effects associated with demolition and construction on telecommunications would be the temporary use of cranes and temporary works which may cause:

- Shadowing / signal blocking associated with the physical size of the crane(s) and buildings under construction; and
- Signal reflection caused by the metallic structure of the crane(s) or reflective building façades.

8.5.21 Crane use on-site may affect broadcast TV and radio during the construction period for properties located to the north east of the FDS Application site.

8.5.22 Broadcast reception may be affected for properties located to the north of the FDS Application site. This impact would occur during the demolition and construction period during which signal interference would be intermittent as the crane moves across the FDS Application site.

Mitigation

8.5.23 The effects of cranes and temporary works on television signals during working hours are fairly minimal and cannot realistically be mitigated. The effect is minimal because cranes and other plant have low mass compared to a permanent structure and their effect is transient and temporary. The effects are short term and will not cause any lasting detrimental effects.

Residual Effects

8.5.24 There is not considered to be any residual effects to TV and radio due to the low massing of the construction equipment.

Radio Reception

8.5.25 Because broadcast radio signals do not get blocked to the same extent as TV signals, the sensitivity of reception for residents to the north is low and the magnitude of change, prior to any required mitigation, is low. There is likely to be a direct, temporary, short-term effect on reception of **negligible to minor negative** significance prior to the implementation of mitigation measures.

8.5.26 The development proposed by the FDS Application may affect radio reception from the Crystal Palace transmitter to areas directly north of the Site. However, radio services to the London area can be received from more than one transmitter, which would enable radio reception to the end user in this area to be maintained.

8.5.27 Medium wave, long wave and short wave transmissions are less affected by broadcast shadowing than broadcast TV. This is because low frequency signals can more easily diffract around buildings and hills, although some loss of signal strength can occur.

8.5.28 Very high frequency radio (FM) transmissions are more susceptible to broadcast shadowing effects because diffraction effects are less significant.

Mitigation

8.5.29 Most of the mitigation measures would remain the responsibility of the end users, and could include one of, or a combination of, the following:

- Realigning end-user reception aerials in to an alternative transmitter; and
- Realigning end-user aerials to ensure maximum reception strength

Residual Effect

8.5.30 The receptor sensitivity can be classed as **negligible** because residents can access radio services from more than one transmitter which would enable radio reception to the end user to be maintained. Therefore the potential residual effects would be of **negligible** significance following the implementation of mitigation measures.

Satellite Reception

8.5.31 The sensitivity of reception for residents to the north west is low and the magnitude of change, prior to any required mitigation, is medium. Therefore, there is likely to be a direct, temporary, short-term effect on reception of **minor negative** significance prior to the implementation of mitigation measures.

8.5.32 The main potential effects associated with demolition and construction on telecommunications would be the temporary use of cranes and temporary works which may cause:

- Shadowing / signal blocking associated with the physical size of the crane(s) and buildings under construction; and
- Signal reflection caused by the metallic structure of the crane(s) or reflective building façades.

8.5.33 Crane use on-site may affect broadcast TV and radio during the construction period for properties located to the north west of the FDS Application site.

8.5.34 Broadcast reception may be affected for properties located to the north and north west. This impact would occur during the demolition and construction period during which signal interference would be intermittent as the crane moves across the FDS Application site.

Mitigation

8.5.35 Generally, little can be done to mitigate the effects of cranes and temporary works on satellite reception during working hours; however effects are fairly minimal due to the open structure and low massing of the plant, and would therefore not cause any lasting detrimental effects.

Residual Effects

There is not considered to be any residual effects to satellite due to the low massing of the construction equipment.

Operation

Site Wide Development Option

Potential Effects on Broadcast Television

8.5.36 Properties located within the theoretical line of sight broadcast shadow may experience a reduction in TV signal strength. The overall magnitude of change on broadcast TV reception can be classified as medium for most properties immediately adjacent to the Comprehensive Development, on its north. The receptor sensitivity can be classed as low because residents can access digital broadcast, via other means. With this in mind and for the reasons set out below, there is likely to be a direct, long-term effect on reception of **minor negative** significance prior to the implementation of mitigation measures.

8.5.37 Proposed roof levels of the buildings for the Comprehensive Development vary. These buildings would cast a number of broadcast TV shadows, the orientation and length of which would depend on the location and elevation of the source transmissions.

8.5.38 Using wave propagation theory, the theoretical length of the line of sight broadcast shadow cast by the buildings was calculated. **Figure 8.1** provides an indication of the orientation and the first part of the shadow, from the Crystal Palace transmitter that extend to the North for up to 1.5km.

8.5.39 Broadcast signals diffract around buildings and structures which effectively reduces the width and length of the theoretical values indicated above. The broadcast signal strength increases with the length of the shadow and if the existing signal strength is strong then reception could be maintained within areas of the broadcast shadow.

8.5.40 The direct line of sight broadcast shadows caused by the Comprehensive Development from the Crystal Palace transmitter would be to the north of the Comprehensive Development because the transmitter is located to the south of the Comprehensive Development.

8.5.41 The effect on these properties is considered to be permanent and of **minor negative** significance prior to the implementation of mitigation measures.

8.5.42 Properties at greatest risk of interference are either:

- Close to the boundary of the Comprehensive Development;
- Close to the source of the shadow; or
- Where a number of shadows overlap from different building from within the Comprehensive Development.

8.5.43 Residential properties which fall in the theoretical shadow are shown in **Figure 8.1**. Those most at risk are located along the east end of Merrow Street, the south end of Villa Street adjoining the development and East Street. Other properties affected are detailed with the FDS section 8.5.70.

Mitigation

8.5.44 Little can be done to ‘design out’ the effects on broadcast television caused by the completed development. Most of the mitigation measures would remain the responsibility of the end users, and could include one of, or a combination of, the following:

- Realigning end-user reception aerials in to an alternative transmitter;
- Realigning end-user aerials to ensure maximum reception strength;
- Upgrading end-user equipment (television reception aerials, cables and / or signal boosters / amplifiers);
- Relocating end-user aerials on building façades or rooftops to maintain a direct line of sight;
- Switching end users’ systems to satellite, subscription cable or ADSL services.

Residual Effects

8.5.45 Following the application of the proposed mitigation measures, there would be **negligible** residual impact on residential television broadcast reception.

Potential Effects on Broadcast Radio

8.5.46 Because broadcast radio signals do not get blocked to the same extent as TV signals there would be a slight change to signal strength. The sensitivity of reception for residents to the north is low and the magnitude of change, prior to any required mitigation, is low. With this I mind and for the reasons set out below, there is likely to be a direct, long-term effect on reception of **Negligible to minor negative** significance prior to the implementation of mitigation measures.

8.5.47 The Comprehensive Development may affect radio reception from the Crystal Palace transmitter to areas directly north of the Comprehensive Development. Radio services to the London area can be received from more than one transmitter, which would enable radio reception to the end user in this area to be maintained.

8.5.48 Medium wave, long wave and short wave transmissions are less affected by broadcast shadowing than broadcast TV. This is because low frequency signals can more easily diffract around buildings and hills, although some loss of signal strength can occur.

8.5.49 Very high frequency radio (FM) transmissions are more susceptible to broadcast shadowing effects because diffraction effects are less significant.

Mitigation

8.5.50 Little can be done to 'design out' the effects to broadcast television caused by the completed development. Most of the mitigation measures would remain the responsibility of the end users, and could include one of, or a combination of, the following:

- Realigning end-user reception aerials in to an alternative transmitter; and
- Realigning end-user aerials to ensure maximum reception strength

Residual Effect

8.5.51 Following the application of the proposed mitigation measures there would be **negligible** residual impact on residential radio broadcast reception.

Potential effects on Satellite (TV and Radio)

8.5.52 The sensitivity of reception for residents to the north and Southborough House is low and the magnitude of change, prior to any required mitigation, is medium. Therefore, there is likely to be a direct, long-term effect on reception of **minor negative** significance prior to the implementation of mitigation measures.

8.5.53 Satellite dishes require a clear line of sight in order to operate. Shadowing effects from buildings, trees and structures can cause a complete loss of signal.

8.5.54 A new building may affect users of satellite TV services by blocking the signal between the receiving dish antenna and the satellite from which services are transmitted.

8.5.55 The main potential for satellite effects associated with the Comprehensive Development relate to shadowing / signal blocking caused by the physical size of a building.

8.5.56 Using trigonometry the theoretical shadow pattern cast for the satellite is indicated in **Figure 8.2.**

8.5.57 The majority of shadows dissipate within the Comprehensive Development boundaries, with a slight infringement on the north on East Street (between Dawes Street and Flint Street).

8.5.58 The direct line of sight between the dish and satellite can be maintained across a range of inclinations and orientations such that the actual satellite shadow would be less than the theoretical values indicated above.

Mitigation

8.5.59 Little can be done to 'design out' the effects on broadcast satellite caused by the completed development. Most of the mitigation measures would remain the responsibility of the end users, and could include one of, or a combination of, the following:

- Realigning satellite dishes;
- Upgrading end-user equipment;
- Relocating end-user satellite dishes on building façades or rooftops to maintain a direct line of sight;
- Switching end users' systems to subscription cable or ADSL services.

Residual Effects

8.5.60 Following the application of the proposed mitigation measures there would be negligible residual impact on residential television broadcast reception.

FDS Development Option

Potential Effects on Broadcast Television

8.5.61 The sensitivity of reception for residents to the north is medium and the magnitude of change, prior to any required mitigation, is low. With this in mind and for the reasons set out below, there is likely to be a direct, long-term effect on reception of **minor negative** significance prior to the implementation of mitigation measures.

8.5.62 Proposed roof levels of the buildings for the FDS Application site vary. These buildings would cast a number of broadcast TV shadows, the orientation and length of which would depend on the location and elevation of the source transmissions.

8.5.63 Using wave propagation theory, the theoretical length of the line of sight broadcast shadow cast by the buildings was calculated. **Figure 8.1** provides an indication of the orientation of the broadcast shadow that extends for up to a maximum length of 1.5km for the Crystal Palace transmitter that are cast to the north of the FDS Application site.

8.5.64 Broadcast signals diffract around buildings and structures which effectively reduces the width and length of the theoretical values indicated above. The broadcast signal strength increases with the length of the shadow and if the existing signal strength is strong then reception could be maintained within areas of the broadcast shadow.

8.5.65 The direct line of sight broadcast shadows caused by the FDS Application from the Crystal Palace transmitter would be to the north of the FDS Application because the transmitter is located to the south of the FDS Application site.

8.5.66 Properties located within the theoretical line of sight broadcast shadow may experience a reduction in TV signal strength. The overall magnitude of change on broadcast TV reception can be classified as medium for most properties immediately adjacent to the FDS Application site, on its north side. The receptor sensitivity can be classed as low because residents can access digital broadcast, via other means.

8.5.67 The theoretical shadow extends fractionally into the site wide development on the corner of Portland Street / Roland Way (to the north of Michael Faraday School) at which point it is anticipated the significance of any effect will be negligible.

8.5.68 The effect on these properties is considered to be permanent and of minor negative significance prior to the implementation of mitigation measures.

8.5.69 Properties at greatest risk of interference are either:

- Close to the boundary of the FDS Application site;
- Close to the source of the shadow; or
- Where a number of shadows overlap from different building from within the FDS Application site.

8.5.70 Residential properties at the south end of Queens Row and Phelp Street, may experience interference.

8.5.71 Little can be done to 'design out' the effects on broadcast television caused by the completed development. Most of the mitigation measures would remain the responsibility of the end users, and could include one of, or a combination of, the following:

- Realigning end-user reception aerials in to an alternative transmitter;
- Realigning end-user aerials to ensure maximum reception strength;
- Upgrading end-user equipment (television reception aerials, cables and / or signal boosters / amplifiers);
- Relocating end-user aerials or satellite dishes on building façades or rooftops to maintain a direct line of sight;
- Switching end users' systems to satellite, subscription cable or ADSL services.

Residual Effects

8.5.72 Following the application of the proposed mitigation measures, there would be negligible residual impact on residential television broadcast reception.

Potential Effects on Broadcast Radio

8.5.73 Because broadcast radio signals do not get blocked to the same extent as TV signals , the sensitivity of reception for residents to the north is low and the magnitude of change, prior to any required mitigation, is low. With this in mind and for the reasons set out below, there is likely to be a direct, long-term effect on reception of **Negligible to minor negative** significance prior to the implementation of mitigation measures.

8.5.74 The FDS Application site may affect radio reception from the Crystal Palace transmitter to areas directly north of the FDS Application site. However, analogue and digital radio services to the London area can be received from more than one transmitter, which would enable radio reception to the end user in this area to be maintained.

8.5.75 Medium wave, long wave and short wave transmissions are less affected by broadcast shadowing than broadcast TV. This is because low frequency signals can more easily diffract around buildings and hills, although some loss of signal strength can occur.

8.5.76 Very high frequency radio (FM) transmissions are more susceptible to broadcast shadowing effects because diffraction effects are less significant.

Mitigation

8.5.77 Little can be done to 'design out' the effects to broadcast television caused by the completed development. Most of the mitigation measures would remain the responsibility of the end users, and could include one of, or a combination of, the following:

- Realigning end-user reception aerials in to an alternative transmitter; and
- Realigning end-user aerials to ensure maximum reception strength.

Residual Effect

8.5.78 The receptor sensitivity can be classed as negligible because residents can access radio services from more than one transmitter which would enable radio reception to the end user to be maintained. Therefore the potential residual effects would be of **negligible** significance following the implementation of mitigation measures.

Potential Effects on Satellite TV and Radio

8.5.79 The sensitivity of reception for residents to the north-west is low and the magnitude of change, prior to any required mitigation, is medium Therefore, there is likely to be a direct, long-term effect on reception of **minor negative** significance prior to the implementation of mitigation measures.

8.5.80 Satellite dishes require a clear line of sight in order to operate. Shadowing effects from buildings, trees and structures can cause a complete loss of signal.

8.5.81 A new building may affect users of satellite TV services by blocking the signal between the receiving dish antenna and the satellite from which services are transmitted.

8.5.82 The main potential for satellite effects associated with the FDS Application site relate to, shadowing / signal blocking caused by the physical size of a building.

8.5.83 Using trigonometry the theoretical shadow pattern cast for the satellite is indicated in **Figure 8.2**.

8.5.84 The majority of shadows caused by the buildings will dissipate within the FDS Application site boundary, with a slight infringement to the western boundary. It is very unlikely the shadow will create interference to the residential properties.

8.5.85 The direct line of sight between the dish and satellite can be maintained across a range of inclinations and orientations such that the actual satellite shadow would be less than the theoretical values indicated above.

Mitigation

8.5.86 Little can be done to 'design out' the effects on broadcast satellite caused by the completed development. Most of the mitigation measures would remain the responsibility of the end users, and could include one of, or a combination of, the following:

- Realigning satellite dishes;
- Upgrading end-user equipment;
- Relocating end-user satellite dishes on building façades or rooftops to maintain a direct line of sight;
- Switching end users' systems to subscription cable or ADSL services.

Residual Effects

8.5.87 Following the application of the proposed mitigation measures there would be **negligible** residual impact on residential television broadcast reception There are no residual effects

8.6 Summary

Site Wide Development Option

8.6.1 A combination of a desk study and site visit identified that residents surrounding the Comprehensive Development receive adequate broadcasts from the Crystal Palace transmitter to the south.

8.6.2 During construction, the use of tower cranes on-site may interfere with TV, Radio and Satellite broadcast signals to residents to the north and north-west of the Comprehensive Development. Little can be done to mitigate these effects; however this will only occur during this temporary phase of redevelopment.

8.6.3 During the operational phase, properties to the north may experience interference to TV broadcasts from the Crystal Palace transmitter. Application of the mitigation measures described should restore the signals.

8.6.4 The demolishing of the properties to the south west of Southborough House located on the north-east of the Site could cause current weak or poor signals to improve temporarily until such time as the new buildings

are in place at which time the signal strength will return to the current level. This could result in dishes that currently receive inadequate signals becoming operational.

8.6.5 Radio transmissions are less affected by broadcast shadows from tall buildings because of their lower frequency signal, which can more easily diffract around buildings. In addition radio is broadcast from many transmitters; therefore there will be a negligible impact on this type of transmission reception.

8.6.6 Satellite transmissions are unlikely to be effected with the exception of properties located on East Street. Application of the mitigation measures described should restore the signals.

FDS Development Option

8.6.7 A combination of a desk study and site visit identified that residents surrounding the FDS Application site receive adequate broadcasts from the Crystal Palace transmitter to the south.

8.6.8 During construction, the use of tower cranes on-site may interfere with TV, Radio and Satellite broadcast signals to residents to the North of the FDS Application site. Little can be done to mitigate these effects; however this will only occur during this temporary phase of redevelopment.

8.6.9 During the operational phase, properties to the north may experience interference to TV broadcasts from the Crystal Palace and transmitter. Application of the mitigation measures should restore the signals.

8.6.10 Radio transmissions are less affected by broadcast shadows from tall buildings and because of their lower frequency signal, which can more easily diffract around buildings. In addition radio is broadcast from many transmitters; therefore there will be a negligible impact on this type of transmission reception.

8.6.11 Satellite transmissions are unlikely to be effected.

Table 8.1: Summary of Telecommunications Effects

Site Wide Development Option

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
Use of Cranes / Temporary Works TV and Satellite	Minor	Negative	T	D	LT	None Required (due to the short time)	Minor	Negative	T	D	LT	NPPF (44)	Wireless Telegraphy Act 2006
Use of Cranes / Temporary Works Radio	Negligible - Minor	Negative	T	D	LT	Realign Aerial	Negligible					NPPF (44)	Wireless Telegraphy Act 2006
Television Broadcast	Minor	Negative	P	D	LT	Realigning end-user reception aerials in to an alternative transmitter Realigning end-user aerials to ensure maximum reception strength; Upgrading end-user equipment (television reception aerials, cables and/or signal boosters/amplifiers); Relocating end-user aerials on building façades or rooftops to maintain a direct line of sight; Switching to digital television transmissions (ie. Freeview); and/or Switching end users' systems to satellite, subscription cable or ADSL services.	Negligible	N/A	N/A	N/A	N/A	NPPF (44)	Wireless Telegraphy Act 2006
Radio Broadcast	Negligible	N/A	P	D	LT	None Required.	Negligible	N/A	N/A	N/A	N/A		

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Satellite Reception	Minor	Negative	P	D	LT	Realigning satellite dishes; Upgrading end-user equipment; Relocating end-user satellite dishes on building façades or rooftops to maintain a direct line of sight; Switching end users' systems to subscription cable or ADSL services.	Negligible	N/A	N/A	N/A	N/A		

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

Table 8.2: Summary of Telecommunications Effects

FDS Development Option

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
Use of Cranes / Temporary Works TV & Satellite	Minor	Negative	T	D	ST	None Required (Due to short term)	Minor	Negative	T	D	ST	NPPF (44)	Wireless Telegraphy Act 2006
Use of Cranes / Temporary Works Radio	Negligible - Minor	Negative	T	D	ST	Re align Aerial	Negligible					NPPF (44)	Wireless Telegraphy Act 2006
Operation													
Television Broadcast	Minor	Negative	P	D	LT	Realigning end-user reception aerials in to an alternative transmitter Realigning end-user aerials to ensure maximum reception strength; Upgrading end-user equipment (television reception aerials, cables and/or signal boosters/amplifiers); Relocating end-user aerials façades or rooftops to maintain a direct line of sight; Switching to digital television transmissions (ie. Freeview); and/or Switching end users' systems to satellite, subscription cable or ADSL services.	Negligible	N/A	N/A	N/A	N/A	NPPF (44)	Wireless Telegraphy Act 2006
Radio Broadcast	Negligible	N/A	P	D	LT	None Required.	Negligible	N/A	N/A	N/A	N/A		

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Satellite Reception	Minor Negative	N/A	P	D	LT	Realigning satellite dishes; Upgrading end-user equipment; Relocating end-user satellite dishes on building façades or rooftops to maintain a direct line of sight; Switching end users' systems to subscription cable or ADSL services	Negligible	N/A	N/A	N/A	N/A		

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

8.7 References

Ref. 8.1 HM Government (2003), Communications Act 2003

Ref. 8.2 HM Government (2006), Wireless Telegraphy Act

Ref. 8.3 HM Government (2003), The Radio Equipment and Telecommunications Terminal Equipment (Amendment No. 2) Regulations 2003

Ref. 8.4 The National Planning Policy Framework (NPPF) 27th March 2012

Ref. 8.5 Greater London Authority (2011), London Plan: Spatial Development Strategy for Greater London (2011)

Ref. 8.6 Greater London Authority (2013), Revised Early Minor Alterations to the London Plan

Ref. 8.7 Greater London Authority (2014), Draft Further Alterations to the London Plan

Ref. 8.8 Southwark Plan (adopted July 2007

Ref 8.9 Southwark Council Core Strategy April 2011

Ref. 8.10 Aylesbury Action Plan (adopted)

Ref. 8.11 http://planningguidance.planningportal.gov.uk/

Ref. 8.12 BBC (no date), Transmitters' accessed from the BBC website (http://www.bbc.co.uk/reception/transmitters/)

Ref. 8.13 BBC and Office of Communications (2007) The Impact of Large Buildings and Structures (including Wind Farms) on Terrestrial Television Reception

Ref. 8.14 Ofcom (2009), Tall structures and their impact on broadcast and other wireless services

Ref. 8.15 Ofcom (no date), 'Information for Viewers' accessed from the Ofcom website (http://www.ofcom.org.uk/advice/)

Ref 8.16 http://www.dishpointer.com/

9 Wind

9.1 Introduction

9.1.1 This Chapter presents an assessment of the likely significant environmental effects of the Site Wide Development Option and FDS Development Option on the local wind microclimate, within and surrounding the Site. Measures to prevent, offset or mitigate any negative effects are identified, as well as methods that will enhance the Site and surrounding area. The assessment summarised in this Chapter is based on the wind modelling and analysis undertaken by HTA and presented in **Appendix 9.1**.

9.1.2 The likely significant effects of the development on the local wind environment have been assessed against best practice criteria for pedestrian comfort and safety. These two aspects are associated with pedestrian use of public open spaces and it is important to ensure that the design follows UK good practice design guidelines developed to minimise associated negative effects.

9.1.3 Wind environment is defined as the wind flow experienced by people and the subsequent influence it has on their activities. It is concerned primarily with wind characteristics at pedestrian level. Other potential wind effects include wind loads, structural response and natural ventilation; however, these are unrelated to the outdoor wind environment and do not fall within the scope of this study.

9.1.4 The effect that buildings and other structures have on the wind environment at pedestrian level, and the anticipation of the likely wind conditions, are of major importance in the context of safety and comfort for pedestrians. The appraisal of the likely significant effects of the wind environment is taking increasing importance in the design of new developments as public open spaces and urban areas become more popular. While it is not always practical to design out all the risks associated with the wind environment, it is possible to minimise risk or discomfort through local mitigation where required.

9.1.5 This Chapter should be read together with the introductory chapters of this ES (**Chapters 1 – 4**) as well as and in the context of the Development Specification and the Application and Parameter Plans with **Chapter 17 'Cumulative Effects'**.

9.2 Legislation, Policy and Guidance

Legislation

9.2.1 There is no applicable legislation of relevance to this assessment. The applicable regulatory framework is summarised as follows::

- National Planning Policy Framework (NPPF) (2012) (Ref. 9.1);
- Planning Practice Guidance (2014) (Ref. 9.2);
- The Spatial Development Strategy for Greater London (The London Plan) (2011) (Ref. 9.3);
- Southwark Local Development Framework, Core Strategy (2011) (ref. 9.4); and
- The Southwark Plan (2007) (Ref 9.5).

Planning Policy

9.2.2 Planning policy at the national, regional, county and local level is discussed in **Chapter 4 'Planning Policy Context'**. Planning policy of relevance to consideration of wind is summarised below. The Lawson Criteria have been adopted in this study. The Lawson Criteria is a widely used method in the UK to quantify

wind conditions on built developments in the UK for over thirty years and although they are not a UK 'standard', they are recognised by local authorities as a suitable benchmark for wind assessments.

National Policy

National Planning Policy Framework (NPPF) (2012);

9.2.3 The NPPF refers to the Government's objective to conserve and enhance the natural and local environment in the planning system. The wind environment forms an integral part of the local environment.

Planning Practice Guidance (2014)

9.2.4 There are no national planning policies directly relating to wind microclimate issues. However, the National Planning Policy Framework states that the Government's objective is that planning should help to deliver a healthy natural environment. It also states that planning policies and decisions should aim to design places which promote safe and accessible environments. The Commission for Architecture and Built Environment (CABE) and English Heritage (EH), Guidance on Tall Buildings sets out how CABE and EH evaluate proposals for tall buildings with regard to *'…..The effect on the local environment, including microclimate, overshadowing, night-time appearance, vehicle movements and the environment and amenity of those in the vicinity of the building….'*

Regional Policy

The Spatial Development Strategy for Greater London (The London Plan) (2011)

9.2.5 The London Plan places importance on the creation and maintenance of a high quality environment for London. Policy 5.3 'Sustainable Design and Construction' states:

"Major development proposals should meet the minimum standards outlined in the Mayor's supplementary planning guidance...ensuring developments are comfortable and secure for users, including avoiding the creation of adverse local climatic conditions".

Policy 7.6 'Architecture' states:

"Building and structures should...not cause unacceptable harm to the amenity of surrounding land and buildings, particularly residential buildings, in relation to privacy, overshadowing, wind and microclimate. This is particularly important for tall buildings."

Policy 7.7 states:

"Tall buildings should not: affect adversely their surroundings in terms of microclimate, wind turbulence, overshadowing, noise, reflected glare, aviation, navigation and telecommunication interference".

Local Policy

Southwark Local Development Framework, Core Strategy (2011)

9.2.6 Although the adopted Core Strategy for Southwark contains no specific policies relating to the wind microclimate, Policy 12 'Design and Conservation' states:

"Development will achieve the highest possible standards of design for buildings and public spaces to help create attractive and distinctive places which are safe, easy to get around and a pleasure to be in".

The Southwark Plan (2007)

9.2.7 There are no saved policies contained in the Southwark Plan specific to the wind microclimate. However, Policy 3.13 'Urban Design' promotes good urban design in all new developments. The policy says

that consideration should be given to the layout of the development and the long-term impacts on the microclimate.

Aylesbury Area Action Plan (2010)

9.2.8 The Aylesbury Area Action plan states that buildings which are taller than the general height need careful consideration. It also states that in the presence of these taller buildings, proposals should demonstrate that:

"...harmful effects on residents, pedestrians and cyclists, such as overshadowing and wind funnelling, will be minimised.

Guidance

The London Plan Supplementary Planning Guidance: Sustainable Design and Construction (2014)

9.2.9 Section 2.3.7 of the SPG refers to that large buildings having the ability to alter their local environment and affect the micro-climate. It states:

"Where a proposed development is significantly taller than its surrounding environment, developers should carry out an assessment of its potential impact on the conditions at ground level and ensure the resulting design of the development provides suitable conditions for the intended uses."

9.2.10 It also states that one way to assess the impact of a large building on the comfort of the street environment is the Lawson Comfort Criteria, a widely accepted scale to assess the pedestrian comfort and safety developed by T.V. Lawson (Lawson, 2011) from Bristol University. This method is comparable with international guidance and it has been used in this study. The Lawson Criteria set out a scale for assessing the suitability of wind conditions in the urban environment based upon threshold values of wind speed and frequency of occurrence. It sets out a range of pedestrian activities from sitting to crossing the road and for each activity defines a wind speed and frequency of occurrence.

9.2.11 The Best Practice Guidelines for the Computational Fluid Dynamics Simulation of Flows in the Urban Environment has also been used as a technical reference for the study.

9.3 Assessment Methodology and Significance Criteria

Relevant Elements of the Comprehensive Development (FDS Application and Masterplan Application)

9.3.1 The following components of the Comprehensive Development are relevant to the assessment: application plans and parameter plans which enable a 3D model to be produced for testing etc. based on proposed heights and massing.

Scope of the Assessment

9.3.2 This Chapter reports the assessment of the likely significant effects of the Comprehensive Development on the wind environment at pedestrian level within the Site and its surroundings.

9.3.1 The scope of the wind assessment was identified in the EIA Scoping Report (**Appendix 2.1**) and takes into account the comments within the LBS EIA Scoping Opinion (**Appendix 2.2**) and within the Scoping Opinion Response (**Appendix 2.3**). The scope of potentially significant effects included within the assessment is outlined below. The wind analysis has been conducted based on a comparison of the Computational Fluid Dynamic (CFD) modelling results of the existing development scenario with the proposed development. Results have been reported for the proposed development including the wind conditions on the balconies, terraces and

outdoor amenity areas accessible by future residents. Potential temporary effects during the construction have been assessed.

9.3.2 The effect of the Comprehensive Development on the local microclimate has been assessed against best practice guidelines or pedestrian comfort safety. These two aspects are associated with pedestrian use of public open spaces and it is important to ensure that the design follows national good practice design guidelines developed to minimise associated negative effects.

9.3.3 Wind environment is defined as the wind flow experienced by people and the subsequent influence it has on their activities. It is concerned primarily with wind characteristics at pedestrian level. Other potential effects include wind loads, structural response and natural ventilation, however, these are unrelated to the wind environment and do not fall within the scope of the wind environment study for the purposes of this ES Chapter.

9.3.4 The wind study determines the expected wind environment around the Site and predicts how the changes resulting from the Comprehensive Development may affect pedestrian safety and comfort for the expected pedestrian activities in and around the Site. For the completed development scenario the local wind conditions have also been simulated at the raised courtyard level and at the highest balcony and roof terrace location of each building. The outdoor amenity areas have been analysed as well. The significance of the impacts prior to mitigation has been stated within the Chapter.

9.3.5 The local wind conditions were simulated and quantified for the following scenarios:

- Existing site conditions with surrounding area; and
- Completed development with the surrounding area Side Wide Development Option; and
- Completed development with the surrounding area (FDS Development Option).

9.3.6 Site 7 located immediately outside the north-west of the Site is already consented and currently under construction. The wind model used has included the area as constructed and is considered as part of the baseline condition. Therefore no cumulative scenarios have been tested.

It should be noted that effects on pedestrian comfort and safety are only considered externally to the buildings within the Comprehensive Development.

Extent of the Study Area

9.3.7 The study area for the wind assessment encompasses the Site and the surrounding areas of the Site. The receptors are located in sensitive points where the wind conditions are expected to be checked, such as pedestrian thoroughfares, building entrances, courtyards, gardens and balconies.

Consultation

9.3.8 During the consultation process some people have highlighted one area where currently the pedestrian comfort is not met. This place is an external area located in the north-west part of Site 1A, in Westmoreland Road. This point, assessed like point 4, shows that the current situation is suitable for Standing and Entrance according to the Lawson Criteria, whereas it will be suitable for Sitting with the development in place.

Method of Baseline Data Collation

Desk Study

9.3.9 To predict the local wind environment of the Comprehensive Development and subsequent pedestrian comfort within and immediately surrounding the Site, the wind assessment used the Integrated Environmental Solution (IES) Virtual Environment (VE) Computational Fluid Dynamics (CFD) model to simulate local wind conditions. IES VE and its CFD package is a well-established advanced computer modelling technique for numerically simulating wind flows. The CFD analyses predict wind velocities and air flow patterns through the

Site, wind data from the nearest suitable meteorological station and the recommended comfort standards (Lawson Criteria). The Lawson Criteria is a widely used method in the UK to quantify wind conditions on built development in the UK. They have been used for over thirty years and although they are not a UK standard, they are recognised by local authorities as a suitable benchmark for wind assessments. A full three dimensional model of the Site and surrounding areas has been constructed for the assessment. For the receptors located in the public realm areas, private gardens, balconies and roof areas, the condition of sitting (level 6 of the Lawson Criteria) has been considered as acceptable. For the points located close to the main entrance areas, the entrance door level has been considered as acceptable (level 5).

9.3.10 The following factors were considered for the assessment based on parameter plans and application plans:

- The effect of the geometry, height and massing of the Comprehensive Development AND THE fds Development Option alone and existing surroundings on local wind speeds and direction;
- The wind speed as a function of the local environment, such as topography, ground roughness and nearby obstructions (buildings, bridges, etc.);
- The effects of the built up urban site on the wind flow patterns; and
- The pedestrian activity to be expected (sitting, standing, strolling and fast walking).

9.3.11 The wind analysis focuses on the potential variation of the wind velocities arising as a result of the Comprehensive Development and the FDS Development Option alone. The assessment of effects has been conducted based on a comparison of the CFD modelling results of the baseline scenario and the proposed scenarios outlined in section 9.3.5 above.

Identification of Sensitive Receptors

9.3.12 The receptors of the wind assessment are the sensitive areas where the results are considered as significant. The IES VE CFD model enables the pedestrian level wind microclimate at and immediately around the Site at sensitive locations: e.g. pedestrian thoroughfares, bus stops, buildings entrances, courtyards, gardens and balconies.

Assessment Modelling

9.3.13 The meteorological data was reviewed and combined to develop a statistical model of wind speed and direction, representative of wind conditions in London. The combination of meteorological data and velocity ratios permits the percentage of time that wind speeds exceed each range of the Beaufort (B) scale to be computed. Prevailing wind directions were determined and the data was used to produce joint frequency tables of wind speeds, divided into ranges of the Beaufort Scale and direction, on a monthly and annual basis for 30 degrees sectors. The wind roses produced using this data are shown in **Appendix 9.1**.

9.3.14 The assessment was carried out without any existing or proposed landscaping which can help to provide shelter from the wind. In this way, the computational modelling is a worst case scenario looking at the wind velocities without landscaping in place.

Significance Criteria

9.3.15 The assessment of potential effects as a result of the Comprehensive Development and the FDS Development Option alone has taken into account both the construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the development proposals, and the sensitivity of the affected receptor / receiving environment to change, as well

as a number of other factors that are outlined in more detail in **Chapter 2 'Approach to the Assessment'** of this ES. Magnitude of change and the sensitivity of the affected receptor / receiving environment are both assessed on a scale of high, medium, low and negligible (as shown in **Table 2.2** in **Chapter 2 'Approach to the Assessment'**.

Significance of Effects

9.3.16 The assessment of wind conditions requires a standard against which the measurements can be compared. The Lawson Comfort Criteria have been established and are widely used on building development across the UK.

9.3.17 The Criteria set out six pedestrian activities and reflect the fact that less active pursuits require more benign wind conditions. The six categories are: sitting, standing, entering/leaving a building, leisure walking, business walking and roadway/car park. For each category, an upper threshold is defined, beyond which conditions are described as unacceptable for a stated activity. If conditions are below the threshold, then they are described as tolerable. An unacceptable result implies that remedial action should be taken to mitigate wind conditions or that the proposed pedestrian activity at that location should be redefined. The Beaufort Wind Force scale describes wind speeds in terms of its observable effects. The scale ranges from increasing wind speeds calm (B0) to violent storms (B11). **Table 9.1** below shows the Lawson Criteria.

Table 9.1 – Lawson Comfort Criteria

Description	Level	Threshold
Roads and Car Parks	1	6%>B5
Business Walking	2	2%>B5
Pedestrian Walk	3	4%>B4
Pedestrian Standing	4	6%>B3
Entrance Doors	5	6%>B3
Sitting	6	1%>B3

9.3.18 The following terms have been used to define the significance of the effects identified:

- **Major negative** effect: where the Comprehensive Development (or the FDS Development Option alone) could be expected to have a very significant negative effect: three-category differences in the wind classification on the Lawson Scale (wind conditions are 3 steps windier than desired or 3 steps windier than the baseline condition);
- **Moderate negative** effect: where the Comprehensive Development (or the FDS Development Option alone) could be expected to have a noticeable negative effect: two-category differences in the wind classification on the Lawson scale (wind conditions are 2 steps windier than desired or 2 step windier than the baseline condition);
- **Minor negative** effect: where the Comprehensive Development (or the FDS Development Option alone) could be expected to result in a small, barely noticeable negative effect : one-category difference in the wind classification on the Lawson scale (wind conditions are 1 step windier than desired or 1 step windier than the baseline condition); and
- **Negligible:** where no discernible effect is expected as a result of the Comprehensive Development(or the FDS Development Option alone): no category-difference in the wind classification on the Lawson scale (wind conditions are similar to those desired or to the baseline condition);
- **Minor positive** effect: where the Comprehensive Development (or the FDS Development Option alone) could be expected to result in a small, barely noticeable positive effect: one-category difference in the wind classification on the Lawson scale (wind conditions are 1 step calmer than desired or 1 step calmer than the baseline condition);

- **Moderate positive** effect: where the Comprehensive Development (or the FDS Development Option alone) could be expected to have a noticeable positive effect: two-category differences in the wind classification on the Lawson scale (wind conditions are 2 steps calmer than desired or 2 steps calmer than the baseline condition); and
- **Major positive** effect: where the Comprehensive Development (or the FDS Development Option alone) could be expected to have a very significant effect: three-category differences in the wind classification on the Lawson Scale (wind conditions are 3 steps calmer than desired or 3 steps calmer than the baseline condition).

Limitations and Assumptions

9.3.19 The likely significant effects presented in this Chapter are based on the wind modelling and analysis undertaken by HTA and the results presented in the HTA report (**Appendix 9.1**).

9.3.20 The assessment considers the worst case scenario: the model, based on the application plans, does not contain the balcony and roof terrace screen design. The 3D model does not include the existing and the proposed landscaping (trees, street furniture etc). Professional judgement was used to asses both the contribution of the screens and the existing and proposed landscaping.

9.4 Baseline Conditions

9.4.1 Analysis of the meteorological data for the existing open Site indicates that the prevailing wind throughout the year is from south south-west (210 degrees). During the late spring and early summer there is a secondary prevailing wind direction from north-east.

9.4.2 The prevailing wind directions for each of the seasons are presented in the form of wind roses (Figure 1 of **Appendix 9.1**).

9.4.3 The wind conditions in the Site and within the surrounding area are currently mostly suitable for sitting. Some areas are tolerable for standing and entrances but not for sitting. The implication of this result is that, once the Comprehensive Development is complete, if the Site has a number of locations where the conditions are tolerable for a different use, then these areas can be affected (positively or negatively). If wind speeds are sufficiently strong then they have the potential to hinder movement and in extreme cases blow pedestrians over. As such, the assessment considers strong winds. In this respect, the Lawson Comfort Criteria stipulate that if the wind speed exceeds Beaufort Force 6,7, or 8 for more than one hour per annum, then there may be a need for remedial measures or a careful assessment of the expected use of that location (e.g. asking: is it reasonable to expect elderly or very young pedestrians to be present at the location on the windiest day of the year?). For locations where the wind speed exceeds Beaufort Force 6, which are found on a pedestrian thoroughfare, the results are unlikely to generate nuisance to pedestrians. However, if the wind speed exceeds Beaufort 6 then the area is likely to be classified as suitable for leisure walking, business walking or roadway use, and so would require mitigation to satisfy the Lawson Comfort Criteria in any case.

9.4.4 The wind assessment has been carried out for the relevant areas located immediately adjacent to the Site. These areas could be impacted by the new buildings. The sensitive receptors assessed are shown in the **Appendix 9.1.**

9.4.5 The wind assessment also includes the relevant area within the Site. The location of the assessed points is shown in the **Appendix 9.1.**

Future Baseline

9.4.6 In the absence of the Comprehensive Development it is likely that similar applications would come forward on the Comprehensive Development to provide a similar quantum and mix in line with the aspirations of

the AAAP. In the event of no development taking place at the Comprehensive Development the anticipated future baseline will remain as outlined above.

9.5 Assessments of Effects, Mitigation and Residual Effects

Demolition and Construction

Site Wide Development Option

9.5.1 The effects on the wind microclimate on the Site are a function of the massing of the buildings constructed as part of the Comprehensive Development which would progressively vary during the construction phase. An assessment of the Site preparation, earthworks and construction phase has not been conducted as the effects would not be significant. However, as construction of the Comprehensive Development proceeds the wind conditions at the Site would gradually adjust to those of the completed development. These effects are described in the following sections.

FDS Development Option

9.5.2 The effects on the wind microclimate on the Site are a function of the massing of the buildings constructed a part of the FDS Application site which would progressively vary during the construction phase. An assessment of the Site preparation, earthworks and construction phase has not been conducted as the effects would not be significant. However, as construction of the FDS Application site proceeds the wind conditions at the Site would gradually adjust to these of the completed development. These effects are described in the following sections.

Operation

Site Wide Development Option

9.5.3 The pedestrian comfort and safety has been assessed comparing the results against the Lawson Criteria. The Criteria set out six pedestrian activities and reflect the fact that less active pursuits require more benign wind conditions. If the results obtained from the analysis are below the threshold, then they are described as tolerable. An unacceptable result implies that remedial action should be taken to mitigate wind conditions and to ensure safety for the pedestrians.

Public Realm Surrounding the Site

9.5.4 There are 37 sensitive points which have been assessed surrounding the Site. These spaces include the surrounding streets and the surrounding amenity areas. The results show that:

- 25 of them have a **negligible** impact. In these points the proposed development has the same results as the predicted usage space,
- 11 of them have a **positive** impact of **minor** effect. This means that comparing the results of the proposal with the predicted usage space, the wind conditions are more favourable by one level of the Lawson Comfort Criteria, and
- One space has a positive impact of moderate effect. The wind conditions of the proposed configuration will be more favourable by two levels of the Lawson's scale of the current disposition.

Mitigation

9.5.5 The assessed wind conditions after the development has been constructed show that the areas are suitable for the intended use and in most of the cases they will be even better than the current situation, therefore no mitigation measures are required.

Residual Effects

9.5.6 The residual effect on these spaces is considered to be **negligible** or **positive** of **minor** effect. One space will have a **positive** impact of **moderate** effect.

Private Amenity Spaces Surrounding the Site

9.5.7 There are 10 sensitive areas in the wind assessment of the private amenity spaces surrounding the masterplan. The results show that there will be a **negligible** impact on all these spaces after the development is constructed.

Mitigation

9.5.8 The assessed wind conditions after the development has been constructed show that no mitigation measures are required for these areas.

Residual Effects

9.5.9 The residual effect on these spaces is considered to be **negligible**.

Public Realm within the Site

9.5.10 There are 78 sensitive points which have been assessed within the Site. The results show that:

- The Comprehensive Development will have a **negligible** impact on 13 of them. In these points the proposed development has the same results as [the predicted usage of the space, and
- The Comprehensive Development will have a **positive** impact of **minor** effect on 65 of them. This means that comparing the results of the proposal with the predicted usage space, the wind conditions are more favourable by one level of the Lawson Comfort Criteria.

Mitigation

9.5.11 The assessed wind conditions after the development has been constructed show that the areas are suitable for the intended use, therefore no mitigation measures are required.

Residual Effects

9.5.12 The residual effect on these areas is considered to be **negligible** or **positive** of **minor** effect.

Private Amenity Spaces Within the Site (ground level and courtyard level)

9.5.13 There are 78 sensitive receptors located in the private gardens on the ground floor and at the centre of the private communal spaces on the ground level and on the courtyard level. The analysis indicates that in absence of landscaping:

- On 13 of them the Comprehensive Development will have a **negligible** impact. In these points the proposed masterplan has the same results as the predicted usage of the space, and
- On 65 of them the Comprehensive Development will have a **positive** impact of **minor** effect. This means that comparing the results of the proposal with the predicted usage space, the wind conditions are more favourable by one level of the Lawson Comfort Criteria.

Mitigation

9.5.14 The assessed wind conditions after the development has been constructed show that the areas are suitable for the intended use, therefore no mitigation measures are required.

Residual Effects

9.5.15 The residual effect on these areas is considered to be **negligible** or **positive** of **minor** effect.

Building Entrances

9.5.16 There are 22 sensitive points which have been assessed in proximity of the main entrances spaces. The results show that:

- On two of them the Comprehensive Development will have a **negligible** impact. In these points the proposed locations are suitable for the intended use, and
- On 20 of them the Comprehensive Development will have a **positive** impact of **minor** effect. This means that comparing the results of the proposal with the predicted usage of the space, the wind conditions are more favourable by one level of the Lawson Comfort Criteria.

Mitigation

9.5.17 The assessed wind conditions after the development show that the areas are suitable for the intended use, therefore no mitigation measures are required.

Residual Effects

9.5.18 The residual effect on these areas is considered to be **negligible** or **positive** of **minor** effect.

Balconies and roof areas:

9.5.19 There are 57 sensitive points which have been assessed within the Site. The results show that:

- On 23 of them the Comprehensive Development will have a **negative** impact of **moderate** effect. In these points the wind conditions are two levels windier than the desired ones,
- On 33 of them the Comprehensive Development will have a **negative** impact of **minor** effect. This means that the wind conditions in these areas are one level windier than the desired conditions, and
- One sensitive area (point 180) shows a **negligible** impact. In this point the proposed masterplan has the same condition as the predicted usage of the space.

Mitigation

9.5.20 The wind analysis has been carried out without considering any protection or sheltering elements. To improve the negative impact of the results the design will include screens on the balconies and the roof areas. A better solution for the balconies located above the tenth floor would be the presence of recessed balconies.

Residual Effects

9.5.21 The development will include screens/parapets on both the balconies and roof areas. Therefore in these areas all the points will have a negligible impact. If above ten storeys all the balconies will be recessed and will include screens and protections there will be negligible impact. If the balconies will include just screens and protection, a negative impact of minor effect will be present. Therefore all the assessed points will have a **negligible** effect.

FDS Development Option

9.5.22 The assessment of this option assumed that the current buildings on the Masterplan Application site will remain. he pedestrian comfort and safety has been assessed comparing the results against the Lawson

Criteria. The Criteria set out six pedestrian activities and reflect the fact that less active pursuits require more benign wind conditions. If the results obtained from the analysis are below the threshold, then they are described as tolerable. An unacceptable result implies that remedial action should be taken to mitigate wind conditions and to ensure safety for the pedestrians.

Public Realm Surrounding the Site

9.5.23 There are 12 sensitive receptors in the assessment of the existing public realm surrounding the Site. The results of the assessment show that:

- On two of them the FDS Development will have a **negligible** impact. In these points the proposed development has the same results as the current situation,
- On nine of them the FDS Development will have a **positive** impact of **minor** effect. This means that comparing the results of the proposal with the baseline condition, the wind conditions are more favourable by one level of the Lawson Comfort Criteria, and
- On one space the FDS Development has a **positive** impact of **moderate** effect. The wind conditions of the proposed configuration will be more favourable by two levels of the Lawson's scale of the current disposition.

Mitigation

9.5.24 The assessed wind conditions after the development has been constructed show that the areas are suitable for the intended use and in most of the cases they will be even better than the current situation, therefore no mitigation measures are required.

Residual Effects

9.5.25 The residual effect on these areas is considered to be **negligible** or **positive** of **minor** effect. One space will have a **positive** impact of **moderate** effect.

Private Amenity Spaces Surrounding the Site

9.5.26 There are three sensitive areas in the wind assessment of the private amenity spaces surrounding the Site. The results show that the FDS Development will have a **negligible** impact on all these spaces after the development has been constructed.

Mitigation

9.5.27 The assessed wind conditions after the development has been constructed show that the areas are suitable for the intended use and in most of the cases they will be even better than the current situation, therefore no mitigation measures are required.

Residual Effects

9.5.28 The residual effect on these areas is considered to be **negligible**.

Public Realm within the Site

9.5.29 There are 25 sensitive points which have been assessed within the Site. The results show that:

- On four of them the FDS Development will have a **negligible** impact. In these points the proposed layout has the same results as the predicted usage of the space, and
- On 21 of them the FDS Development will have a **positive** impact of **minor** effect. This means that comparing the results of the proposal with the predicted usage of the space, the wind conditions are more favourable by one level of the Lawson Comfort Criteria.

Mitigation

9.5.30 The assessed wind conditions after the development has been constructed show that the areas are suitable for the intended use, therefore no mitigation measures are required.

Residual Effects

9.5.31 The residual effect on these areas is considered to be **negligible** or **positive** of **minor** effect.

Amenity Spaces within the Site (ground level and courtyard level)

9.5.32 There are nine sensitive spaces which have been assessed within the Site. The results show that:

- On five of them the FDS Development will have a **negligible** impact. In these points the proposed layout has the same results as the predicted usage of the space, and
- On four of them the FDS Development will have a **positive** impact of **minor** effect. This means that comparing the results of the proposal with the predicted usage space, the wind conditions are more favourable by one level of the Lawson Comfort Criteria.

Mitigation

9.5.33 The assessed wind conditions after the development has been constructed show that the areas are suitable for the intended use, therefore no mitigation measures are required.

Residual Effects

9.5.34 The residual effect on these areas is considered to be **negligible** or **positive** of **minor** effect.

Building Entrances

9.5.35 There are 22 sensitive receptors which have been assessed within the Site. The results show that:

- On two of them the FDS Development will have a **negligible** impact. In these points the proposed layout has the same results as the predicted usage of the space, and
- On 20 of them the FDS Development will have a **positive** impact of **minor** effect. This means that comparing the results of the proposal with the predicted usage of the space, the wind conditions are more favourable by one level of the Lawson Comfort Criteria.

Mitigation

9.5.36 The assessed wind conditions after the development has been constructed show that the areas are suitable for the intended use, therefore no mitigation measures are required.

Residual Effects

9.5.37 The residual effect on these areas is considered to be **negligible** or **positive** of **minor** effect.

Balconies and roof areas:

9.5.38 There are 41 sensitive receptors which have been assessed within the Site. The results show that:

- On 18 of them of them the FDS Development will have a **negative** impact of **moderate** effect. In these points the wind conditions are two levels windier than the desired ones,
- On 22 of them the FDS Development will have a **negative** impact of **minor** effect. This means that the wind conditions are one level windier than the desired conditions, and
- One sensitive area (point 79) shows a **negligible** impact. In this point the proposed layout has the same condition as the predicted usage of the space.

Mitigation

9.5.39 The wind analysis has been carried out without considering any protection or sheltering elements. To improve the negative impact of the results the design will include screens on the balconies and the roof areas. A better solution for the balconies located above the tenth floor would be the presence of recessed balconies.

Residual Effects

9.5.40 The development will include screens/parapets on both the balconies and roof areas. Above ten storeys all the balconies will be recessed and will include screens and protections. Therefore on all the assessed points the FDS Development will have a **negligible** effect.

9.6 Summary

Site Wide Development Option

9.6.1 The pedestrian comfort and safety of the Comprehensive Development has been assessed comparing the results against the Lawson Criteria. The Criteria set out six pedestrian activities and reflect the fact that less active pursuits require more benign wind conditions. If the results obtained from the analysis are below the threshold, then they are described as tolerable. An unacceptable result implies that remedial action should be taken to mitigate wind conditions and to ensure safety for the pedestrians.

9.6.1 A qualitative assessment of the likely significant impact during the demolition and construction phase has been undertaken based on professional judgement and experience. Wind microclimate impacts are typically highly localised, therefore the impact during this phase is likely to be negligible or, where negative, temporary.

9.6.2 With the completed Comprehensive Development the pedestrian comfort and safety at ground level and courtyard level is expected to be suitable for the intended uses. The same good conditions are expected on the roof areas and on the balconies. Because of the presence of recessed balconies above ten storeys, appropriate wind conditions are expected to exist there as well.

FDS Development Option

9.6.3 The pedestrian comfort and safety of the FDS Development Option has been assessed comparing the results against the Lawson Criteria. The Criteria set out six pedestrian activities and reflect the fact that less active pursuits require more benign wind conditions. If the results obtained from the analysis are below the threshold, then they are described as tolerable. An unacceptable result implies that remedial action should be taken to mitigate wind conditions and to ensure safety for the pedestrians.

9.6.4 A qualitative assessment of the likely significant impact during the demolition and construction phase has been undertaken based on professional judgement and experience. Wind microclimate impacts are typically highly localised, therefore the impact during this phase is likely to be negligible or, where negative, temporary. With the completed FDS Development Option, the pedestrian comfort and safety at ground level and courtyard level is expected to be suitable for the intended uses. The same good conditions are expected on the roof areas and on the balconies.

Table 9.2: Summary of Wind Effects

Site Wide Development Option

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation													
Wind conditions in the surrounding areas after the development in 35 points out of 47	N/A	Negligible	P	D	LT	No mitigation measures needed.	N/A	Negligible	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A
Wind conditions in the surrounding areas after the development in 11 points out of 47	Minor	Positive	P	D	LT	No mitigation measures needed.	Minor	Positive	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A
Wind conditions in the surrounding areas after the development in 1 out of 47 points	Moderate	Positive	P	D	LT	No mitigation measures needed.	Moderate	Positive	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A
Wind conditions within the Site in 23 points out of 190	Moderate	Negative	P	D	LT	Screens/parapets are needed and the balconies should be recessed	N/A	Negligible	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A
Wind conditions within the Site in 33 points out of 190	Minor	Negative	P	D	LT	Screens/parapets are needed	N/A	Negligible	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A
Wind conditions within the Site in 44 points out of 190	N/A	Negligible	P	D	LT	No mitigation measures needed.	N/A	Negligible	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A
Wind conditions within the Site in 90 points out of 190	Minor	Positive	P	D	LT	No Mitigation measures needed.	Minor	Positive	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

Table 9.3: Summary of Wind Effects

FDS Development Option

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT /LT)		
Construction													
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation													
Wind conditions in the surrounding areas after the development in 5 points out of 15	N/A	Negligible	P	D	LT	No mitigation measures needed.	N/A	Negligible	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A
Wind conditions in the surrounding areas after the development in 9 points out of 15	Minor	Positive	P	D	LT	No mitigation measures needed.	Minor	Positive	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A
Wind conditions on the surrounding areas after the development in 1 out of 15 points	Moderate	Positive	P	D	LT	No mitigation measures needed.	Moderate	Positive	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A
Wind conditions within the Site in 18 points out of 97	Moderate	Negative	P	D	LT	Screens/parapets are needed and the balconies should be recessed	N/A	Negligible	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A
Wind conditions within the Site in 22 points out of 190	Minor	Negative	P	D	LT	Screens/parapets are needed	N/A	Negligible	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A
Wind conditions within the Site in 12 points out of 97		Negligible	P	D	LT	No mitigation measures needed.	N/A	Negligible	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A
Wind conditions within the Site in 45 points out of 97	Minor	Positive	P	D	LT	No Mitigation measures needed.	Minor	Positive	P	D	LT	Ref.9.1, Ref.9.2, Ref.9.3, Ref.9.4, Ref.9.5, Ref.9.6	N/A

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

9.7 References

Ref. 9.1 Department for Communities and Local Government (2012). *National Planning Policy Framework (NPPF)*

Ref. 9.2 Department for Communities and Local Government (2014). *Planning Practice Guidance*

Ref. 9.3 Greater London Authority (2011). The London Plan, *Spatial Development Strategy for Greater London*

Ref. 9.4 The London Borough of Southwark (2011). *Local Development Framework, Core Strategy*

Ref. 9.5 The London Borough of Southwark (2007). *The Southwark Plan*

Ref. 9.6 Greater London Authority (2014). *The London Plan Supplementary Planning Guidance: Sustainable Design and Construction*

10 Daylight, Sunlight and Overshadowing

10.1 Introduction

10.1.1 This Chapter assesses of the likely significant environmental effects of the Site Wide Development Option and FDS Development Option on daylight, sunlight availability and overshadowing. In particular it considers the likely significant effects of the Comprehensive Development and the FDS Development Option on the neighbouring residential properties and amenity spaces around the Site. The assessment also considers the likely daylight and sunlight availability and the overshadowing expected within the Comprehensive Development.

10.1.2 This Chapter should be read together with the introductory chapters of this ES (**Chapters 1 – 5**) as well as **Chapter 17 'Cumulative Effects'**.

10.1.3 This Chapter describes the relevant planning policies and guidance applicable to the Comprehensive Development. The methods used to assess likely significant impacts are described in this Chapter and they are available in more detail in the Daylight, Sunlight and Overshadowing report prepared by HTA in **Appendix 10.1**.

10.1.4 The likely significant effects of the Comprehensive Development are established in respect of relevant target criteria; the mitigation measures required to prevent, reduce or offset the impacts are described and the significance of the resulting residual impacts are identified.

10.2 Legislation, Policy and Guidance

Legislation Framework

10.2.1 There is no applicable legislation of relevance to this assessment.

Planning Policy

National Policy

National Planning Policy Framework (NPPF) (2012) (Ref 10.1)

10.2.2 There are no national planning policies directly relating to daylight, sunlight and overshadowing. The NPPF states that the Government's objective is that planning should help to deliver a healthy natural environment. It states:

"Planning policies and decisions should aim to ensure that developments…create attractive and comfortable places to live, work and visit…"

Regional Policy

The Spatial Development Strategy for Greater London (The London Plan) (2011) (Ref. 10.2)

10.2.3 The policy 7.6 'Architecture' of the London Plan states that new development must:

"…not cause unacceptable harm to the amenity of surrounding land and buildings, particularly residential buildings, in relation to privacy, overshadowing, wind and microclimate."

Local Policy

Southwark Local Development Framework, Core Strategy (2011) (Ref 10.3)

10.2.4 The Policy 12 'Design and Conservation" of the document states:

"Development will achieve the highest possible standards of design for buildings and public spaces to help create attractive and distinctive places which are… a pressure to be in."

The Southwark Plan (2007) (Ref. 10.4)

10.2.5 The saved policy 4.2 of the Southwark Plan states:

"Planning permission will be granted for residential development, including dwellings within mixed use schemes, provided that they…include high standards of…natural daylight and sunlight…"

Aylesbury Area Action plan (2010) (Ref. 10.5)

10.2.6 The Aylesbury Area Action Plan states that one of the main aims of the development is the improvements of:

"...the open space, security, lighting, play facilities and maintenance"

Guidance

British Standard (BS) 8206: Lighting for buildings, Part 2: 2008 Code of practice for daylighting (Ref. 10.6)

10.2.7 BS 8206-2:2008 gives recommendations regarding design for daylight in buildings. It describes good practice in daylighting design and presents criteria intended to enhance the well-being and satisfaction of people in buildings, recognizing that the aims of good lighting go beyond achieving minimum illumination for task performance. It states:

"Daylighting gives to a building a unique variety and interest. An interior which looks gloomy, or which does not have a view to the outside when this could reasonably be expected, will be considered unsatisfactory by its users. The recommendations of this part of BS 8206 recognize that a principal aim of the designer is to produce interiors which are comfortable and give pleasure to their occupants."

CIBSE: Code for interior lighting 1994 (Ref 10.7)

10.2.8 This Code has been prepared with the aims of specifying the lighting conditions appropriate for a wide range of interiors, and of offering guidance on design methods for obtaining those conditions. The recommendations given in the Code are representative of good practice. Although the Code has no statutory standing, some of the recommendations are cited as references in certain mandatory standards. Taken together, the recommendations represent a basis for designers to use.

BRE Handbook 'Site Planning for Daylight and Sunlight 2011: A Guide to Good Practice, Second Edition' (2011) (Ref. 10.8)

10.2.9 The BRE Handbook gives advice which is not mandatory and should not be used as an instrument of planning policy. BRE guidelines have been drafted primarily for use with low density suburban developments and should therefore be used flexibly when dealing with dense urban sites and extensions to existing buildings. The Guide states in the introduction:

> *"The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design. In special circumstances the developer or planning authority may wish to use different target values. For example, in a historic city centre, or in an area with modern high rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings."*

Southwark Council 2011 Residential Standards Supplementary Planning Document

10.2.10 Section 2.7 Daylight and Sunlight states:

> *"Residential development should maximize sunlight and daylight, both within the new development and to*

neighbouring properties. Development should seek to minimize overshadowing or blocking of light to adjoining properties. A lack of daylight can have negative impacts on health as well as making the development gloomy and uninviting.
Developments should meet site layout requirements set out in the Building Research Establishment (BRE) Site Layout for Daylight and Sunlight – A Guide to Good Practice (1991)".

10.2.11 This document is superseded by BRE Handbook 'Site Layout Planning for Daylight and Sunlight 2011: A Guide to Good Practice, Second Edition' (2011).

10.3 Assessment Methodology and Significance Criteria

Relevant Elements of the Comprehensive Development

10.3.1 The following components of the Comprehensive Development are relevant to the assessment:

- Planning Application Drawings; and
- Parameter Plans for the Masterplan Application.

Scope of the Assessment

10.3.2 The Comprehensive Development is likely to have an effect on the level of daylight and sunlight to surrounding residential properties; the assessment described in this Chapter determines the extent of those effects. Daylight and sunlight levels with the FDS Development Option alone have been also assessed. The sunlight assessment includes both the analysis of the buildings and the analysis of the external spaces.

10.3.3 Therefore the proposed scope comprises two elements of work:

- Impact on the existing surrounding properties of the Site
- Impact of the existing properties surrounding the FDS, including the Masterplan Application site in its current built form.
- Although it is not possible to undertake an impact assessment *within* the FDS development due to the absence of a baseline condition, a DSO analysis has been carried out within the FDS development following the BRE recommendations.

Extent of the Study Area

10.3.4 The Daylight and Sunlight assessment, described in this Chapter, has been carried out for the Site and the existing neighbouring properties.

Consultation

10.3.5 A consultation meeting took place on 7 August 2014 with LBS Officers, Notting Hill Housing, Deloitte and HTA. Consideration has been given to points raised by LBS LBS requested that additional properties surrounding the site should be included:: Site 1a, Site 7 and a few missing buildings along Inville Road. LBS requested the applicant to consider the impact of the broad phases of the Masterplan i.e. the impact that the early phases will have on the existing estate before it is fully developed.

Method of Baseline Data Collation

Desk Study

10.3.6 The technical analysis was carried out by creating a 3D model of the Site and its surroundings. The daylight and sunlight assessment of the FDS Application site was based on up-to-date drawings provided by the design team. The assessment of the impact of the Comprehensive Development on the existing surrounding buildings considers the model submitted on the 1st of August 2014. The simulations have been carried out considering three different models:

- Model 1: Baseline condition (existing condition with the existing buildings on site);
- Model 2: Site Wide Development Option ; and and
- Model 3: FDS Development Option (FDS Application site with the surrounding existing buildings).

10.3.7 The criteria and guidance described in BRE's '*Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice'* BRE, 2011) and *BS 8206 Part 2 2008 Code of Practice for Day Lighting* will be used to assess daylight and sunlight provision in the Site. With this method the following indicators are used:

Daylight

10.3.8 The Vertical Sky Component (VSC) has been calculated to assess the impact on existing neighbouring buildings. Where windows of existing surrounding properties fail to meet the minimum VSC criteria at the face of the window, an assessment of the 'before' and 'after' scenarios has been undertaken to determine whether any negative impact exceeds 20%, the upper acceptable limit in accordance to the guidelines. The Average Daylight Factor (ADF), achieved in the main living areas, i.e. kitchens, living rooms and bedrooms, as well as the potential these spaces have for a clear view of the sky has been calculated for the proposed units.

Sunlight

10.3.9 Probable Sunlight Hours' (PSH) has been assessed for both existing receptors and proposed units. This requires a winter season and an annual assessment. Only windows that face within 90 degrees of south have been assessed.

Overshadowing

10.3.10 Two-hour sun contour has been assessed, to identify whether 50% any garden or amenity space receives a minimum of two hours of direct sun-on-the-ground on 21st March as recommended by the guidelines. The calculations have been carried out on 21st March (spring equinox) and 21 June (mid-summer day). The impact on the existing surrounding open spaces as well as sunlight provision in courtyards and private gardens within phase 1b/1c have been assessed.

Identification of Sensitive Receptors

10.3.11 The receptors of the daylight and sunlight assessment are the windows of habitable rooms where the occupants have a reasonable expectation of daylight. Receptors for overshadowing studies will include gardens and open amenity spaces where pedestrian leisure activities are expected. For the internal daylight assessment (Average Daylight Factor calculation and No Sky Line analysis) the receptor is the Area of Interest (working plane at 0.85m above the floor of the room).

Assessment Modelling

10.3.12 The methodology for assessing daylight, sunlight and overshadowing once the Development is completed is set out in the 2011 BRE Handbook. The relevant methodologies are summarised in this Chapter. Further details are provided in the HTA Daylight and Sunlight Report (refer to **Appendix 10.1**).

10.3.13 The daylight and sunlight assessment relate to residential properties only. The 2011 BRE Handbook states that residential properties are more sensitive to daylight availability.

10.3.14 Only the existing buildings which directly face toward the Comprehensive Development have been assessed. The properties without windows facing the Site will not be affected by the Development, therefore they were not analysed.

10.3.15 To assess the impact of the Comprehensive Development on the existing buildings a comparison with the baseline condition has been carried out. For the daylight, sunlight and overshadowing assessment within the FDS Development, an impact assessment cannot be undertaken because there are no baseline conditions with which to make a comparison. This assessment has been carried out referring to the criteria set out in the 2011 BRE Handbook for adequate daylight and sunlight.

10.3.16 For the location of the building façades surrounding the Site which were assessed in terms of daylight and sunlight, please refer to **Appendix 10.1.**

10.3.17 For the location of the amenity spaces surrounding the Site that were assessed for overshadowing, please refer to **Appendix 10.1**.

10.3.18 For the location of the windows and the external spaces that were analysed for the daylight, sunlight and overshadowing assessment within the FDS Development itself please refer to **Appendix 10.1.**

Assessment of Daylight Impacts

10.3.19 The methodology is based on guidelines set out in the 2011 BRE Handbook. The methodology to assess daylight impacts of the properties surrounding the Comprehensive Development is as follows:

- **Test 1:** 25 Degree Line method. This test should only be used where the development is of a reasonably uniform profile and is directly opposite the existing building. For this reason only where this condition is met the 25 degree rule has been applied and if the development subtends an angle of less than 25 degrees to the centre of the lowest window of an existing building, then it is unlikely to have a substantial effect on the daylight received by the existing dwelling. For an angle greater than 25 degrees or in the presence of development that has a non uniform profile, a more detailed assessment is needed to calculate the loss of daylight to the existing building.
- **Test 2:** Vertical Sky Component method (VSC). The VSC is a unit of measurement that represents the amount of available daylight from the sky, received at a particular window. It is measured on the outside face of the window. This unit is expressed as a percentage as it is the ratio between the amount of sky visible at the given reference point compared to the amount of light that would be available from a totally unobstructed hemisphere of sky. To put this unit of measurement into perspective, the maximum percentage value for a window with a completely unobstructed view through 90° in every direction is 40%. In order to maintain good levels of daylight the BRE guidance recommend that the VSC of a window should be 27% or greater. However, the 2011 BRE Handbook makes allowance for different target values in cases where a higher degree of obstruction may be unavoidable such as historic city centres or modern high rise buildings. The guide states that the 27% value is:

  "..purely advisory and different targets may be used on the special requirements of the proposed development or its location".

Where the VSC is greater than 27%, meaning that enough daylight is still reaching the window of the existing building, additional calculations have been carried out further to assess the impact of the Comprehensive Development of daylight provision at the existing properties.

- **Test 3:** Comparison method: The comparison test considers the VSC results of the baseline condition and the VSC results of the Comprehensive Development (or the FDS Development in the case of the FDS Development Option) in place. The 2011 BRE Handbook states that where the VSC with the Development completed is less than 27% the comparison with the existing situation should be analyzed and if the VSC is less than 0.8 times its former value, occupants of the existing building will notice a reduction in the amount of daylight. In order to provide an impact assessment on the existing properties the comparison test has been carried out in any case.

10.3.20 The methodology used to assess the amount of daylight in the FDS Development differs from that one used for the impact assessment of the existing buildings. Because the size and the shape of the internal spaces are known, the most effective way to assess the quality and quantity of daylight is as follows:

- **Average Daylight Factor:** The ADF, which measures the overall amount of daylight in a space, is the ratio of the average illuminance on the working plane in a room to the illuminance on an unobstructed horizontal surface outdoors, expressed as a percentage. The ADF takes into account the VSC value, i.e. the amount of daylight received on windows, the size and number of windows, the diffuse visible transmittance of the glazing used, the maintenance factor and the reflectance of the room surfaces. Therefore, it is considered as a more detailed and representative measure of the daylight levels within a space. British Standards *BS8206-2 Code of practice for daylighting* provides a set of recommended minimum values for different habitable spaces. These are:
- 2% for kitchens
- 1.5% for living rooms
- 1% for bedrooms

10.3.21 The calculations carried out by HTA analyse the relevant rooms within the First Development Site, where the size and the position of both windows and rooms are known.

- **No-Sky Line:** A measure to assess the distribution of daylight in a space is the percentage of area that lies beyond the no-sky line i.e. the area that receives no direct skylight. This is important as it indicates how good the distribution of daylight is in a room. If more than 20% of the working plane lies beyond the no-sky line poor daylight levels are expected within the space.

10.3.22 For the assessment of the FDS Development only the Average Daylight Factor and No-Sky view methods described above have been considered. Contrary to the VSC that measures daylight provision only at the window pane and is more appropriately used to measure a change in skylight levels, these consider the amount and distribution of daylight within each room.

Assessment of Sunlight Impacts

10.3.23 The methodology is based on guidelines set out in the 2011 BRE Handbook. Only windows facing 90° of due south have been considered for this kind of calculation. The methodology to assess sunlight impacts on the properties surrounding the Comprehensive Development is as follows:

- **Test 1:** 25 Degree Line method
- **Test 2:** APSH and WPSH method: the BRE has produced sunlight templates for London, Manchester and Edinburgh indicating the Annual Probable Sunlight Hours (APSH) for these regions. The London template has been selected for this study which has an APSH of 1,486 hours and a Winter Probable Sunlight Hours of 446 hours. The same VSC reference points are used for the calculation of the APSH and WPSH. It should be considered that sunlight is deemed less important in kitchens and bedrooms. The 2011 BRE Handbook states:

  "In houses, the main requirement for sunlight is in living rooms, where it is valued at any time of day, but especially in the afternoon".

10.3.24 The 2011 BRE Handbook also states:

"...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".

10.3.25 The BS 8206-2 recommends that for a space to be reasonably sunlit:

- at least one main window wall should face within 90^{o} of due south and
- the centre of at least one window to a main living room should receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours in the winter months between 21 September and 21 March. If a room has multiple windows on the same wall or on adjacent walls, the

highest value of APSH should be taken. If a room has two windows on opposite walls, the APSH due to each can be added together.

10.3.26 If the available sunlight hours are below the above thresholds then an additional assessment has been carried out.

- **Test 3:** Comparison method: The comparison test considers the APSH and WPSH results of the baseline condition and the APSH and WPSH results of the Comprehensive Development, or the FDS Development alone in the case of the FDS Development Option, in place. The BRE guidance say that if the reduction in sunlight between the baseline condition and the future one results in an APSH and WPSH of at least 0.8 times its former value, then it is considered that the sunlight received is adequate.

10.3.27 For the assessment of the FDS Development only the APSH and the WPSH calculation have been undertaken as there are no baseline conditions with which to make the comparison.

Assessment of Overshadowing Impacts

10.3.28 The methodology is based on guidelines set out in the 2011 BRE Handbook. BRE Guide recommends that for a garden or amenity to appear adequately sunlit throughout the year, at least half of it should receive at least two hours of sunlight on 21 March (Spring Equinox). The methodology to assess the sunlight impact of the amenity spaces is as follows:

- **Test 1:** % of area which receives sun: The path of the sun is tracked and it is compared with the presence of the abstractions within the analysed site. Sunlight provision is considered adequate if at least 50% of the amenity space receives two hours of sunlight on 21 March.
- **Test 2:** comparison method: this analysis tests if the amenity space receives at least 80% of sunlight of its former value. If this is the case the BRE guidance states that the loss of sunlight is negligible.

  "The availability of sunlight should be checked for all open spaces where it will be required. This would normally include: gardens (usually the main back garden of a house), parks and playing fields, children's playgrounds,.."

10.3.29 For the assessment of the open spaces within the FDS Development site only Test 1 has been undertaken as there are no baseline conditions with which to make the comparison.

10.3.30 For both the impact of the existing amenity spaces and external spaces within the FDS Development the test on 21 June (mid-summer's day) has been carried out.

10.3.31 The 2011 BRE Handbook suggests that where large buildings are proposed which may affect a number of amenity spaces it is useful to plot a shadow plan to show the location of shadows at different times of the day on 21 March. For this date the shadow range calculation has been carried out at hourly intervals throughout the day from 7:00 a.m. to 5:00 p.m.

Significance Criteria

10.3.32 The assessment of potential effects as a result of the Comprehensive Development, and the FDS Development alone in the case of the FDS Development Option,has taken into account both the construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the development proposals, and the sensitivity of the affected receptor / receiving environment to change, as well as a number of other factors that are outlined in more detail in **Chapter 2** of this ES. Magnitude of change and the sensitivity of the affected receptor / receiving environment are both assessed on a scale of high, medium, low and negligible (as shown in **Table 2.2** in **Chapter 2 'Approach to the Assessment'** .

10.3.33 For the daylight, sunlight and overshadowing analysis, the 2011 BRE Handbook provides a guideline for the EIAs, when evaluating the daylight and sunlight impact of a new development. It 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…Where the loss of skylight or sunlight does not meet the guidelines…the impact is assessed as minor, moderate or major adverse… The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied."*

10.3.34 In addition, the results which come from the assessment should be treated with flexibility when assessing the significance of daylight and sunlight impacts in urban locations.

10.3.35 The Impacts Assessment within the FDS Development cannot be undertaken because there are no baseline conditions with which to make a comparison. Considerations are provided on whether they will receive adequate levels of daylight and sunlight and whether any overshadowing is considered acceptable.

Significance of Effects

Daylight Assessment

10.3.36 The following terms have been used to define the significance of the effects identified for the Daylight Assessment of the Residential Properties Surrounding the Site:

- **Major negative effect:** where the Comprehensive Development could be expected to have a very significant negative effect. The VSC following development is less than 50% its existing value;
- **Moderate negative effect:** where the Comprehensive Development could be expected to have a noticeable negative effect. The VSC following development is between 50 and 65% of its existing value;
- **Minor negative effect:** where the Comprehensive Development could be expected to result in a small, barely noticeable negative effect. The VSC following development is between 65% and 80% of its existing value;
- **Negligible:** where no discernible effect is expected as a result of the Comprehensive Development. There are no obstruction of the 25 Degree Line or the VSC is at least 27% or the VSC value following development is of at least 80% of its existing value or it improves up to 20% of its former value.
- **Minor positive effect:** where the Comprehensive Development could be expected to have a barely noticeable positive effect. The VSC following development is at least 27% and the VSC following development improves between 20% and 35% of its existing value;
- **Moderate positive effect:** where the Comprehensive Development could be expected to have a noticeable positive effect. This is the case when the VSC following development is at least 27% and it improves between 35% and 50% of its existing value; and
- **Major positive effect:** where the Comprehensive Development could be expected to have a very significant positive effect. This is the case when the VSC following development is at least 27% and it improves more than 50% of its existing value.

Sunlight Assessment

10.3.37 The following terms have been used to define the significance of the effects identified for the Sunlight Assessment of the Residential Properties Surrounding the Site:

- **Major negative effect:** where the Comprehensive Development could be expected to have a very significant negative effect. The total Average Percentage Sunlight Hours (APSH) is less than 25% and the APSH following development is less than 50% of its existing value or Winter Percentage Sunlight Hours (WPSH) is less than 5% and the WPSH following development is less than 50% its existing value

- **Moderate negative effect:** where the Comprehensive Development could be expected to have a noticeable negative effect. The total APSH is less than 25% and the APSH following development is between 50% and 65% its existing value or the WPSH is less than 5% and the WPSH following development is between 50% and 65% its existing value
- **Minor negative effect:** where the Comprehensive Development could be expected to result in a small, barely noticeable negative effect. The total APSH is less than 25% and the APSH following development is between 65% and 80% its existing value or the WPSH is less than 5% and the WPSH following development is between 65% and 80% its existing value;
- **Negligible:** where no discernible effect is expected as a result of the Comprehensive Development. Window wall faces are within 90 degrees of due south and there is no obstruction of the 25 degree line or the APSH value is 25% or greater with at least the 5% of WPSH received during the winter months, or the APSH value and the WPSH value following development is at least 80% its existing value or the improvement with the developments in place is up to 20% its existing value.
- **Minor positive effect**: where the Comprehensive Development could be expected to result in a small, barely noticeable positive effect. The total APSH is more than 25% and the APSH following the development improves between 20% and 35% its existing value or the WPSH is more than 5% and the WPSH following development improves between 20% and 35% its existing value;
- **Moderate negative effect:** where the Comprehensive Development could be expected to have a noticeable positive effect. The total APSH is more than 25% and the APSH following development improves between 35% and 50% its existing value or the WPSH is more than 5% and the WPSH following development improves between 35% and 50% its existing value; and
- **Major positive effect:** where the Comprehensive Development could be expected to have a very significant positive effect. The total Average Percentage Sunlight Hours (APSH) is more than 25% and the APSH following development improves more than 50% of its existing value or Winter Percentage Sunlight Hours (WPSH) is more than 5% and the WPSH following development improves more than 50% its existing value.

Overshadowing Assessment

10.3.38 The following terms have been used to define the significance of the effects identified for the Overshadowing Assessment for Amenity Space Surrounding the Site:

- **Major negative effect**: where the Comprehensive Development could be expected to have a very significant negative effect. This is the case when less than 50% of the amenity space receives 2 hours of sunlight or when the sunlight following development is less than 50% its existing value;
- **Moderate negative effect:** where the Comprehensive Development could be expected to have a noticeable negative effect. This is the case when less than 50% of the amenity space receives 2 hours of sunlight or when the predicted hours of sunlight following development is between 50% and 65% its existing value;
- **Minor negative effect:** where the Comprehensive Development could be expected to result in a small, barely noticeable negative effect. This is the case when less than 50% of the amenity space receives 2 hours of sunlight or when the predicted hours of sunlight following development is between 65% and 80% its existing value;
- **Negligible:** where no discernible effect is expected as a result of the Comprehensive Development. This is the case when at least 50% of the amenity space receives 2 hours of sunlight on 21st March or the predicted hours of sunlight following development are at least the 80% of its existing value or the improvement with the developments in place is up to 20% its existing value.
- **Minor positive effect:** where the Comprehensive Development could be expected to result in a small, barely noticeable positive effect. This is the case when more than 50% of the amenity space receives 2 hours of sunlight or when the predicted hours of sunlight following development improves between 20% and 35% its existing value;

- **Moderate negative effect:** where the Comprehensive Development could be expected to have a noticeable positive effect. This is the case when more than 50% of the amenity space receives 2 hours of sunlight or when the predicted hours of sunlight following development improves between 35% and 50% its existing value; and
- **Major positive effect**: where the Comprehensive Development could be expected to have a very significant positive effect. This is the case when more than 50% of the amenity space receives 2 hours of sunlight or when the predicted hours of sunlight following development improves more than 50% its existing value.

Limitations and Assumptions

10.3.39 1.3.11 A survey has been undertaken for the external part of the existing buildings facing 90 degrees of due south. No internal survey has been undertaken for the residential properties surrounding the Site. For this reason, the daylight and sunlight assessments have been carried out on the assumption that the windows affected will be those of the most sensitive habitable use. Therefore, the results consider a robust worst case scenario.

10.3.40 The impact assessment of the daylight and sunlight levels within the FDS Development could not be undertaken because there are no baseline conditions with which to make a comparison. However, a daylight and sunlight study has been carried out for the typical living areas across the FDS Development. Refer to **Appendix 10.1** for the results.

10.4 Baseline Conditions

Daylight and Sunlight

10.4.1 The Daylight and Sunlight assessment has been carried out for the relevant windows of the residential properties located immediately adjacent to the Site. These properties could be impacted by the new buildings. The daylight and sunlight levels of the surrounding properties in Bradenham Close, Westmoreland Road and Portland Street are currently below the threshold values recommended by the BRE guidance. Similar results are for the buildings located in Dawes Street, East Street, Alvey Street, Baghot Street, Thurlow Street and Southern Street. The external spaces in Westmoreland Road do not achieve enough sunlight as the BRE guide recommends: two hours of sun on 21 March in at least 50% of the area. Similar results are for the private spaces located close to Villa Road.

Site Wide Development Option

10.4.2 **Table 10.1** lists the buildings that have been assessed for the Comprehensive Development option:

Table 10.1: Buildings that have been assessed for the Comprehensive Development

Assessed Buildings	
1 - WESTMORELAND ROAD - Building 1	23 - DAWES STREET - Building 2
2 - WESTMORELAND ROAD - Building 2	24 - DAWES STREET - Building 3
3 - WESTMORELAND ROAD - Building 3	25 - DAWES STREET - Building 4
4 - WESTMORELAND ROAD - Building 4	26 - DAWES STREET - Building 5
5 - WESTMORELAND ROAD - Building 5	27 - DAWEST STREET - Building 6
6 - WESTMORELAND ROAD - Building 6	28 - EAST STREET
7 - WESTMORELAND ROAD - Building 7	29 - ALVEY STREET - Building 1

Assessed Buildings	
8 - WESTMORELAND ROAD - Building 8	30 - ALVEY STREET - Building 2
9 - WESTMORELAND ROAD - Building 9	31 - KINGLAKE STREET
10 - BRADENHAM CLOSE - Building 10	32 - BAGHSOT STREET - Building 1
11 - BRADENHAM CLOSE - Building 11	33 - BAGSHOT STREET - Building 2
12 - BRADENHAM CLOSE - Building 3	34 - BAGSHOT STREET - Building 3
13 - BRADENHAM CLOSE - Building 4	35 - BAGSHOT STREET - Building 4
14 - BRADENHAM CLOSE - Building 5	36 - THURLOW STREET - Building 1
16 - PORTLAND STREET - Building 1	37 - THURLOW STREET - Building 2
17 - PORTLAND STREET - Building 2	38 - SOUTHERN STREET - Building 1
18 - ROLAND WAY - Building 1	39 - SOUTHERN STREET - Building 2
19 - ROLAND WAY - Building 2	40 - SOUTHERN STREET - Building 3
20 - VILLA STREET	41 - EAST STREET/FLINT STREET
21 - INVILLE ROAD	42 - KINGLAKE STREET/BACHSHOT STREET
22 - DAWES STREET - Building 1	43 - ALBANY ROAD

10.4.3 In accordance with the BRE Guide, only windows facing within 90 degrees of due south need to be assessed for the sunlight assessment, therefore not all the buildings listed above have been considered in the sunlight study.

FDS Development Option

10.4.4 **Table 10.2** lists the buildings that have been assessed for the First Development Site Option :

Table 10.2:

Assessed Buildings
1 - WESTMORELAND ROAD - Building 1
2 - WESTMORELAND ROAD - Building 2
3 - WESTMORELAND ROAD - Building 3
4 - WESTMORELAND ROAD - Building 4
5 - WESTMORELAND ROAD - Building 5
6 - WESTMORELAND ROAD - Building 6
7 - WESTMORELAND ROAD - Building 7
8 - WESTMORELAND ROAD - Building 8
9 - WESTMORELAND ROAD - Building 9
10 - BRADENHAM CLOSE - Building 1
11 - BRADENHAM CLOSE - Building 2
12 - BRADENHAM CLOSE - Building 3
13 - BRADENHAM CLOSE - Building 4
14 - BRADENHAM CLOSE - Building 5

Assessed Buildings
15 - PORTLAND STREET - Building 15 A
15 - PORTLAND STREET - Building 15 B
15 - PORTLAND STREET - Building 15 C

10.4.5 In accordance with the BRE Guide, only windows facing within 90 degrees of due south need to be assessed for the sunlight assessment, therefore not all the buildings listed above have been considered in the sunlight study.

10.4.6 The properties assessed are shown in the **Appendix 10.1.**

Overshadowing

Site Wide Development Option

10.4.7 There are 65 amenity areas surrounding the site are 65. The baseline conditions in relation to the current sun hours received at these spaces and the hourly overshadowing of these existing amenity spaces on 21st March with the development in place are shown in **Appendix 10.1.** The results show that 60 out of 65 spaces pass the test of the overshadowing analysis. The remaining 5 spaces fail the analysis. They are private spaces located in the northern part of tall buildings.

FDS Development Option

10.4.8 There are 25 amenity areas surrounding the site are 25. The baseline conditions in relation to the current sun hours received at these spaces and the hourly overshadowing of these existing amenity spaces on 21 March are shown in **Appendix 10.1.** The results show that all the spaces achieve at least two hours of sun in at least 50% of the area on 21 March. There is only one space (space n. 16) which does not achieve the target. The main reason for this failure is the location: it is located in the northern part of tall adjacent buildings.

10.4.9 A sunlight assessment has been carried out for all the shared amenity spaces and private gardens within the FDS. The courtyards of Block 1, 4, 5 and 6 as well the private gardens of Blocks 2 and 3 were assessed, a total of 53 spaces. Results show that on the 21st of March 50% of the courtyards and 6% of the gardens comply with the BRE overshadowing criterion. The main reason for failure is sunlight being obstructed by towers located on the south side of each block and narrow courtyards as well as gardens being open to the northern half of the sky. The analysis has been carried out also during summertime (21 June) when these spaces will be mostly in use. Results show that 100% of the courtyards and 96% of the gardens comply with the BRE standards.

Future Baseline

10.4.1 In the absence of the Comprehensive Development it is likely that similar applications would come forward on the Comprehensive Development to provide a similar quantum and mix in line with the aspirations of the AAAP. In the event of no development taking place at the Comprehensive Development the anticipated future baseline will remain as outlined above.

10.5 Assessments of Effects, Mitigation and Residual Effects

Demolition and Construction

10.5.1 The daylight, sunlight and overshadowing assessment does not consider the effects during the demolition and construction stages. This is because the likely availability of daylight, sunlight and the occurrence of overshadowing after demolition will be less than that of the completed development.

10.5.2 Further analyses have been undertaken which assess the impact on the existing buildings during the four construction phases. Phase 2A and 2B will have a negligible impact due to the heights and the distance between the new buildings and the current ones. Most of the windows will pass the 25 degrees test meaning that good levels of daylight and sunlight will be guaranteed. Similarly, construction phase 3 will not impact negatively on the buildings of phase 3A because the new buildings will be lower and smaller in extent than the existing ones.

Operation

Site Wide Development Option

Daylight Analysis

10.5.3 Because of the importance of the impact of the Comprehensive Development in terms of daylight, the comparison of the existing situation with the new one has been analysed even though the VSC on the existing buildings with the Comprehensive Development in place is at least 27% (test 2).

10.5.4 The results indicate that most of the windows surrounding the Site will continue to receive adequate daylight as defined by the BRE guidance. Only two windows located in building 18 in Roland Way (as shown in **Figure 10.1** below) are affected due to the presence of a new proposed block on the southern part of the existing building.

Figure 10.1 - Surrounding buildings included in the DSO analysis

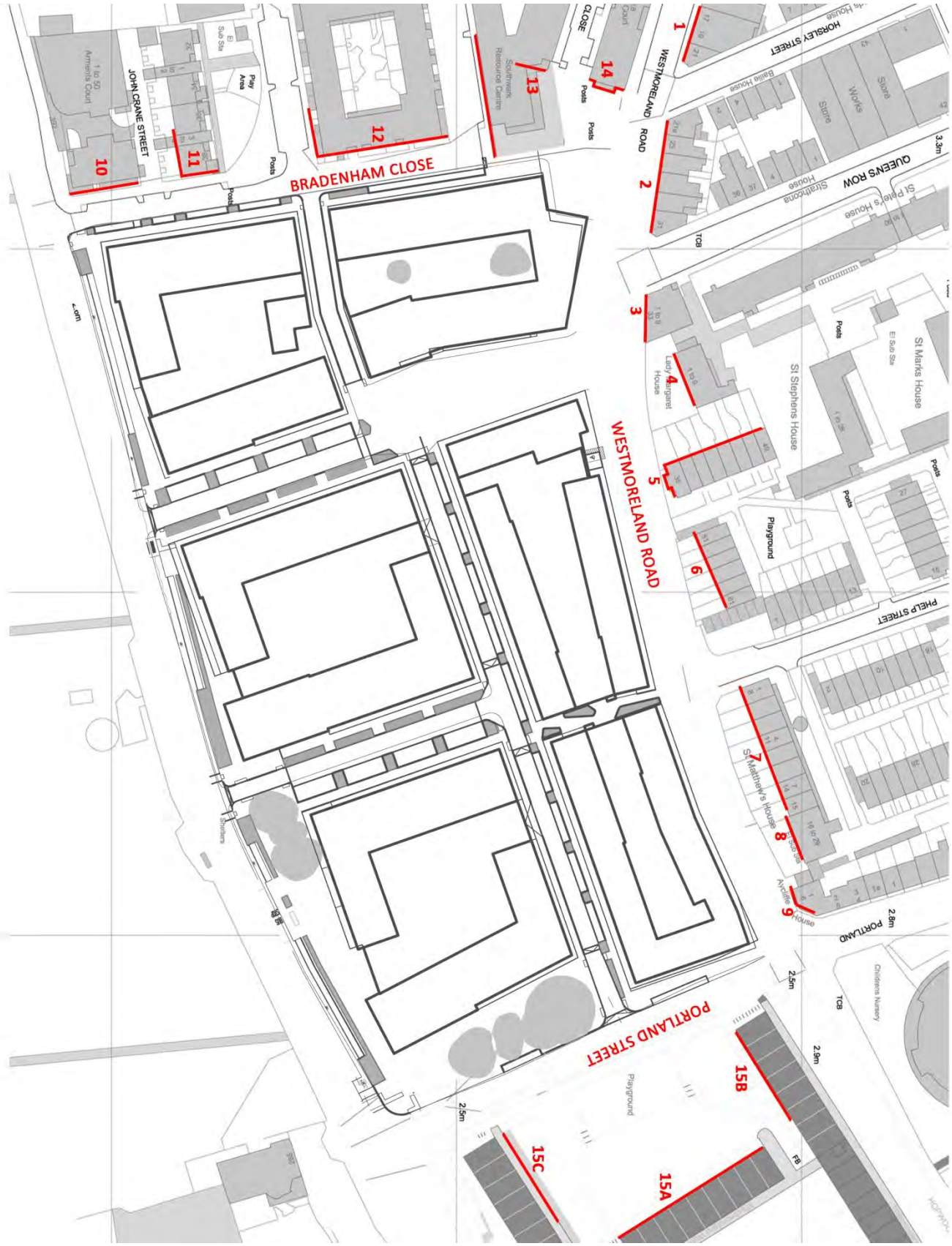
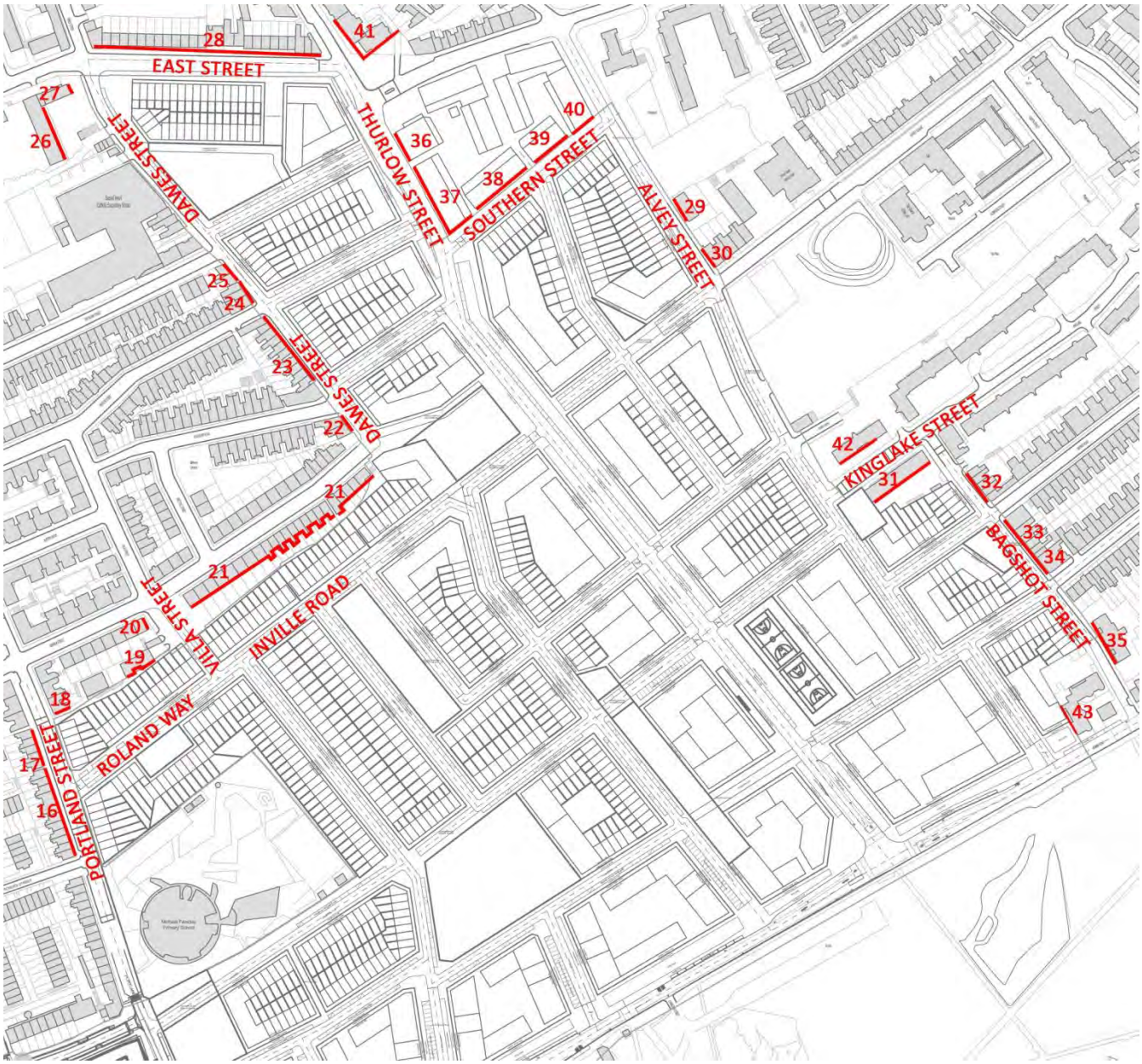


Figure10.2 - Surrounding buildings included in the DSO analysis



10.5.5 **Table 10.3** below summarises the daylight impact assessment of the development on the surrounding buildings.

Table 10.3: Daylight Impact Assessment of the Development on the Surrounding Buildings

Daylight		
Type of Effect	Significance of Effect	Number of External Areas
Negative	Major	0
Negative	Moderate	0
Negative	Minor	2
Negative		963
Positive	Minor	58
Positive	Moderate	37
Positive	Major	35

10.5.6 The table shows that the development will have a **negative** impact of **minor** effect on two windows. They are located in building 1 of Roland way. After the development they will have a loss of daylight reducing the current value of VSC by 20% or less.

10.5.7 The table shows that the development will have a **negligible** impact on most of the existing windows. It means that for those windows the amount of daylight after the development will be very similar to the current one.

10.5.8 The development will have a **positive** impact of **minor** effect on 58 windows. These windows will receive an improvement between 20% and 35% from the current VSC value. They are located in Westmoreland Road (buildings 2, 3, 4, 5,6,8), Bradenham Close (buildings 10, 12 and 13), Dawes Street (buildings 2, 3, 4), East Street and Alvey Street (building 1).

10.5.9 The development will have a **positive** impact of **moderate** effect on 37 windows. Their daylight improvement will be of a VSC value between 35% and 50% higher than the existing one. These windows are located in Westmoreland Road (buildings 3 and 8), in Bradenham Close (buildings 1,2,3 and 4), in East Street, Alvey Street (building 1) and in Thurlow Street (buildings 1 and 2).

10.5.10 The development will have a **positive** impact of **major** effect on 35 windows. The VSC will improve the current situation more than 50% . The windows that will receive this improvement are located in Westmoreland Road (building 9), Bradenham Close (buildings 2,3 and 5) and in Thurlow Street (building 2).

Mitigation

10.5.11 Only two windows located in building 2 in Roland Way are affected due to the presence of a new proposed block on the southern part of the existing building. The current situation does not present any building in that site, therefore the comparison between the current disposition and the new one shows a VSC loss of 28.32% for one window and a VSC loss of 28.57% for the other one. To improve the situation it is possible to increase the distance between the two buildings and to reduce the height of the new block.

Residual Effects

10.5.12 The urban design team has taken into consideration this negative impact deciding to lower the building height positioning a two storey building instead of a three storey one. Therefore the development will have a negligible impact on two windows as they pass the 25 degrees test.

Sunlight Analysis

10.5.13 In accordance with the BRE Guide, only windows facing within 90 degrees of due south need to be assessed. The results show that most of the windows will achieve a good amount of sunlight after the development. Half of them pass the 25 degree test, the remaining 368 fail the test, therefore the analysis of the Percentage of Sunlight Hours is required for both the annual and the winter cases.

10.5.14 363 windows pass the Percentage Sunlight Hours Test: they will receive adequate sunlight hours during the full year (25% of sunlight hours) and during the winter period (5 % of sunlight hours).

10.5.15 Five windows fail the second test, therefore the comparison with the existing situation is needed to understand the amount of losses (negative impact) or possible gains (positive impact) achieved after the development. The comparison test shows that all the windows will not have losses in sunlight and in most of the cases there will be an improvement of the current situation. **Table 10.4** below summarises the sunlight impact assessment of the Comprehensive Development on the surrounding buildings.

Table 10.4: Sunlight Impact Assessment of the Comprehensive Development on the Surrounding Buildings

Sunlight		
Type of Effect	Significance of Effect	Number of External Areas
Negative	Major	0
Negative	Moderate	0
Negative	Minor	0
Negligible		702
Positive	Minor	6
Positive	Moderate	4
Positive	Major	2

10.5.16 The table shows that most of the existing windows will have a **negligible** impact. It means that those windows will pass the threshold values set out by the BRE Guidance. When the windows do not achieve these criteria the comparison with the existing situation has been undertaken and the percentage of difference between the two situations has been calculated. If the amount of sun with the development in place will be greater than the current disposition, it means that there will be a positive impact; otherwise a negative impact has been assessed. If the difference between the two situations is the same or if there will be a loss or a gain of sunlight up to 20% the impact will be negligible.

10.5.17 Six windows will have a **positive** impact of **minor** effect. These windows are located in building 2 of Thurlow Street, building 4 of Bradenham Close and in the building at the corner of Kinglake Street and Bagshot Street.

10.5.18 Four windows will have a **positive** impact of **moderate** effect. These are located in building 3 of Westmoreland Road and in the building at the corner of Kinglake Street and Bagshot Street.

10.5.19 Two windows will have a **positive** impact of **major** effect. Both these windows are located in building 3 of Westmoreland Road. One of them will have an APSH improvement of 49% and a WPSH improvement of 76.6%. The other will have an APSH improvement of 43.9% and a WPSH improvement of 63.4%.

Mitigation

10.5.20 No mitigation measures are needed for this kind of assessment because they are all positive or negligible effects.

Residual Effects

10.5.21 The residual effect is therefore considered to be as the results described above. It should also be noted that the assessment of sunlight availability is based upon windows of the lowest habitable residential levels. With increased height within the building, sunlight availability is likely to improve.

Overshadowing Analysis

10.5.22 The sunlight impact assessment of the surrounding external amenity spaces shows that most of the amenity spaces achieve good levels of sunlight after the development. There will be a negative impact in amenity space 65 only. Therefore, it should be noted that two hours of sun are achieved for more than 50% of the area on 21 March according to the BRE criterion even in this area. Comparing the results obtained simulating the Comprehensive Development with the current situation there is a loss of sunlight for 25.77% of the area. The significance of the **negative** impact is of **minor** effect and it is due to the presence of a closer building in the south-west part of the private space.

10.5.23 The development will have a **positive** impact of **minor** effect on eight amenity spaces (Points 21, 23, 30, 32, 40, 54, 55 and 56). In these areas there is an improvement in sunlight between 20% and 35% of the area compared with their former value.

10.5.24 The development will have a **positive** impact of **moderate** effect on seven external spaces (Points 4, 5, 19, 20, 31, 34 and 42). It means that the area which receives at least 2 hours of sun on 21 March is between 35% and 50% greater than the former value.

10.5.25 There also are 15 points where the **positive** impact is of **major** effect. In these spaces the sunlight result improves for more than 50% the former value. **Table 10.5** below presents a summary of the impact of the Comprehensive Development on the surrounding amenity spaces.

Table 10.5: Impact of the Comprehensive Development on the Surrounding Amenity Spaces

Overshadowing		
Type of Effect	Significance of Effect	Number of External Areas
Negative	Major	0
Negative	Moderate	0
Negative	Minor	1
Negligible		34
Positive	Minor	8
Positive	Moderate	7
Positive	Major	15

Mitigation

10.5.26 No substantial mitigation measures are available as the results of the overshadowing analysis are directly related to the scale and massing of the Comprehensive Development. To improve the negative impact of amenity space 65 the distance of the new building from this space should be higher or the height lower.

Residual Effects

The simulations have been carried out considering the frozen model submitted on 14 August 2014. From this date the design team has been informed of the results. The updated proposal includes a lower building facing space 65, increasing the amount of sunlight. Therefore the residual effect will be **negligible**. All the remaining spaces will have the results described above.

FDS Development Option

Daylight Analysis

10.5.27 Because of the importance of the impact of the FDS Application site in terms of daylight, the comparison of the existing situation with the new one has been analysed even though the VSC on the existing buildings with the FDS Application site in place is at least 27% (test 2). The assessment of this option assumed that the current buildings on the Masterplan Application site will remain.

10.5.28 The results indicate that all the buildings surrounding the site will continue to receive adequate daylight as defined by the BRE guidance.

10.5.29 **Table 10.6** below summarises the daylight impact assessment of the FDS Application site on the surrounding buildings.

Table 10.6: Daylight Impact Assessment of the FDS Development on the Surrounding Buildings

Daylight		
Type of Effect	Significance of Effect	Number of External Areas
Negative	Major	0
Negative	Moderate	0
Negative	Minor	0
Negligible		429
Positive	Minor	40
Positive	Moderate	14
Positive	Major	30

10.5.30 The table shows that the development will have a **negligible** impact on most of the existing buildings. It means that for those windows the amount of daylight after the development will be very similar to the current one.

10.5.31 The development will have a **positive** impact of **minor** effect on 40 windows. They will receive an improvement between 20% and 35% from the current VSC value. These windows are located in Westmoreland Road (buildings 2,3,4,5 and 8), in Bradenham Close (buildings 1, 3 and 4) and at the corner of East Street and Flint Street.

10.5.32 The development will have a **positive** impact of **moderate** effect on 14 windows. The daylight improvement will be of a VSC value between 35% and 50% higher than the current one. These windows are located in Westmoreland Road (buildings 3 and 8), and in Bradenham Close (buildings 1,2,3 and 4)

10.5.33 The development will have a **positive** impact of **major** effect on 30 windows. The VSC will improve the current situation more than 50%. The windows that will receive these results are located in Westmoreland Road (building 9) and Bradenham Close (buildings 2, 3 and 5).

10.5.34 The proposed scheme has been carefully designed to provide future occupants with adequate daylight levels, with consideration not to impact negatively on the natural daylight received by the neighbouring buildings. **Table 10.7** below summarises the analysis results:

Table 10.7: Analysis Results

		Daylight (within the development)					
		Average Daylight Factor			View of the Sky		
Aylesbury Regeneration	No. of units tested	No. of rooms tested	No. of rooms that pass	% of rooms that pass	No. of rooms tested	No. of rooms that pass	% of rooms that pass
Block 1	49	124	81	65	124	104	84
Block 3	9	42	28	67	42	27	64
Block 4	35	109	86	79	109	106	97
Block 5	60	176	110	63	176	121	69
Block 6	29	108	85	79	108	82	76
Total	182	559	390	70%	559	440	79%

10.5.35 Typical units that vary in orientation, layout and windows' size and are considered as a representative sample of each block were modelled and assessed against BRE standards. A selection of kitchens, living rooms and bedrooms, totalling 559 rooms across Phase 1b/1c were assessed in terms of average daylight factor and sky view. 70% of these units achieve adequate daylight levels and 79% have a view of the sky.

Mitigation

10.5.36 No mitigation measures are needed for the impact assessment on the surrounding properties. This includes the current buildings on the Masterplan Application site.

10.5.37 The design of the units has changed substantially since the Best and Final Offer (BAFO) stage, with daylight modelling being undertaken of typical unit types during the design process. This focussed particularly on the houses in Blocks 2 and 3 and on the maisonette types around the podia, as these were likely to have the most problematic daylight/sunlight and overshadowing impacts. The early designs have been much improved during the progress to planning submission.

10.5.38 The design team tried to maximise the size and the position of the openings. For the maisonette type the recessed walls have been reduced as much as possible to decrease the overshadowing in the kitchens and livings rooms located at ground level. In the houses the daylight results have been greatly improved with the addition of rooflights above the living rooms, achieving up to 2% of ADF. The shape and the size of the bedrooms have been optimized to achieve the maximum results in terms of daylight and sunlight.

10.5.39 In some cases where we tested moving balconies from in front of living rooms to be in front of bedrooms we found that the results improved the living rooms to a small degree but worsened the results for the bedrooms, so we have not implemented these changes.

Residual Effects

10.5.40 For the surrounding properties the residual effects will be equal to the results described above.

10.5.41 Regarding the analysis undertaken within the site daylight modelling carried out during the design process has allowed for improvements to be made and integrated at an early stage in order to improve the performance of the units as much as possible. Some of the units fail to meet the ADF criterion, mainly because of obstruction caused by recessed walls and balconies; however, they take advantage of the extra outdoor amenity space that balconies create and the privacy offered by setting walls back from the main facade, convenient especially for units located on the lower floors. As design is being finalised, changes to improve the units' performance will be made where possible.

Sunlight Analysis

10.5.42 In accordance with the BRE Guide, only windows facing within 90 degrees of due south need to be assessed. The results show that most of the windows will achieve a good amount of sunlight after the development.

10.5.43 39 out of 262 pass the 25 degree test, the remaining 223 fail the test, therefore the analysis of the Percentage of Sunlight Hours is required for both the annual and the winter cases.

10.5.44 220 windows pass the Percentage Sunlight Hours Test: they will receive adequate sunlight hours during the full year (25% of sunlight hours) and during the winter period (5 % of sunlight hours).

10.5.45 Three windows fail the second test, therefore the comparison with the existing situation is needed to understand the amount of losses (negative impact) or possible gains (positive impact) achieved after the development. The comparison test shows that all the windows will not have losses in sunlight and in most of the cases there will be an improvement of the current situation. **Table 10.8** below summarises the impact of the Comprehensive Development on the surrounding buildings in terms of sunlight.

Table 10.8: Summary of the *i*mpact of the FDS Application Site on the Surrounding Buildings in Terms of Sunlight

Sunlight		
Type of Effect	Significance of Effect	Number of External Areas
Negative	Major	0
Negative	Moderate	0
Negative	Minor	0
Negligible		326
Positive	Minor	2
Positive	Moderate	1
Positive	Major	2

10.5.46 There will be a **negligible** impact on most of the windows.

10.5.47 The development will have a positive impact of minor effect on 2 windows. These are located in Bradenham Close (building 4).

10.5.48 The development will have a **positive** impact of **moderate** effect on one window. This is located in building 3 of Westmoreland Road. The APSH improvement will be of 31.9% and the WPSH will be of 45.4%

10.5.49 There will be a **positive** impact of **major** effect on two windows. Both these windows are located in the building 3 of Westmoreland Road. One of them will have an APSH improvement of 49% and a WPSH improvement of 76.6%. The other will have an APSH improvement of 43.9% and a WPSH improvement of 63.4%.

10.5.50 A sunlight assessment has been undertaken within the FDS Application site. The main requirement for sunlight in houses is in living rooms, where it is valued at any time day but especially in the afternoon. Where possible these should have at least one window that faces 90^{o} of due south. As sunlight provision depends highly on the units' orientation, for a development of this size, BRE recognize that not all living areas will achieve compliance due to orientation constrains. Therefore, BRE guidance applies mainly to South facing living rooms as rooms that face significantly north of due east or west are unlikely to meet the BRE standards. A total of 73 living rooms that have at least a window facing due south were assessed. **Table 10.9** summarises the performance of the assessed units.

Table 10.9: Performance of the Assessed Units

		Sunlight (within the development)		
		Annual Percentage Sunlight Hours		
Aylesbury Regeneration	No. of units tested	No. of living rooms with window facing within 90° of due south	No. of living rooms that pass	% of rooms that pass
Block 1	49	16	15	94
Block 3	9	3	1	33
Block 4	35	12	10	83
Block 5	60	30	20	67
Block 6	29	12	12	100
Total	182	73	58	79%

10.5.51 Overall, 58 out of 73 living rooms, having at least a window facing towards South, pass the APSH criterion.

Mitigation

10.5.52 No mitigation measures are needed for the impact assessment on the surrounding properties. This includes the current buildings on the Masterplan Application site.

10.5.53 BRE guidance applies mainly to South facing living rooms as rooms that face significantly north of due east or west are unlikely to meet the BRE standards. Therefore, it is important that these spaces are left unobstructed to receive direct sunlight throughout the year. Maximizing the size of the openings facing south is also beneficial as this will allow more sunlight to enter these areas. However the optimum size of the windows should avoid excessive heat losses and solar gains during winter and summer respectively.

Blocks 4, 5 and 6 overlooking the Burgess Park, achieve high levels of sunlight as these have no obstructions on the south. Units of Blocks 1, 2 and 3, located at the rear of the FDS Application site, are unavoidably obstructed by the blocks located on the south side of the scheme. To minimise obstruction, these blocks' towers have been placed on the south side to avoid overshadowing. In addition, Blocks 2 & 3 maisonettes have been carefully designed to avoid obstruction from shading features such as balconies in order to achieve adequate sunlight levels. Some units may fail to meet the BRE standards; however most of them receive adequate sunlight, during winter, when this is mostly valued.

Residual Effects

10.5.54 For the surrounding properties the residual effects will be equal to the results described above

10.5.55 Sunlight modelling carried out during the design process has allowed highlighting those areas where sunlight is hard to reach. To ensure that most of the units will receive adequate sunlight, it is important to avoid obstruction from shading features and neighbouring buildings. Where this is not possible at least design should allow for adequate sunlight levels during winter when this is mostly required. Changes to maximise the number of units within the scheme that have access to sunlight throughout the year will be considered as the design evolves.

Overshadowing

10.5.56 The sunlight impact assessment of the surrounding external amenity spaces shows that all the amenity spaces achieve good levels of sunlight after the development.

10.5.57 There will be a **negligible** impact on five areas (Points 1, 2, 22, 24 and 25).

10.5.58 There will be a **positive** impact of **minor** effect on spaces 21 and 23.

10.5.59 The development will have a **positive** impact of **moderate** effect on spaces 4, 5, 19 and 20.

10.5.60 The other amenity spaces achieve a good improvement in terms of sunlight with a **positive** impact of **major** effect. In these spaces the area that receives at least two hours of sun on 21 March is 50% greater than their former value. **Table 10.10** below presents a summary of the impact of the FDS Application site on the surrounding amenity spaces.

Table 10.10: The Impact of the FDS Application Site on the Surrounding Amenity Spaces

Overshadowing		
Type of Effect	Significance of Effect	Number of External Areas
Negative	Major	0
Negative	Moderate	0
Negative	Minor	0
Negligible		5
Positive	Minor	2
Positive	Moderate	4
Positive	Major	14

10.5.61 Open spaces within sites 1b and 1c, i.e. all courtyards and private gardens, were assessed against relevant BRE sunlight criteria. Results, presented in **Table 10.11**, show that half of the courtyards and only three of the private gardens receive adequate sunlight on the 21st of March. The two courtyards that fail to comply with BRE standards are overshadowed by the tall towers of the blocks located on the South. Private gardens that are open to the northern half of the sky or are overshadowed by the higher density blocks located on the South fail also to comply with the relevant criteria. Most of the outdoor amenity spaces, however, receive good sunlight levels during summertime, when these spaces are more often in use by occupants.

Table 10.11: Open Spaces

	Aylesbury Regeneration Phase 1B/1C - Summary	No. of spaces tested	No. of spaces that pass	% of spaces that pass
Overshadowing (Open spaces & gardens within the development)	Sunlight provision on 21 March	Courtyards	4	2
		Gardens	49	3
	Sunlight provision on 21 June	Courtyards	4	4
		Gardens	49	47

Mitigation

10.5.62 No mitigation measures are needed for the impact assessment on the surrounding properties including the current buildings in the Masterplan Application site.

10.5.63 No mitigation measures are available within the FDS Application site for the availability of the direct sunlight provision on open spaces as the results of the overshadowing analysis are directly related to the scale and massing of the development.

Residual Effects

10.5.64 For the surrounding properties the residual effects will be equal to the results described above.

10.5.65 Given the density and scale of the scheme the massing of the blocks within site 1b and 1c has been optimised to allow open spaces and private gardens within the FDS Application site receive direct sunlight throughout the year.

10.6 Summary

Site Wide Development Option

10.6.1 A daylight, sunlight and overshadowing assessment has been undertaken by HTA Design LLP, gauging the likely impact of the Comprehensive Development on the surrounding buildings.

10.6.2 Due to the nature of the Comprehensive Development, where the size and the position of the openings are not known, the analysis within this area has been not undertaken.

During the demolition and construction phases, there are not expected to be significant impacts. When the development is completed, the results show that only two windows will be affected on the daylight with a negative impact of minor effect. However the simulated model considers the design submitted the 1 August 2014. The architects have been instructed of these results and mitigation measures have been undertaken so that there will be a negligible impact on those two windows. There will be negligible impact on most of the remaining windows. There will be a positive impact of minor effect on 58 windows and a positive impact of moderate effect on 37 windows. Finally there will be a positive impact of major effect on 35 windows.

10.6.3 The sunlight analyses show that no negative impacts will be there after the development. There will be a negligible impact on most of the windows, a positive impact of minor effect on six windows, a positive impact of moderate effect on four windows and a positive impact of major effect on the two remaining windows.

10.6.4 The overshadowing analyses show that the impact of the proposal on the surrounding external amenity spaces will have a negative impact of minor effect on only one space. This space is a private garden located in the south-west part of the development. However after the time of these analyses the urban design team has been instructed to improve the proposal, therefore a negligible effect will be present in that area. There will be a negligible impact on most of the remaining spaces. There will be a positive impact of minor effect on eight amenity spaces, and a positive impact of moderate effect on seven spaces. There will be a positive impact of major effect on 15 amenity spaces.

FDS Development Option

10.6.5 A daylight, sunlight and overshadowing assessment has been undertaken by HTA Design LLP, gauging the likely impact of the development on the surrounding buildings.

10.6.6 During the demolition and construction phases, there are not expected to be significant impacts. When the development will be constructed, the results show that no negative impacts will be present in terms of daylight and sunlight in the surrounding properties and amenity spaces.

10.6.7 Daylight and sunlight provision within the FDS Development has been also assessed. An assessment has been carried out for the kitchens, living rooms and bedrooms of typical units across the scheme. The analysis follows the methodology outlined in the BRE guide. 70% and 79% of the rooms assessed comply with the BRE daylight and sunlight standards respectively. Overshadowing due to balconies of the upper floors and

the neighbouring blocks as well as walls being set back from the main facade are among the main reasons of failure to meet the standards. However, those units, especially the ones overlooking a public pathway, enjoy privacy and extra outdoor amenities.

10.6.8 According to the BRE guide, the main requirement for sunlight in houses is in living rooms, where it is valued at any time day but especially in the afternoon. Where possible these should have at least one window that faces 90^{o} of due south. As sunlight provision depends highly on the units' orientation, for a development of this size, BRE recognize that not all living areas will achieve compliance due to orientation constrains. Therefore, BRE guidance applies mainly to South facing living rooms as rooms that face significantly north of due east or west are unlikely to meet the BRE standards. A total of 73 living rooms that have at least a window facing due south were assessed and 79% pass the BRE sunlight criterion. Most of the rooms that fail to comply, mainly because sunlight is being obstructed by balconies or other shading features, will still receive adequate sunlight levels during winter, when sunlight is mostly valued.

Table 10.12: Summary of Daylight, Sunlight and Overshadowing Effects

Site Wide Development Option

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation													
Daylight conditions in the surrounding after the development in 2 windows out of 1095	Minor	Negative	P	D	LT	No substantial mitigation available as the results of the overshadowing analysis are directly related to the scale and massing of the development.	N/A	Negligible	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Daylight conditions in the surrounding after the development in 963 windows out of 1095	N/A	Negligible	P	D	LT	No mitigation measures needed	N/A	Negligible	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Daylight conditions in the surrounding after the development in 58 windows out of 1095	Minor	Positive	P	D	LT	No mitigation measures needed	Minor	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Daylight conditions in the surrounding after the development in 37 windows out of 1095	Moderate	Positive	P	D	LT	No mitigation measures needed	Moderate	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Daylight conditions in the surrounding after the development	Major	Positive	P	D	LT	No mitigation measures needed	Major	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
in 35 windows out of 1095													
Sunlight conditions in the surrounding after the development in 702 out of 714	N/A	Negligible	P	D	LT	No mitigation measures needed	N/A	Negligible	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Sunlight conditions in the surrounding after the development in 6 out of 714	Minor	Positive	P	D	LT	No mitigation measures needed	Minor	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Sunlight conditions in the surrounding after the development in 4 out of 714	Moderate	Positive	P	D	LT	No mitigation measures needed	Moderate	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Sunlight conditions in the surrounding after the development in 2 out of 714	Major	Positive	P	D	LT	No mitigation measures needed	Major	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Overshadowing conditions in the surrounding after the development in 1 out of 65	Minor	Negative	P	D	LT	No substantial mitigation available as the results of the overshadowing analysis are directly related to the scale and massing of the development.	N/A	Negligible	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Overshadowing conditions in the surrounding after the development in 34 out of 65	N/A	Negligible	P	D	LT	No mitigation measures needed	N/A	Negligible	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Overshadowing conditions in the surrounding after	Minor	Positive	P	D	LT	No mitigation measures needed	Minor	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
the development in 8 out of 65													
Overshadowing conditions in the surrounding after the development in 7 out of 65	Moderate	Positive	P	D	LT	No mitigation measures needed	Moderate	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Overshadowing conditions in the surrounding after the development in 15 out of 65	Major	Positive	P	D	LT	No mitigation measures needed	Major	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A

Table 10.13: Summary of Daylight, Sunlight and Overshadowing Effects

FDS Development Option

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation													
Daylight conditions in the surrounding after the development in 3429 windows out of 513	N/A	Negligible	P	D	LT	No mitigation measures needed	N/A	Negligible	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Daylight conditions in the surrounding after the development in 340 windows out of 513	Minor	Positive	P	D	LT	No mitigation measures needed	Minor	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Daylight conditions in the surrounding after the development in 14 windows out of 513	Moderate	Positive	P	D	LT	No mitigation measures needed	Moderate	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Daylight conditions in the surrounding after the development in 30 windows out of 513	Major	Positive	P	D	LT	No mitigation measures needed	Major	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Sunlight conditions in the surrounding after the development in 326 out of 331	N/A	Negligible	P	D	LT	No mitigation measures needed	N/A	Negligible	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A

Sunlight conditions in the surrounding after the development in 2 out of 331	Minor	Positive	P	D	LT	No mitigation measures needed	Minor	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Sunlight conditions in the surrounding after the development in 1 out of 331	Moderate	Positive	P	D	LT	No mitigation measures needed	Moderate	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Sunlight conditions in the surrounding after the development in 2 out of 331	Major	Positive	P	D	LT	No mitigation measures needed	Major	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Overshadowing conditions in the surrounding after the development in 5 out of 25	N/A	Negligible	P	D	LT	No mitigation measures needed	N/A	Negligible	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Overshadowing conditions in the surrounding after the development in 2 out of 25	Minor	Positive	P	D	LT	No mitigation measures needed	Minor	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Overshadowing conditions in the surrounding after the development in 4 out of 25	Moderate	Positive	P	D	LT	No mitigation measures needed	Moderate	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A
Overshadowing conditions in the surrounding after the development in 14 out of 25	Major	Positive	P	D	LT	No mitigation measures needed	Major	Positive	P	D	LT	Ref. 10.1, Ref. 10.2, Ref. 10.3, Ref. 10.4, Ref. 10.5, Ref. 10.6, Ref. 10.7	N/A

10.7 References

Ref. 10.1 Department for Communities and Local Government (2012). *National Planning Policy Framework (NPPF)*

Ref. 10.2 Greater London Authority (2011). The London Plan, *Spatial Development Strategy for Greater London*

Ref. 10.3 The London Borough of Southwark (2011). *Local Development Framework, Core Strategy*

Ref. 10.4 The London Borough of Southwark (2007). *The Southwark Plan*

Ref. 10.5 The London Borough of Southwark (2007). *The Southwark Plan*Ref.10.6 BSI (2008). *British Standard (BS) 8206: Lighting for buildings, Part 2: 2008 Code of practice for daylighting*

Ref. 10.7 CIBSE (1994). Code for interior lighting

Ref. 10.8 BRE (2011). *Site Planning for Daylight and Sunlight 2011: A Guide to Good Practice, Second Edition'*

11 Transportation and Access

11.1 Introduction

11.1.1 This Chapter reports the assessment of the likely significant environmental effect of the Site Wide Development Option and the FDS Development Option in relation to transportation and access. In particular it considers the likely significant effects of additional traffic generated by the Comprehensive Development on the local road network and incorporates a summary of the Transport Assessment (Ref. 11.1).

11.1.2 The Chapter describes:

- The assessment methodology;
- The baseline conditions at the Site and surroundings;
- The likely significant environmental effects;
- The mitigation measures required to prevent, reduce or offset any significant adverse effects; and
- The likely residual effects after these measures have been employed.

11.1.3 This Chapter has been prepared by specialist consultants WSP.

11.1.4 This chapter should be read together with the introductory chapters of this ES (**Chapters 1 – 4**) as well as **Chapter 17 'Cumulative Effects'**. The Comprehensive Development for which permission is sought is set out in **Chapter 3 'The Comprehensive Development'** and the Application and Parameter Plans.

11.1.5 The underlying work associated with the assessment is detailed in the comprehensive TA (Ref. 11.1) that supports the planning applications for the Comprehensive Development. This Chapter presents an assessment of the environmental effects of the Comprehensive Development on all transport modes. The assessment reported in this Chapter is consistent with the traffic data on which the Transport Assessment is based.

11.1.6 This Chapter sets out relevant planning policy at a national, regional and local level, which has been considered in respect of the Comprehensive Development. This Chapter then provides a description of the baseline conditions and details the assessment methodology and significance criteria that have been used to assess the potential effects of the Comprehensive Development on the baseline transport infrastructure, including the road highway network, public transport facilities and pedestrian and cycle network, identifying mitigation strategies where necessary. A summary of the residual transportation and access effects is then provided. More detailed information is set out within the Transport Assessment.

11.2 Legislation, Policy and Guidance

Legislation Framework

11.2.1 There is no legislation applicable to the assessment of transport effects of development.

Planning Policy

National Policy

National Planning Policy Framework (NPPF) (2012)

11.2.2 National policy relating to transport planning of developments is set out in the National Planning Policy Framework (NPPF) (Ref. 11.2), which was published in March 2012. Paragraphs 29 to 41 of Section 4 of the NPPF relate to transport planning and promoting sustainable development.

11.2.3 Paragraph 30 of the NPPF states that:

"In preparing Local Plans, local planning authorities should therefore support a pattern of development which, where reasonable to do so, facilitates the use of sustainable modes of transport."

11.2.4 Paragraph 32 of the NPPF sets out the requirement for Transport Assessments as follows:

"All developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment. Plans and decisions should take account of whether:

- *the opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;*
- *safe and suitable access to the site can be achieved for all people; and*
- *Improvements can be undertaken within the transport network that cost effectively limits the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe."*

11.2.5 Paragraph 34 states:

"Plans and decisions should ensure developments that generate significant movement are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised."

11.2.6 Paragraph 35 of the NPPF states:

"Therefore, developments should be located and designed where practical to:

- accommodate the efficient delivery of goods and supplies;
- give priority to pedestrian and cycle movements, and have access to high quality public transport facilities;
- create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrians, avoiding street clutter and where appropriate establishing home zones;
- incorporate facilities for charging plug-in and other ultra-low emission vehicles; and
- consider the needs of people with disabilities by all modes of transport."

11.2.7 Paragraph 36 goes on to state:

"A key tool to facilitate this will be a Travel Plan. All developments which generate significant amounts of movement should be required to provide a Travel Plan."

11.2.8 Paragraph 38 states:

"For larger scale residential developments in particular, planning policies should promote a mix of uses in order to provide opportunities to undertake day-to-day activities including work on site. Where practical, particularly within large-scale developments, key facilities such as primary schools and local shops should be located within walking distance of most properties."

11.2.9 With regards to parking, paragraph 39 of the NPPF states:

"If setting local parking standards for residential and non-residential development, local planning authorities should take into account:

- *the accessibility of the development;*

- *the type, mix and use of development;*
- *the availability of and opportunities for public transport;*
- *local car ownership levels; and*
- *an overall need to reduce the use of high-emission vehicles."*

London Planning Policy

The London Plan (July 2011 with Revised Early Minor Alterations to the London Plan October 2013)

11.2.10 Policy in relation to the transport planning of developments in London is set out in the London Plan (Ref. 11.3). Section 6 deals specifically with transport planning and promoting sustainable transport. Paragraph 6.1 states that London should be:

> *'A city where it is easy, safe and convenient for everyone to access jobs, opportunities and facilities with an efficient and effective transport system which actively encourages more walking and cycling, makes better use of the Thames, and supports delivery of all the objectives of this Plan.'*

The Mayor's Transport Strategy (2010)

11.2.11 The Mayor's Transport Strategy (MTS) (Ref. 11.4) is a statutory document, developed alongside the London Plan as part of a strategic policy framework to support and shape the economic and social development of London over the next 20 years.

11.2.12 The MTS sets out the Mayor's transport vision and describes how Transport for London (TfL) and its partners, including the London boroughs, will deliver that vision. The Mayor's transport vision is that: 'London's transport system should excel among those of world cities, providing access to opportunities for all its people and enterprises, achieving the highest environmental standards and leading the world in its approach to tackling urban transport challenges of the 21st century.'

11.2.13 There are six goals which set out how this overarching vision should be implemented.

- *'Support economic development and population growth;*
- *Enhance the quality of life for all Londoners;*
- *Improve the safety and security for all Londoners;*
- *Improve transport opportunities for all Londoners;*
- *Reduce transport's contribution to climate change, and improving its resilience; and*
- *Support delivery of the London 2012 Olympic and Paralympic Games and its legacy.'*

11.2.14 These goals will be addressed by proposals including the following:

- *'Carrying out major upgrades to the Underground and potential extensions;*
- *Improving interchange between bus, underground, rail and other forms of transport;*
- *Making more use of the river for transporting people and goods;*
- *Improving the accessibility of the transport network;*
- *Bringing about a revolution in cycling in London;*
- *Promoting and encouraging new, cleaner technologies such as electric vehicles; and*
- *Creating better, more attractive streets.'*

Local Planning Policy

Aylesbury Area Action Plan (AAAP) (January 2010) (Ref. 11.5)

11.2.15 The AAAP area is made up of two parts, the Area Action Core, which is the Aylesbury Estate itself, and the wider area, including East Street, Walworth Road, Old Kent Road, and Burgess Park. In the wider AAAP area, there will be improvements to transport, schools and open space.

11.2.16 Section 4: Public life: Better and safer streets, squares and parks, sets out the approach of the AAAP to issues such as street layout. Policy PL1: Street Layout states that the following streets will comprise the main street network:

- *'Thurlow Street will be the new main local street for the new neighbourhood;*
- *Albany Road will be a calmed route and will be better integrated with the park so that it is perceived as a route through the park;*
- *A community spine will connect public transport routes and town centres with the main schools and some of the community facilities in the area action core;*
- *Three green fingers will run from Burgess Park into the AAP area, connecting with Surrey Square Park, the Missenden Play area and Faraday Gardens; and*
- *All streets will be designed as attractive public spaces. Development proposals that include streets and spaces should contain landscaping schemes as an integral part of their design. These will include planting, green space, attractive boundary design and hard surfaced spaces. High quality materials should be used consistently.'*

11.2.17 Policy in relation to the transport planning of the development is set out in section 5: Connections: Improved Transport Links of the plan.

11.2.18 The key aim of the AAP in relation to transport is to 'improve access to the Aylesbury Estate area, make the street environment more pleasant and easier to use, reduce the need to travel by car and encourage people to walk, cycle or use public transport.'

11.2.19 Policy TP1: Designing of streets states that:

- *'Development proposals should provide a well-connected network of high quality streets that provide a safe, accessible, comfortable and attractive environment for walking and cycling and should at the same time create practical and logical access routes for motor vehicles;*
- *Streets must be designed as attractive public spaces in accordance with the design guidance in Appendix 6 of the AAP. They will cater for a range of users with priority generally given to pedestrians and cyclists and should be designed to minimise the impact of speeding vehicles; and*
- *The design and layout of streets must take into account the requirements of vulnerable road users and mobility impaired people.*

11.2.20 Policy TP2: Public Transport states that: 'We will work with Transport for London (TfL) to ensure significant improvements take place to the frequency, quality and reliability of bus services operating in the action area core. A route through the development for high capacity public transport is identified on the proposals map and will be safeguarded.'

11.2.21 Policy TP3: Parking states that:

- *'The amount of car parking in development proposals should not exceed a maximum of 0.4 spaces per home averaged over the whole masterplan;*
- *'The justification for the level of parking will be based on the Transport Assessment and the Travel Plan. This must take into account: the public transport accessibility level (PTAL), consideration of transport for*

families and whether there is a negative impact on overspill car parking on the public highway and the availability of controlled parking zones; and

- *Car parking must be designed in accordance with the design guidance contained in Appendix 6 of the AAP.'*

11.2.22 As part of the AAAP, place-making objectives and sustainable development objective have been set. Those which related directly to transport are as follows:

- *P3: Connections: The Aylesbury area as a place with excellent public transport links states that key elements of the plan will be:*
  - '*To improve public transport so as to greatly widen the living, educational, recreational and employment choices of the existing and new residents;*
  - *To make the wider Aylesbury area accessible for all; and*
  - *To provide high quality pedestrian and cycle routes to encourage more people to use healthy and sustainable modes.'*
- *S16 states the need to 'promote sustainable transport and minimise the need to travel by car.'*

Sustainable Transport SPD (2010)

11.2.23 The Sustainable Transport Supplementary Planning Document (SPD) (Ref. 11.6) was adopted in March 2010' and provides further information and guidance to the Southwark Plan and the London Plan.

11.2.24 The two key objectives of this SPD in relation to transport are to provide:

- *'Guidance so all development is easily accessible and encourages people to walk, cycle and use public transport; and*
- *Guidance for new development so that it reduces congestion and pollution within Southwark.'*

11.2.25 Section 6.1 covers the requirements relating to transport in new developments, and states that:

- *'Pedestrian access to new developments should be designed to be equally accessible to all members of the community, including women, people with disabilities, older people and children;*
- *The needs of cyclists should be fully taken into account, making sure it is easy for cyclists to find their way through a development and onto existing proposed cycle networks;*

11.2.26 Section 6.1 further states that, the following should be considered as part of proposals for new development:

- *'Proposals for development should actively promote walking and cycling to, through and from the site;*
- *Any potential negative impacts of the development on pedestrian and cyclist safety and ways to avoid these impacts should be identified;*
- *Development should be designed to provide a safe environment that minimises the risk/fear of crime to pedestrians and cyclists in and around the development, particularly for women whose access can be limited by a fear of crime;*
- *Improvements to the quality of the environment for pedestrians and cyclists should be considered in the area surrounding the development, e.g. pathways, lighting etc.;*
- *Access into and through the site for pedestrians and cyclists should be improved so it is the most direct, continuous and attractive to use;*
- *Facilities should be provided to help pedestrians and cyclists cross busy road junctions close to a development;*

- *The number of places where there could be conflict between pedestrians, cyclists and other road users e.g. cars, should be minimised. The potential for shared surfaces for pedestrians and cyclists should be considered;*
- *The existing transport infrastructure should be assessed to determine current conditions, available road space, barriers that might exist for walking and cycling and possible solutions to these problems;*
- *Preferred routes for pedestrians and cyclists from the site to uses that attract people such as schools, shops, leisure uses, offices and other small and medium sized businesses in the surrounding area should be identified;*
- *Proposed walking and cycling routes should be clearly signposted;*
- *Pollution and noise in areas used mostly by pedestrians and cyclists should be minimised;*
- *Pedestrian and cycling facilities should be designed to the council's standards;*
- *The potential for funding from Section 106 and/or 278 agreements to be spent on projects that improve access for pedestrians and cyclists should be considered;*
- *Separation of cyclists and pedestrians from motor vehicles should be considered where there is enough space available or where space can be made available; and*
- *There should be few cross overs as possible into a development site and they should be designed not to have a negative impact on access routes for pedestrians and cyclists, where appropriate.'*

11.2.27 The development proposals have been considered and developed with the relevant authorities and policy decision makers to ensure consistency with the planning policy at the National, London and Southwark level. Specifically, the redevelopment of the site enables many improvements to the transportation network for both vehicular and sustainable travel modes to be made as part of the development proposals to provide an improved living environment and experience for the residents. The development proposals will bring the whole area up to current design standards in terms of provision for cyclists, pedestrians, access to the public transport network, car parking and access and movement within the local highway network.

Guidance

11.2.28 The guidance from the following documents has been referred to in the assessment:

- Guidelines for the Environmental Assessment of Road Traffic, The Institute of Environmental Assessment (now IEMA) (1993) (Ref. 11.7);
- The Design Manual for Roads and Bridges (DMRB), Volume 11 – Environmental Assessment; and Volume 12 - Traffic Appraisal of Road Schemes, Department for Transport (Ref. 11.8);
- Pedestrian Environment Review System, Review Handbook Version 2, Transport for London (2006) (Ref. 11.9).

11.3 Assessment Methodology and Significance Criteria

Relevant Elements of the Comprehensive Development

The following components of the Comprehensive Development are relevant to the consideration of traffic and transportation effects of the detailed and outline assessment:

- Planning application drawings (FDS Application site Detailed Plans and Masterplan Application site Parameter Plans);

- Design Code;
- Development Specification.

11.3.1 Access works to the Comprehensive Development form part of the applications. These are upgrades and part of the scheme and therefore inherent mitigation rather than mitigation to offset effects as indicated below in the assessment. However, works proposed to Albany Road as part of urban realm proposals are not inherent to the scheme as they are not essential to deliver the development. Consequently, measures to amend the Albany Road junctions are considered as mitigation measures. The whole length of Albany Road is to be reviewed by LBS to ensure co-ordinated approach is taken to highway improvements.

11.3.2 The Development Specification confirms the proposed development assumed for the assessment of transport effects and comprises the total development across the two application sites. The travel demand of the proposed development is set out in the Transport Assessment. The development mix is as follows:

- Up to 3,560 residential units;
- 2,500 sqm of business space / employment use (Use Class B1);
- 3,000 sqm of retail (Use Class A1, A3 or A4) or workspace (Use Class B1);
- 500 sqm of retail (Use Class A1);
- 263 sqm of community / leisure use (Use Class D1 or D2); and
- 4,750 Health / Community / Early Years (Use Class D1).

11.3.3 For the assessment of transportation and access effects for this ES, the full development has been assessed which incorporates the relevant elements of the Comprehensive Development. In total the proposals are for the demolition of 2,647 dwellings and the construction of Up to 3,560 dwellings within the same area, an increase of 993 dwellings. The transport effects of the non-residential development within the area have also been assessed. As there are existing non-residential uses on site at the moment serving predominantly the existing population, the effect of the development proposals has been assessed by assuming an uplift in existing trips. This uplift has been applied to the trips generated by the on-site retail, early years, community and healthcare facilities. The uplift assumes that with approximately 33% more residents within the same area, these services will see an equivalent 33% increase in trips. For the employment uses, there is approximately 3,000m^2 of office space on site at the moment which means that the remaining 2,500m^2 has been applied as new office space.

11.3.4 The main access points to the Comprehensive Development will use the existing surrounding street network as its basis, with a new focus on improvements in access for pedestrians and cyclists, and improved access and movement for vehicular traffic. The Comprehensive Development proposes a return to a grid of well-connected streets as set out in the AAAP.

11.3.5 Additional mitigation measures are proposed to be implemented as part of the development to encourage sustainable travel and are summarised above and described in more detail in the Transport Assessment. Any mitigation relevant to this assessment is detailed later in the relevant sections.

Scope of the Assessment

11.3.6 Discussions have been undertaken with LBS since 2013 and on-going dialogue regarding transport matters has continued throughout, including the detail of the transport modelling, trip generation, distribution and assignment; and the impacts on sustainable travel modes.

11.3.7 A formal Transport Assessment scoping exercise was undertaken between WSP, LBS and TfL during 2014, with a final version issued and agreed with all parties specifically regarding the assessment methodology and relevant transport study area to be included in the assessment in March 2014.

11.3.8 It has been agreed that the baseline against which the impact of the Comprehensive Development will be assessed will include the following committed development sites and planned developments. Those that have been considered and found not significant to include within the assessment are also included in **Table 11.1** below.

Table 11.1 Committed and planned developments included in the traffic modelling

Site Details	Status	Reason for Inclusion / Exclusion from Assessment
Elmington (site bounded by Edmund Street, Southampton Way and Notley Street)	Granted	Demolition of existing buildings and redevelopment of the site comprising new buildings ranging from 3 to 7 storeys in height to provide 279 residential units. Just south of Burgess Park. Has consent but is currently vacant. Vehicle impact included in assessment as set out in application TA.
Heygate Outline Application	Granted	Vehicle impact included in assessment as set out in application TA.
Eileen House	Granted	Demolition of existing building and erection of a 41 storey (128.7m AOD) building and separate 8 storey (35.60m AOD) building incorporating 270 private flats. TA indicates negligible car impact so not specifically included in assessment.
Leisure Centre	Granted	Destination rather than origin trip generator – at top of Walworth road - on site of existing leisure centre so no change in distribution of traffic. Not specifically included in assessment.
One The Elephant	Granted	284 studio, one, two and three-bedroom homes. Net vehicle trips from application TA of 5 AM, 12 PM. Area of assessment does not overlap, considered insignificant impact so not specifically included in assessment.
Tribeca Square	Granted	243 student rooms, 373 dwellings, retail, restaurant, cinema. 42 car parking spaces, 37 of which disabled. No traffic data in application information, assumed to have no vehicle impact on assessment area.
Trafalgar Place	Granted	140 residential units (19x 1 bed, 85x 2 beds, 32x 3 beds and 4x 4 beds) a 244sqm church hall (use class D1), and a 117sqm retail unit. 17 car parking spaces assumed to generate 17 out AM and 17 in PM. Vehicle impact included in assessment.
Former London Park Hotel	Granted	470 resi units, small theatre and café. 30 parking spaces. Car impact 3 AM, 2 PM so insignificant. Not included in assessment.
89-93 Newington Causeway	Granted	38 units – car free. No vehicle impact.

Site Details	Status	Reason for Inclusion / Exclusion from Assessment
237 Walworth Road	Pending a decision	68 units – car free. No vehicle impact.
Site 7 within the Aylesbury Estate regeneration area	Granted	147 mixed tenure residential units within two apartment blocks. Currently under construction. Vehicle impact taken from application TA and included in assessment.

11.3.9 Where available, information has been taken from the relevant Transport Assessments of the developments in **Table 11.1** above and used within the traffic and transport assessment. In some cases reasonable assumptions were required to distribute vehicle trips onto the local road network.

Extent of the Study Area

11.3.10 The geographic scope of the highway impact assessment has been established in consultation with LBS and TfL. The following key junctions have been included in the assessment (all signalised junctions unless otherwise stated):

- Albany Road / Camberwell Road;
- Albany Road / Portland Street;
- Albany Road / Wells Way;
- Albany Road / Thurlow Street;
- Albany Road / Old Kent Road (including left turn via Shorncliffe Road);
- Thurlow Street / East Street (staggered priority junction);
- Old Kent Road / East Street;
- Camberwell Road / John Ruskin Street (priority junction);
- Walworth Road / Merrow Road (priority junction); and
- Walworth Road / Heygate Street;
- Heygate Street/ Rodney Place;
- A201 New Kent Road/ Rodney Place; and
- Portland Street/ Merrow Street.

11.3.11 It is considered that beyond the cordon of junctions identified above, the net change in traffic flow will not be at a material level that will justify assessment.

Consultation

11.3.12 The scope of assessment was established through a number of meetings with LBS and TfL as set out in **Table 11.2** below.

Table 11.2 Consultation activities

Date	Activity
3 March 2014	Issue formal scoping document to LBS and TfL
24 April 2014	Scoping meeting with LBS

Date	Activity
14 May 2014	Formal pre-app meeting with TfL (LBS also present)

Method of Baseline Data Collation

Desk Study

11.3.13 The data used to establish the baseline conditions and inform the assessment has been collated from a variety of sources as part of a desk study. This data includes:

- Bus timetables and route information (TfL);
- Bus stop usage data from BODS (TfL);
- Tube timetables and route information (TfL);
- National rail timetables and route information (national rail data);
- 2001 and 2011 census statistics (Office for National Statistics (ONS);
- National Travel Survey 2012 (ONS);
- London Travel Demand Survey data for Southwark (TfL);
- The TRICS (Trip Rate Information Computer system) trip rate database;
- Department for Transport (DfT) accessibility datasets;
- Personal Injury Accident statistics (TfL);
- Traffic survey data including manual classified counts (MCC), automatic traffic counts (ATC), queues and delay (2013 and 2014);
- Parking data for on-street and off-street parking associated with the estate (2013)
- Pedestrian survey data (including pedestrian flow data) (2014)
- PERS (Pedestrian Environment Review System) audit data (2014).

11.3.14 Data from previous studies undertaken on the Site in 2013 by consultants JMP concerning traffic flows and parking data was reviewed initially, with the traffic data being supplemented with new traffic survey data from May 2014. New ATC data was also collected in May 2014.

11.3.15 In addition to the collection of traffic data in the form of classified turn counts, queues (and saturation flows at the signalised junctions) identified in 11.3.8, automatic traffic data was collected for seven days on:

- Albany Road;
- Wells Way,
- East Street;
- Thurlow Street; and
- Portland Street.

Site Visit / Other Assessment

11.3.16 Site visits were undertaken in May, June and July 2014 to help inform the transport assessment work.

Identification of Sensitive Receptors

11.3.17 The sensitive receptors have been identified through the Transport Assessment scoping with LBS and have identified the following locations for the assessment:

- Albany Road / Camberwell Road;
- Albany Road / Portland Street;
- Albany Road / Wells Way;
- Albany Road / Thurlow Street;
- Albany Road / Old Kent Road (including left turn via Shorncliffe Road);
- Thurlow Street / East Street (staggered priority junction);
- Old Kent Road / East Street;
- Camberwell Road / John Ruskin Street (priority junction);
- Walworth Road / Merrow Road (priority junction); and
- Walworth Road / Heygate Street
- Heygate Street/ Rodney Place;
- A201 New Kent Road/ Rodney Place; and
- Portland Street/ Merrow Street.

11.3.18 These represent the primary junctions and links around and within the Site used to demonstrate the impacts of the redevelopment on the traffic as well as being able to assess the effects on vulnerable road users including pedestrians and cyclists.

Assessment Modelling

11.3.19 The identified junctions have been assessed both without and with the associated development trips using industry standard modelling techniques and software. Namely the following modelling software has been used: LINSIG for signal junction and PICADY for priority junctions. The traffic impact of the Comprehensive Development has been assessed using the relevant software package appropriate for the junction under consideration. The peak hours have been established from the Automatic Traffic Count (ATC) data and modelled as follows:

- Weekday AM peak hour 08.00-09.00; and
- Weekday PM peak hour 17.00-18.00.

11.3.20 Junction assessment models have been prepared for a Do-Nothing, Do-Minimum and Do-Something scenario as follows:

- Do-Nothing – this scenario assesses the performance of the baseline road network including the committed development schemes identified in Table 11.1;
- Do-Minimum – this scenario assesses the performance of the proposed road network including the committed development as identified in Table 11.1 and the Comprehensive Development;
- Do-Something – this scenario assesses the performance of the proposed road network including the committed development; the Comprehensive Development and the mitigation measures.

11.3.21 The baseline position in this Chapter is therefore set as the existing highway network and also includes the committed developments in the area that have been considered to have a potential impact on traffic flows in the vicinity of the site.

Significance Criteria

11.3.22 The assessment of potential effects as a result of the Comprehensive Development has taken into account both the construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the development proposals, and the sensitivity of the affected receptor / receiving environment to change, as well as a number of other factors that are outlined in more detail in **Chapter 2 'The Approach to the Assessment'** of this ES. Magnitude of change and the sensitivity of the affected receptor / receiving environment are both assessed on a scale of high, medium, low and negligible (as shown in **Table 2.2** in **Chapter 2 'The Approach to the Assessment'**).

11.3.23 The magnitude of effect depends upon the effect being assessed and this has been informed by the guidance set out in IEMA document Guidelines for the Environmental Assessment of Road Traffic (1993) (Ref. 11.7). The main factors relating to transportation are identified as follows and the associated criteria applied to each factor within this assessment are described below:

- Severance;
- Driver delay;
- Pedestrian and cycle delay;
- Pedestrian and cycle amenity;
- Fear and intimidation; and
- Accidents and safety.

11.3.24 Severance is defined in paragraph 4.27 of the IEMA guidance as:

> *"the perceived division that can occur within a community when it becomes separated by a major traffic artery".*

11.3.25 Paragraph 4.31 of the IEMA guidance goes on to state:

> *"Changes in traffic flow of 30%, 60% and 90% are regarded as producing "slight", "moderate" and "substantial" changes in severance respectively."*

11.3.26 For this assessment the changes in traffic flow thresholds will follow the above figures but adjusted to reflect the significance as follows:

- Negligible less than 30%;
- Minor 30% to 60%;
- Moderate 60% to 90%; and
- Major greater than 90%

11.3.27 The above percentage increase criteria relate to arterial or main and through roads and will include all A roads, B Roads and other main through routes with a strong movement function. DMRB Volume 11 (Ref. 11.8) provides further guidance on determining severance (Part 8, Chapter 6). It is acknowledges that there is a traffic flow threshold below which changes in Severance are not considered significant, this is where the existing AADT (Average Annual Daily Traffic) flow is below 800 vehicles.

11.3.28 Driver delay can be established from the traffic modelling results, identifying the average increase in delay by change in delay at the junction. The IEMA guidance suggests criteria based on delay in seconds per mile but this statistic is not an output from the traffic modelling. The driver delay significance criteria have been based on the change in average junction delay as follows:

- Negligible less than 30 seconds change per vehicle;
- Minor 30 to 60 seconds change per vehicle;
- Moderate 60 to 90 seconds change per vehicle; and

- Major greater than 90 seconds change per vehicle.

11.3.29 The IEMA guidance indicates that pedestrian delay is influenced by "changes in the volume, composition or speed of traffic" which affect the ability of people to cross the road. The IEMA guidance goes onto advise that assessors should "… use their judgement to determine whether pedestrian delay is a significant impact".

11.3.30 The assessment of pedestrian and cycle delay has been based on an initial assessment of the change in traffic flow and change in speed as a result of the development. This has been based on a change of +/-200 vehicles per hour and +/-5 miles per hour for each of the relevant junction approaches. A Qualitative assessment will also be undertaken where the number of crossing stages on a signal junction is amended or where specific cycle measures are proposed.

11.3.31 The IEMA guidance defines pedestrian amenity as "the relative pleasantness of a journey", which can be affected by "changes in traffic flow, traffic composition and pavement width/ separation from traffic". Pedestrian amenity also covers the issue of 'fear and intimidation within the IEMA guidelines. There are no commonly agreed thresholds for estimating levels of fear and intimidation but this impact is considered dependent on the volume of traffic, its HGV component, its proximity to people, or the lack of protection or segregation from traffic influenced by factors such as footway width. There are no commonly agreed thresholds for cycle amenity; however reference will be made to emerging TfL guidance.

11.3.32 For the purposes of this assessment the pedestrian amenity has been based on the following criteria, based on the change in the number of vehicles passing along the adjacent road, using the junction approaches:

- Negligible less than 3 vehicles per minute change
- Minor more than 3 vehicles per minute change
- Moderate more than 7 vehicles per minute change
- Major more than 10 vehicles per minute change

11.3.33 Due to the numerous local causation factors involved in PIAs, the IEMA guidelines do not recommend the use of thresholds to determine significance. With regards to accidents and safety, the IEMA guidance states at paragraph 4.42 that:

> *"Professional judgement will be needed to assess the implications of local circumstances, or factors, which may evaluate or lessen the risk of accidents, e.g. junction conflicts".*

11.3.34 Paragraph 4.5 of the IEMA Guidance makes it clear that:

> *"A critical feature of an environmental assessment is determining whether a given impact is significant".*

11.3.35 Paragraph 4.5 goes on to state:

> *"For many effects there are no simple rules or formulae which define thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed up by data or quantified data wherever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact…"*

11.3.36 The accident assessment will review the past five years of available accident data, and will review and undertake a trend analysis and assess the impact of the development proposals in respect of changes to potential conflict points as a result of the development.

Significance of Effects

11.3.37 The following terms have been used to define the significance of the effects identified:

- **Major effect:** where the Comprehensive Development could be expected to have a very significant effect (either positive or negative) on severance, pedestrian amenity, pedestrian and driver delay, accidents or safety;
- **Moderate effect:** where the Comprehensive Development could be expected to have a noticeable effect (either positive or negative) on severance, pedestrian amenity, pedestrian and driver delay, accidents or safety;
- **Minor effect:** where the Comprehensive Development could be expected to result in a small, barely noticeable effect (either positive or negative) on severance, pedestrian amenity, pedestrian and driver delay, accidents or safety; and
- **Negligible:** where no discernible effect is expected as a result of the Comprehensive Development on severance, pedestrian amenity, pedestrian and driver delay, accidents or safety.

Limitations and Assumptions

11.3.38 Any limitations and assumptions relevant to this assessment have been identified in the relevant section of this Chapter as appropriate and are summarised as follows:

- No specific guidelines exist on the assessment thresholds for driver, pedestrian and cycle delay which have therefore been assumed to be those set out in paragraph 11.3.26 - 28;
- No specific guidelines exist on the assessment thresholds for pedestrian and cycle amenity which have therefore been assumed to be those set out in paragraph 11.3.30;
- Any qualitative assessment will be subject to interpretation by the assessor. However, the assessor has experience in this area and has therefore applied their knowledge and expertise in this area to ensure a robust assessment of effects.
- Due to the mainly residential nature of the development, it is unlikely that will generate significant heavy goods vehicle (HGV) traffic flows. HGVs are considered as triggers for assessment for the construction phase which is when HGV generation is likely to be at its highest.
- Due to the existing uses being a mix of residential and non-residential uses, it has not been possible to isolate existing trips associated with each existing land use. Estimations of the likely uplift in non-residential trips have been applied as set out in more detail in the Transport Assessment (Ref. 11.1).

11.4 Baseline Conditions

11.4.1 The following provides a summary of the baseline transport conditions with further details being available in the Transport Assessment.

Pedestrian Infrastructure

11.4.2 The Site as it currently stands includes a number of routes through it so it does offer a high level of permeability for pedestrians. Roland Way, Inville Road Thurlow Street offers a high level of connectivity through the site in a north-south direction and Hopwood Road, Beaconsfield Road, Kinglake Street and Inville Road provide for the east-west direction.

11.4.3 There is a wide area encompassing Walworth, Camberwell, Elephant and Castle and Bermondsey which is within a 25 minute walk of the site. This provides access to a range of facilities and services for pedestrians, notably primary and secondary schools, shopping and health related services.

11.4.4 A Pedestrian Environment Review System (PERS) audit was undertaken by WSP on Thursday 22, Friday 23 and Wednesday 28 May 2014 to establish the quality of the pedestrian route network around the Site. It was undertaken in accordance with guidance provided in TfL's 'Pedestrian Environment Review System, Review Handbook Version 2, May 2006' (Ref. 11.9). The study area included Walworth Road, Portland Street,

Thurlow Street, Old Kent Road, East Street and Albany Road. The audit assessed all connections between the site and the surrounding area, and all public transport connections that form part of likely routes to and from the site. The overall results were positive with mainly 'green' indicators, some average 'amber' indicators and no negative 'red' indicators. The following conclusions could be drawn from the audit:

- Pedestrian lighting should be more frequent, especially in streets without active frontages, where there is a low sense of security. This is particularly the case for B214 Albany Road, for which 5 out the 13 sections of road received an amber rating. Moreover, the surface quality of the pavements should be improved, and sufficient lighting should be provided near bus stops.
- An increased number of rest points should be provided, with frequent positioning on the main routes within the study area.
- Improvements at Portland Street, between Hopwood Road and B214 Albany Road could include the removal of a wall that reduces pedestrian space, the design of a new pedestrian route on the eastern side or the introduction of pedestrian lighting. This would have the effect of improving the levels of perceived personal security.
- Crossings at signal junctions on Albany Road at Portland Street, Wells Way and Thurlow Street, despite having 'green' scores have multiple crossing stages for pedestrians that increase pedestrian delay. Opportunities to simplify crossing movements should be explored.
- Mitigation measures are also recommended for Dawes Street / East Street junction, where there is a lack of pedestrian crossing facilities. This would improve the accessibility of the East Street market area.

11.4.5 An audit of the existing pedestrian network has also identified the locations where signalised and zebra crossings are available to assist pedestrian movement through the area. On Walworth Road and Old Kent Road signalised pedestrian crossing facilities are available at regular intervals of around 100m -150m along these roads. On Albany Road there is a combination of signalised and zebra crossing facilities for pedestrians at intervals of approximately 100m – 200m. Thurlow Street, Portland Street and East Street also have zebra crossings available.

11.4.6 Pedestrian counts were undertaken alongside the traffic counts at a number of locations as follows:

- Zebra crossing on Albany Road by Bradenham Close
- Zebra crossing on Albany Road First Development Site
- Portland Street / Albany Road junction
- Albany Road / Wells Way junction
- Signal controlled pedestrian crossing by Chumleigh Street
- Thurlow Street / Albany Road junction
- Zebra crossing on Albany Road by Bagshot street
- Zebra crossing on Thurlow Street by Beaconsfield Road
- Zebra crossing on Thurlow Street south of East Street
- Pedestrian crossing at East Street / Thurlow Street junction

11.4.7 The surveys counted the number of people using the pedestrian crossings at these locations as well as the number of pedestrians using the footpaths around the junction. All counts were directional and two-way pedestrian flows in the area have been assessed. Further details are available in the Transport Assessment

11.4.8 The busiest areas for pedestrians are on East Street, the east side of Thurlow Street and the east side of Portland Street.

11.4.9 The busiest crossings are on Thurlow Street with the signalised crossing at East Street consistently busy.

Cycle Infrastructure

11.4.10 There are a number of established cycle routes within the vicinity of the site. TfL publishes 14 guides for cycling in London which include routes recommended by experienced cyclists. The guides include signed cycle routes, quieter and less busy streets, greenways through parks and along canals, stations with cycle parking and details of the Cycle Superhighways.

11.4.11 A wide area encompassing Southwark, Westminster, Victoria, the City, Clapham and Rotherhithe is within a 25 minute cycle of the site.

11.4.12 Cycle Superhighways are cycle routes running from outer London into and across central London. They are designed to give safer, faster and more direct journeys into the city. CS7 travels from Merton to the City via the A24 and A3 using Clapham Road, Kennington Park Road and providing access to the City across Southwark Bridge. There are also a number of alternative quieter signed or recommended routes that utilise the side roads adjacent to this Cycle Superhighway.

11.4.13 The following existing London Cycle Network (LCN) routes are relevant to the Aylesbury Estate:

- Route 2 – LCN+ route between Lambeth (Imperial War Museum) to Deptford
- Route 23 – LCN+ route between Southwark Bridge and Crystal Palace

11.4.14 The London Cycle Hire scheme offers a self-service bike sharing cycle hire scheme for short journeys. It does not require membership and allows people to hire a bike from one of the docking stations located around London, ride it to where you like, and then return it to any docking station, ready for the next person. There are a number of locations near Elephant and Castle and to the north of the site where cycle hire facilities are available. The nearest facility is located at Rodney Road, Walworth which is just a short walk (less than 5 minutes) from north end of the site. The remaining cycle hire locations are a 15 to 20 minute walk from the centre of the site.

11.4.15 Walworth Road and Old Kent Road have considerable numbers of cycle parking spaces along their length. Within the site area, there are existing cycle stands at:

- The Aylesbury Medical Centre;
- The junction of East Street and Thurlow Street;
- Faraday School;
- The junction of Portland Street and Wooler Street;
- South section of Portland Street; and
- On Albany Road at the outdoor gym.

11.4.16 There are very high numbers of cyclists using parts of the road network in the vicinity of the site. Where high cycle flows were observed they tend to be tidal as follows:

- Walworth Road: more than 440 northbound AM and up to 200 southbound PM;
- Rodney Road: more than 500 westbound AM and 262 eastbound PM;
- Portland Street: more than 400 northbound AM and nearly 200 southbound PM;
- Albany Road: up to 166 westbound AM and 96 eastbound PM (between Wells Way and Portland Street);
- Old Kent Road: 578 northbound AM and 280 southbound PM.

Car Clubs

11.4.17 There are a number of locations where cars are available to hire within the local area, principally provided through Zipcar. Notably there are eight cars either within or very close to the estate (for hire through Zipcar) as follows:

- Walworth, Bradenham Close
- Walworth, Portland Street
- Walworth, Sondes Street
- Kennington, Wooler Street
- Walworth, East Street
- Old Kent Road, Bagshot Street
- Old Kent Road, Madron Street
- Walworth, Chatham Street

11.4.18 There are also other ways of hiring cars in London through: 'easyCar club' which allows private individuals to make money by hiring their car out for use if they are not using it; and 'citycar club' which also has some cars available nearby.

Public Transport

11.4.19 The Site is situated between two bus corridors (the A2 and the A215), but also has bus services that pass through the estate, along Albany Road and Thurlow Street. Consequently, the Public Transport Accessibility Level (PTAL) of the site varies by location, with the areas closer to the A2 and A215 having a higher PTAL than the area around Thurlow Street.

11.4.20 The PTAL of the Site varies from 5 (very good) close to Camberwell Road, to between 1 (very poor) and 2 (poor) for areas around the Albany Road/ Wells Way and Albany Road/ Thurlow Street junction.

Existing Bus Services

11.4.21 There are 20 daytime bus services operating within a 400m walk of the boundary of the Site (excluding school buses), and there are also 7 night buses.

11.4.22 **Table 11.3** summarises the route and number of buses per hour of the daytime bus services, and Table 11.4 summarises the route and number of buses per hour of the night time bus services.

Table 11.3 Daytime bus services and frequencies

No.	Route	Average Daytime Frequency		
		Mon-Fri	Saturday	Sunday
12	Oxford Circus – Dulwich Library	4-6 mins	4-6 mins	3-7 mins
21	Lewisham Centre – Newington Green	5-8 mins	6-10 mins	10-13 mins
35	Falcon Road (Clapham) – Shoreditch	8-12 mins	10-13 mins	12-15 mins
40	Dulwich/ The Plough – Aldgate Bus Station	6-10 mins	9-12 mins	15 mins
42	Sunray Avenue – Aldgate Station	8-11 mins	8-10 mins	15 mins
45	St Pancras International Station – Atkins Road/ New Park Road	7-10 mins	7-10 mins	15 mins
53	Orchard Road/ Griffin Road – Horse Guards Parade	6-10 mins	6-10 mins	9-12 mins

No.	Route	Average Daytime Frequency		
		Mon-Fri	Saturday	Sunday
63	Forest Hill Tavern – Kings Cross Station/ York Way	4-8 mins	5-9 mins	7-11 mins
68	West Norwood Station – Euston Bus Station	5-8 mins	6-10 mins	9-12 mins
78	Shoreditch High Street Station – St Mary's Road	7-10 mins	8-10 mins	10-12 mins
136	Grove Park Bus Station – Elephant & Castle/ Newington Causeway	8-12 mins	12-14 mins	15 mins
148	Denmark Hill/ Camberwell Green – White City Bus Station	6-10 mins	7-10 mins	9-13 mins
168	Royal Free Hospital – Dunton Road	5-9 mins	6-10 mins	9-10 mins
171	Newquay Road – Holborn Station	6-10 mins	7-11 mins	10-13 mins
172	Brockley Rise/ Chandos – King Edward Street	8-11 mins	10-15 mins	15 mins
176	Penge/ Pawleyne Arms – Tottenham Court Road Station	6-10 mins	7-10 mins	10-13 mins
343	City Hall – New Cross/ Jerningham Road	4-8 mins	6-10 mins	10-15 mins
363	Crystal Palace Parade – Lambeth Road	8-12 mins	8-12 mins	15 mins
453	Deptford Bridge – Great Central Street	5-9 mins	6-10 mins	8-12 mins
468	Swan & Sugar Loaf – Lambeth Road	5-9 mins	7-11 mins	10-13 mins

Table 11.4 Night bus services and frequencies

No.	Route	Average Nightime Frequency		
		Mon-Fri	Saturday	Sunday
N21	Market Place/ Bexleyheath Clock Tower – Charing Cross Station	30mins	30mins	30mins
N35	Falcon Road/ Grant Road – Tottenham Court Road Station	30mins	30mins	30mins
N63	Crystal Palace Parade – Kings Cross Station/ York Way	30mins	30mins	30mins
N68	Old Coulsdon/ Tudor Rose – Tottenham Court Road Station	30mins	30mins	30mins
N89	Trafalgar Square/ Charing Cross Station – Erith Town Centre/ Riverside	30mins	30mins	30mins
N171	Springbank Road/ Hither Green Station – Tottenham Court Road	30mins	30mins	30mins
N343	Trafalgar Square/ Charing Cross – New Cross/ Jerningham Road	30mins	30mins	30mins

11.4.23 There are 14 bus stops which are situated within 400m of the Site boundary with a number of bus services available depending on the bus stop. **Table 11.5** summarises which bus services are available from each bus stop.

Table 11.5 Bus stops and bus service availability

Bus Stop Name	Road Location	Served by
Albany Road/ Camberwell Road	Albany Road	42
Camberwell Road/ Albany Road	Camberwell Road	12,35,40,42,45,68,148,171,176,468
Albany Road/ Wells Way	Albany Road	42, 136, 343
Alsace Road	Thurlow Street	42, 136, 343
Balfour Street	Rodney Road	136, 343
Congreve Street (SE17)	East Street	42
Bowyer Place	Camberwell Road	12,35,40,42,45,68,148,171,176,468
Dunton Road	Old Kent Road	21,53,63,172,363,453
Old Kent Road/ East Street	Old Kent Road	21,42,53,63,172,363,453
Portland Street	Albany Road	42
St Georges Way/ Burgess Park	Wells Way	136, 343
East Street/ Thurlow Street	East Street	42
East Street/ Flint Street	Thurlow Street/ Flint Street	136, 343
Westmoreland Road	Camberwell Road	12,35,40,45,68,148,171,176,468

11.4.24 TfL has recently extended bus service 136 to follow the route of bus 343 through the Aylesbury Estate area, due to overcrowding of the 343 service. TfL has also indicated that it would be likely to extend a bus service which currently terminates at Elephant and Castle, along Albany Road and Thurlow Street to the Old Kent Road Tesco supermarket.

Underground and Rail Services

11.4.25 **Table 11.6** sets out the names and distances to the nearest London Underground stations, and the lines which are available from these stations.

Table 11.6 London underground stations and lines

Station	Approximate Distance	Lines
Elephant and Castle	1.3km	Northern, Bakerloo
Borough	1.8km	Northern
London Bridge	2.2km	Northern, Jubilee
Kennington	1.4km	Northern
Oval	1.8km	Northern

11.4.26 **Table 11.7** shows the nearest National Rail and London Overground stations, the distance from the centre of the Site and the services which are available from those stations.

Table 11.7 National Rail/ London Overground stations

Station	Approximate Distance	Lines
Elephant and Castle	1.3km	National Rail

Station	Approximate Distance	Lines
London Bridge	2.2km	National Rail
Peckham Rye	2.0km	London Overground

Bus Interchange at Elephant and Castle

11.4.27 There are a large number of bus stops on the entries to the Elephant and Castle roundabout, including interchange facilities between buses and trains at Elephant and Castle underground and railway station. Many of the very frequent bus services operating in the vicinity of the Site stop at Elephant and Castle, meaning that the bus offers a quick, convenient way of accessing the station from the Site.

Parking and Servicing

11.4.28 The existing level and type of car parking available throughout the estate varies by area and the following provides a description of the car parking availability of the different areas.

11.4.29 The section of East Street between Dawes Street and Elsted Street is predominantly residential with on-street parking subject to resident permit, pay and display or short stay restrictions at the western end, and to the west of Thurlow Street there is a mix of retail and residential land uses, with parking being mainly short stay, with servicing for the businesses being on-street.

11.4.30 Thurlow Street provides access to the residential blocks and community facilities along its length and access to the wider highway network. Parking areas are available within the estate, as well as on-street parking controlled by parking permits and short stay pay and display charges.

11.4.31 Albany Road is a distributor route with on-street parking at the western end of the section between Bagshot Road and Bradenham Close which is controlled by parking permits and pay and display.

11.4.32 Portland Street has pay and display/parking permit controlled parking spaces provided in places along its length and on both sides of the carriageway. Car club spaces are also present.

11.4.33 As well as the on-street parking provisions, there is also car parking provided for the residential blocks as parking courts and garages.

11.4.34 The current level of car parking demand within the estate was researched through surveys carried out in January 2013 and a parking demand assessment undertaken by consultants JMP for LB Southwark (Ref. 11.10). The surveys covered daytime (10.00-11.00); evening (20.00-21.00); and Saturday (10.00-11.00) and were undertaken on Thursday 10th January and Saturday 12th January 2013.

11.4.35 The current parking availability within the site area is as follows (excluding private garages but including Site 7 that was part of the survey area):

- On-street Parking – 371 spaces (including 2 disabled)
- Off-street Parking – 1,151 spaces (no disabled bays)
- Total Parking – 1,522 spaces

11.4.36 The current provision provides a ratio of 0.43 spaces per unit (for off-street only) and 0.56 spaces per unit (including on and off-street provision). This does not take account of the availability of private garages within the estate for parking. The on-street parking can also be used by non-Site residents, including residents and visitors from the surrounding areas.

11.4.37 The parking demand assessment (Ref.11.10) considered the 14 zones on the site and their associated parking stress levels based on parking availability and demand for both on and off-street parking spaces. In general parking across the Site is sufficient to meet demand as well as having spare capacity should demand

increase. Zone 4a has lower than average on and off-street parking provision and has relatively high parking stress levels both on and off-street during the weekday daytime and Saturday surveys.

11.4.38 The majority of the parking within the study area is off-street (1,151 spaces) and parking stress levels were generally higher in the on-street parking than the off-street parking areas across the estate. In general, zones tended to have more capacity during the evening survey than the daytime survey. Whilst this is unusual for a residential area with the greatest demand for parking typically being in the evening. This suggests that either the daytime demand may not be from residents or that a large proportion of existing residents do not work typical daytime working hours.

11.4.39 A small number of illegal parking incidents were recorded during the surveys which did not appear to be related to parking stress level or location of on and off-street parking.

Motorcycle Parking

11.4.40 Six existing motorcycle parking spaces are provided at each of the following locations:

- Fielding Street;
- Munton Road (located off Rodney Place);
- Chatham Street; and
- Brandon Street.

Taxi Ranks

11.4.41 There is one TfL appointed taxi rank in the study area located on A201 New Kent Road. It operates 24 hours a day, and has three spaces for taxis to wait.

On Street Loading Bays

11.4.42 Loading bays are provided at the following locations across the study area:

- John Ruskin Street (2 spaces);
- Penrose Street (2 spaces);
- Larcom Street (3 spaces); and
- Mina Road (2 spaces).

Highway Network

11.4.43 **Figure 11.1** shows the road network in the local area, it includes where there are sections of one-way and locations with no-through access for vehicles.

11.4.44 The five principle roads within the area, along with their respective Annual Average Daily Traffic (AADT) are;

- Walworth Road / Camberwell Road A215 17,000 AADT;
- Albany Road B214 21,000 AADT;
- Wells Way 15,000 AADT;
- Thurlow Street 13,000 AADT; and
- A2 Old Kent Road (TLRN) 39,000 AADT.

11.4.45 Other less major roads that are worthy of note in the local area are Portland Street and East Street.

11.4.46 The A2 Old Kent Road comes under the Transport for London Road Network (TLRN), which forms the key routes or major arterial roads in London and is made up of roads of roads that are owned and maintained by 'Transport for London' (TfL). None of the roads within the study area are part of the Strategic Route Network (SRN).

11.4.47 Further details on the analysis of existing junction performance is set out in the TA.

B214 Albany Road / A215 Camberwell Road

11.4.48 The junction of B214 Albany Road / A215 Camberwell Road is a four arm traffic signal controlled junction, with two lanes on each arm, situated to the south west of Aylesbury Estate. The northern, eastern and western arms operate at a 20mph speed limit; whilst the southern arm speed limit is set at 30mph. Drivers travelling from the northern arm are not permitted to right turn into Urlwin Street, and a yellow box is marked in the centre of the junction, to ensure that stationary traffic is prevented from blocking the junction. No other weight, width or turning restrictions apply.

11.4.49 All arms benefit from pedestrian crossing facilities. The northern and southern arms of the junction have advanced stop lines for bicycles, which is important considering that cyclists comprise 47% and 31% of all vehicles in the morning and evening peak respectively travelling north from A215 Camberwell Road.

B214 Albany Road / Portland Street

11.4.50 The junction of B214 Albany Road / Portland Street is a three arm traffic signal controlled junction, situated to the south of Aylesbury Estate. The junction operates at a 20mph speed limit, and consists of a single lane approach on the minor arm, and a two lane approach on the major arms. A yellow box is marked in the centre of the junction to ensure that stationary traffic travelling eastbound along B214 Albany Road is prevented from blocking the junction.

11.4.51 Aside from Albany Road (west), all arms have associated advanced stop lines for cyclists, which is important considering that during the morning peak period, cyclists account for 27% of all vehicles turning right into Portland Street from Albany Road E. It can be noted that there are no weight, width or turning restrictions.

B214 Albany Road / Wells Way

11.4.52 The junction of B214 Albany Road / Wells Way is a three arm traffic signal controlled junction, situated to the south of Aylesbury Estate. The junction operates at a 20mph speed limit, and consists of a three lane approach on the western arm (one right turn lane and two straight ahead lanes), a two lane approach on the eastern arm (one straight ahead lane and one left turn lane, with a central lane for cyclists), and a three lane approach on the southern minor arm (one left turn lane and two right turn lanes). For drivers travelling from A214 Albany Road (west), wishing to turn right, they must give way to traffic travelling from A214 Albany Road (east).

11.4.53 Aside from the Wells Way left-turn lane, all arms have associated advanced stop lines for cyclists, and the southern and western arm benefit from pedestrian crossing facilities. It can be noted that there are no weight, width or turning restrictions.

B214 Albany Road / Thurlow Street

11.4.54 The junction of B214 Albany Road / Thurlow Street is a three arm traffic signal controlled junction which operates at a 20 mph speed limit, with two lanes on each arm.

11.4.55 Thurlow Street and Albany Road (east) arms benefit from pedestrian crossing facilities. It can be noted that there are no weight, width or turning restrictions.

A2 Old Kent Road / A214 Albany Road / Humphrey Street / Shorncliffe Road

11.4.56 The junction of Old Kent Road, Albany Road and Humphrey Street is a four arm traffic signal controlled junction, which also controls Shorncliffe Road under a separate stream of the controller. A2 Old Kent Road operates under a 30mph speed limit, and the remaining arms have a speed limit of 20mph. A2 Old Kent Road is part of the TLRN.

11.4.57 The junction consists of a three lane approach on the northern arm (two ahead lanes, and an ahead/left turn lane), a three lane approach on the eastern arm (a left turn, an ahead, and a right turn lane), a four lane approach on the southern arm (three ahead lanes, and a left turn lane), and a two lane approach on the western arm (an ahead lane, and a right turn lane).

11.4.58 Only buses are permitted to turn right from the northern arm of the junction into Albany Road, no vehicles are permitted to turn left from Albany Road, and no vehicles are permitted to turn right from the southern arm of the junction. No other weight, width or turning restrictions apply. A yellow box is marked in the centre of the junction to ensure that stationary traffic is prevented from blocking the junction.

11.4.59 All arms of the junction, including Shorncliffe Road benefit from pedestrian crossing facilities, but no cycling facilities are provided. It should be noted that bicycles account for 24% of the traffic travelling northbound on the A2 Old Kent Road during the morning peak and 16% of the traffic travelling southbound on the A2 Old Kent Road during the evening peak.

East Street / Thurlow Street

11.4.60 The junction of Thurlow Street with East Street is a four arm right-left staggered priority junction situated within the Aylesbury Estate. A 20mph speed limit applies to this junction.

11.4.61 Pedestrian crossing facilities are provided on Thurlow Street. It can be noted that there are no weight, width or turning restrictions.

A2 Old Kent Road / Hendre Road

11.4.62 The junction of A2 Old Kent Road, East Street and Hendre Road is a four arm traffic signal controlled junction, which is located to the east of Aylesbury Estate. The A2 Old Kent Road is part of the TLRN. The junction operates at a 20mph speed limit, and consists of a three lane approach on the northern arm (one right turn lane, one ahead lane and one ahead/left turn lane), a two lane approach on the southern arm (one ahead lane and one ahead/left turn lane), and single lane approaches on the eastern and western arms.

11.4.63 Whilst pedestrian crossing facilities are provided on all arms, there is a lack of cycling facilities at the junction. It should be considered that in the morning peak, cyclists account for 33% of the traffic flow travelling north on A2 Old Kent Road.

11.4.64 Right turning restrictions are in place from Hendre Road, East Street, and A2 Old Kent Road N. No other weight, width or turning restrictions apply.

A215 Walworth Road / Heygate Street

11.4.65 The junction of Walworth Road and Heygate Street is a four arm traffic signal controlled junction, which is located to the north west of Aylesbury Estate. The southern, eastern and western arms operate under a 20mph speed limit; whilst the northern arm speed limit is set at 30mph. The junction consists of a two lane approach on the northern and eastern arms, a single lane approach and a bus lane on the southern arm, and a single lane approach on the western arm.

11.4.66 The western arm of the junction (Steedman Street) is an exit only lane, and no vehicles (except cyclists) are permitted to enter. A cycle lane is provided for bicycles wishing to enter Steedman Street, and an advanced stop line is provided on the western and eastern arms of the junction. No other weight, width or turning restrictions apply.

11.4.67 Pedestrian crossing facilities are provided on all arms of the junction.

Rodney Place / Heygate Street

11.4.68 The junction of Rodney Place and Heygate Street is a three arm priority junction with a right turn lane to Rodney Place. The junction operates at a 20mph speed limit.

11.4.69 An advanced stop line is provided for cyclists turning right into Rodney Place from Heygate Street, and with-flow cycle lanes are provided in both directions along Heygate Street. A central refuge crossing facility is provided for pedestrians on the minor arm of the junction. It can be noted that there are no weight, width or turning restrictions.

A210 New Kent Road / Rodney Place

11.4.70 The junction of New Kent Road and Rodney Place is a three arm priority junction, which is located to the north west of Aylesbury Estate. Rodney Place operates at a 20mph speed limit, whilst the speed limit along New Kent Road is set at 30mph. The junction consists of a single lane approach on the minor arm, and a single lane approach and a bus lane on the major arm. The westbound and eastbound movements on New Kent Road are separated by a central reservation.

11.4.71 Due to the presence of a central reservation, vehicles exiting Rodney Place can only travel westbound on the A201 New Kent Road, and vehicles travelling eastbound on New Kent Road are unable to turn right into Rodney Place. It can be noted that there are no other weight, width or turning restrictions.

11.4.72 There is a dedicated off carriageway cycle lane on the southern side of New Kent Road. To the east of Rodney Place, this cycle lane continues as far as Balfour Street, while to the west, the cycle lane ends at Elephant Road.

Portland Street / Merrow Street

11.4.73 The junction of Portland Street and Merrow Street is a four arm crossroad priority junction situated within the Aylesbury Estate. The junction operates at a 20mph speed limit, which is aided by the traffic calming facilities on the northern, southern and western arms of the junction. Vehicles may only travel eastbound along Merrow Street E, and westbound along Merrow Street W. There are no other weight, width or turning restrictions.

11.4.74 It should be noted that during the morning peak, cyclists make up 69% of all vehicles travelling north along Portland Street, and 59% of all vehicles travelling south along Portland Street during the evening peak at this location.

B214 Albany Road

11.4.75 B214 Albany Road runs along the south of the Aylesbury Estate, and provides key access points to the development. The majority of Albany Road is single lane, widening to two lanes at some of the main junctions, and the speed limit of the road is set at 20mph.

London Congestion Charge

11.4.76 The London congestion charge is a fee charged on most motor vehicles operating within the Congestion Charge Zone (CCZ) between 07:00-18:00 Monday to Friday. As of the 16 June 2014, the congestion charge rose from £10 to £11.50 a day.

11.4.77 The congestion charge zone covers the area within the London Inner Ring Road (which forms the A501, A1202, A1210/A1211, A100, A201, A202, A302, A3204, A4202 and parts of the A5). The Aylesbury Estate is located south of the congestion zone boundary which is located at A201 New Kent Road at its closest point.

Personal Injury Accidents

11.4.78 Injury accident data for the study area was obtained from TfL for the five year period between 1 January 2009 and 31 December 2013. The locations and severity of these accidents are assessed fully in the Transport Assessment.

11.4.79 Of the 332 injury accidents recorded in the five year period ending on 31 December 2013, there were 281 slight injury accidents (85%), 47 serious injury accidents (14%) and 4 fatal accidents (1%).

11.4.80 Inspection of the accident reports of the four fatal accidents indicates that two were as a result of large vehicles turning into vulnerable road users at the Camberwell Road/ Albany Road junction. One accident was as a result of a stolen vehicle being driven by a driver who was impaired by alcohol. The final accident, involving a lamp column falling onto a pedestrian, is again related to a large vehicle making a turning movement.

11.4.81 **Table 11.8** summarises the numbers of accidents at key junctions near to the Site.

Table 11.8 Number of accidents at key junctions near Aylesbury Estate

Junction	Slight	Serious	Fatal
Camberwell Road/ Albany Road	15	2	2
Old Kent Road/ Albany Road	25	5	1
Albany Road/ Portland Street	3	1	0
Albany Road/ Wells Way	2	0	0
Albany Road/ Thurlow Street	10	2	1

11.4.82 It is considered that the accident records do show that certain junctions within the area are more susceptible than others to accidents; however the volume of movements and the time period of consideration mean that some level of incident is to be expected.

Accidents involving vulnerable road users

11.4.83 Vulnerable Road Users include pedestrians, cyclists and motorcyclist as they are not protected by an enclosed vehicle, and are not properly observed by some drivers. Vulnerable road users are therefore more likely to suffer a serious injury in a collision. **Table 11.9** summarises the injury accidents which involved vulnerable road users (pedestrians, cyclists and motorcyclists) and bus passengers.

Table 11.9 Accidents involving vulnerable road users

	Slight	Serious	Fatal	% All Accidents	% KSI Accidents
Pedestrians	60	24	2	26%	51%
Cyclists	82	6	1	27%	14%
Motorcyclists	42	12	0	16%	23%
Bus Passengers	22	1	0	7%	2%
Motor Vehicles only	75	4	1	24%	10%

11.4.84 Over two thirds of the recorded injury accidents involved an injury to a vulnerable road user, with three quarters of the accidents involving injury to either a vulnerable road user or a bus passenger

11.4.85 Nearly 90% of the KSI (Killed or Seriously Injured) accidents involved vulnerable road users, with over half of the KSI accidents involving pedestrians.

11.4.86 The accident records suggest that any road improvements should ensure that pedestrians and other road users are able to use the area in a safe manner.

Future Baseline

11.4.87 The future baseline for assessment has been established by predicting the change in the number of trips that the development will create once completed. These trips come from the additional residential dwellings plus the non-residential uses such as offices and other facilities. The starting point for the trip generation is the comparison of similar sites to establish person trips for each land use. These trips have then been assigned to modes of travel using local survey data provided by TfL. Full details of the trip generation, distribution and assignment methodology are set out in the Transport Assessment.

11.4.88 The combined development proposals will see an increase in trips across all modes in addition to the trips that are currently generated by the site. The total uplift in trips is set out in **Table 11.10** below.

Table 11.10 Increase in Trips by Mode from Development

Mode of Travel	AM Arrivals	AM Departures	PM Arrivals	PM Departures
Car Driver	62	79	67	72
Car Passenger	18	34	24	23
Bus	82	185	98	86
Walk	146	306	242	158
Bicycle	20	46	19	13
Total	**329**	**651**	**450**	**353**

11.4.89 As it is not possible to arrive or depart from the development by train or underground, these trips have been reassigned to the other modes of travel, based on the mode share of passengers arriving at Elephant and Castle station.

11.4.90 The TA also considers a sensitivity test where mode shift occurs and the development generates fewer car trips and an increased number of bus and cycle trips. Details of this test are set out in the Transport Assessment.

11.4.91 The effects of the development traffic are assessed by comparing the situation where the development does not proceed, the 'Do Nothing' scenario, with the situation where the development does proceed. The 'Do Something' scenario.

11.4.92 The Do Nothing scenario has been established by adding the committed development flows identified in **Table 11.1** to the baseline surveys.

11.4.93 The Do Something scenario adds the development traffic flows to the Do Nothing scenario.

11.5 Assessments of Effects, Mitigation and Residual Effects

Demolition and Construction

11.5.1 The effects of demolition and construction on transport come not only from the on-site operations but also from the construction traffic accessing the Site. Construction traffic associated with the Comprehensive

Development will access the Site from the existing road network. Construction traffic will be limited to accessing the site using the routes indicated on **Figure 11.2**.

11.5.2 A contractor has been engaged to provide advice on construction issues. The contractor has prepared an initial assessment of the FDS Application site in terms on operatives on site and vehicle movements making deliveries.

11.5.3 As the FDS Application site is the most dense part of the Comprehensive Development proposals, in terms of habitable rooms per hectare, it has been assumed that the peak of this phase represents a reasonable worst case in terms of construction traffic for use in assessment.

11.5.4 The assessment indicates that the peak movements will be in mid-June 2017 when the work on plots 1, 2 and 5 is happening concurrently. At this time there is expected to be a total of 290 operatives on site and there will be 1100 deliveries occurring in the month. Further information on this element of the proposals is provided in **Chapter 6 'Demolition and Construction'**.

11.5.5 The vehicle movements have been converted to a daily flow by assuming each vehicle arrives and leaves during the day and there are four 5.5-day weeks in each month. This equates to 100 vehicle movements per day (50 in, 50 out).

11.5.6 Peak hour (AM + PM) movements are typically around one-sixth of a daily flow which would equate to 8 arrivals and 8 departures across the two peaks. For a robust assessment 8 arrivals and 8 departures in each peak have been assumed for assessment purposes.

11.5.7 For operatives, it is assumed that a similar mode share to the local census journey to work is appropriate where approximately 10% of work trips are made by car/van. It is expected that most vehicle based operative trips will be by minibus type vans. This would equate to 29 arrivals in the AM peak and 29 departures in the PM peak.

11.5.8 A summary of the trip generation for construction traffic is provided in Table 11.1 below.

Table 11.11 Construction Traffic for Assessment Purposes

	Light Vehicles	Heavy Vehicles	Total
AM Peak	29	16	45
PM Peak	29	16	45
Daily	58	100	158

Construction Traffic Routes

11.5.9 The location of the Site between two major north-south routes and north of Burgess Park means that there are limited routes for construction traffic to take. It is proposed to limit construction traffic to the routes indicated on **Figure 11.2** comprising:

- Albany Road B214;
- Walworth Road / Camberwell Road A215;
- Old Kent Road A2; and
- Thurlow Street / Flint Street / Rodney Road / Heygate Street.

11.5.10 Beyond these streets the construction traffic will be limited to major routes.

11.5.11 Due to the constraints around the site it is not considered appropriate to limit construction traffic to one particular route to, say, the A2 as it will focus all movements in a particular area. It is better to allow a number of main routes to be used to distribute the traffic.

Site Wide Development Option

Severance

11.5.12 The construction traffic routes to the Comprehensive Development are illustrated on **Figure 11.2**. Routing construction traffic along these roads means that the traffic is kept on parts of the highway network which already have relatively high traffic flows.

11.5.13 **Tables 11.12** and **11.13** summarise the links where traffic flows change as a result of the construction traffic during each time period.

Table 11.12 Peak Construction Traffic Flows by Link

Road	Between		AM		PM		Daily	
			All Vehs	HGV	All Vehs	HGV	All Vehs	HGV
A201 New Kent Road	Rodney Place	-	1	1	6	1	54	20
A201 New Kent Road	Rodney Place	A2 Old Kent Road	7	2	2	1	62	21
Rodney Place	A201 New Kent Road	Heygate Street	9	3	8	3	117	40
A215 Walworth Road	Heygate Street	-	8	3	10	3	126	44
Heygate Street	Rodney Place	A215 Walworth Road	4	1	3	2	49	20
Rodney Road	Rodney Place	East Street	5	2	5	1	68	21
A2 Old Kent Road	East Street	A201 New Kent Road	4	2	6	3	72	34
East Street	Thurlow Street	A2 Old Kent Road	3	1	1	1	22	8
East Street	Thurlow Street	-	0	0	0	0	0	0
Hendre Road	A2 Old Kent Road	-	0	0	0	0	0	0
A215 Walworth Road	Heygate Street	East Street	12	4	13	5	175	64
A215 Walworth Road	Fielding Street	Merrow Street	12	4	13	5	175	64
Fielding Street	A215 Walworth Road	-	0	0	0	0	0	0
Portland Street	Merrow Street	-	0	0	0	0	0	0
Thurlow Street	East Street	Area 3/4 Access	1	1	4	1	33	10
A2 Old Kent Road	East Street	B203 Dunton Road	1	1	6	2	51	25
Merrow Street	A215 Walworth Road	Portland Street	0	0	0	0	0	0
Merrow Street	Portland Street	-	0	0	0	0	0	0
A215 Walworth Road	Merrow Street	John Ruskin Street	12	4	13	5	175	64
John Ruskin Street	A215 Walworth Road	-	0	0	0	0	0	0

Road	Between		AM		PM		Daily	
A215 Walworth Road	John Ruskin Street	B214 Albany Road	12	4	13	5	175	64
Portland Street	Merrow Street	B214 Albany Road	0	0	0	0	0	0
Urlwin Street	A215 Walworth Road	-	0	0	0	0	0	0
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	0	0	0	0	0	0
A215 Camberwell Road	A214 Albany Road	-	10	3	9	3	133	48
B214 Albany Road	A215 Walworth Road	Area 1 Access	4	4	19	4	160	55
B214 Albany Road	Portland Street	Wells Way	24	8	23	8	328	115
Wells Way	B214 Albany Road	-	0	0	0	0	0	0
B214 Albany Road	Wells Way	Thurlow Street	24	8	23	8	328	115
B214 Albany Road	A2 Old Kent Road	Area 2 Access	16	6	17	6	238	86
B204 Humphrey Road	A2 Oid Kent Road	-	0	0	0	0	0	0
A2 Old Kent Road	B214 Albany Road	-	15	5	12	4	188	60
Thurlow Street	Area 3/4 Access	B214 Albany Road	7	2	5	2	89	29
B214 Albany Road	Area 2 Access	Thurlow Street	16	6	17	6	238	86
B214 Albany Road	Area 1 Access	Portland Street	24	8	23	8	328	115
Steedman Street	A215 Walworth Road	-	0	0	0	0	0	0
Boyson Road	A215 Walworth Road	-	0	0	0	0	0	0
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	1	1	6	2	51	25
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	15	5	12	4	188	60

Table 11.13 Impact of Construction Traffic (% flow change) by Link

Road	Between		AM	PM	Daily
			All Vehs	All Vehs	All Vehs
A201 New Kent Road	Rodney Place	-	0%	0%	0%
A201 New Kent Road	Rodney Place	A2 Old Kent Road	0%	0%	0%
Rodney Place	A201 New Kent Road	Heygate Street	3%	6%	4%
A215 Walworth Road	Heygate Street	-	1%	1%	1%
Heygate Street	Rodney Place	A215 Walworth Road	1%	1%	1%
Rodney Road	Rodney Place	East Street	1%	1%	1%
A2 Old Kent Road	East Street	A201 New Kent Road	0%	0%	0%
East Street	Thurlow Street	A2 Old Kent Road	0%	0%	0%
East Street	Thurlow Street	-	0%	0%	0%
Hendre Road	A2 Oid Kent Road	-	0%	0%	0%
A215 Walworth Road	Heygate Street	East Street	2%	2%	2%

Road	Between		AM	PM	Daily
A215 Walworth Road	Fielding Street	Merrow Street	1%	2%	2%
Fielding Street	A215 Walworth Road	-	0%	0%	0%
Portland Street	Merrow Street	-	0%	0%	0%
Thurlow Street	East Street	Area 3/4 Access	0%	1%	0%
A2 Old Kent Road	East Street	B203 Dunton Road	0%	0%	0%
Merrow Street	A215 Walworth Road	Portland Street	0%	0%	0%
Merrow Street	Portland Street	-	0%	0%	0%
A215 Walworth Road	Merrow Street	John Ruskin Street	1%	2%	1%
John Ruskin Street	A215 Walworth Road	-	0%	0%	0%
A215 Walworth Road	John Ruskin Street	B214 Albany Road	1%	1%	1%
Portland Street	Merrow Street	B214 Albany Road	0%	0%	0%
Urlwin Street	A215 Walworth Road	-	0%	0%	0%
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	0%	0%	0%
A215 Camberwell Road	A214 Albany Road	-	1%	1%	1%
B214 Albany Road	A215 Walworth Road	Area 1 Access	0%	2%	1%
B214 Albany Road	Portland Street	Wells Way	2%	2%	2%
Wells Way	B214 Albany Road	-	0%	0%	0%
B214 Albany Road	Wells Way	Thurlow Street	2%	2%	2%
B214 Albany Road	A2 Old Kent Road	Area 2 Access	1%	1%	1%
B204 Humphrey Road	A2 Oid Kent Road	-	0%	0%	0%
A2 Old Kent Road	B214 Albany Road	-	1%	0%	0%
Thurlow Street	Area 3/4 Access	B214 Albany Road	1%	1%	1%
B214 Albany Road	Area 2 Access	Thurlow Street	1%	1%	1%
B214 Albany Road	Area 1 Access	Portland Street	3%	3%	3%
Steedman Street	A215 Walworth Road	-	0%	0%	0%
Boyson Road	A215 Walworth Road	-	0%	0%	0%
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	1%	5%	2%
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	1%	1%	1%

11.5.14 Based on these changes in link flows, the construction traffic will have a negligible effect on severance as none of the changes in flow are more than 30%.

11.5.15 It is likely that the implementation of temporary pedestrian routes across the site during constriction will have a direct, temporary short-term **minor negative** effect on severance.

11.5.16 Overall it is considered that the construction of the Comprehensive Development will have a direct, temporary short-term **minor negative** effect on severance.

Mitigation

11.5.17 Construction access, traffic and temporary diversions will be controlled through a Construction Logistics Plan (CLP). This will set out how construction traffic will be managed and its impact minimised. Further details are set out in the Transport Assessment (Ref. 11.1) to which the CLP is appended.

Residual Effect

11.5.18 It is considered that the construction of the Comprehensive Development will have a direct, temporary short-term **minor negative** effect on severance.

Driver Delay

11.5.19 During construction, driver delay will be affected by temporary traffic management in the vicinity of the Comprehensive Development, and the potential temporary closure of existing routes in the vicinity of the proposed development. The increase in heavy vehicle flows in the vicinity of the Site during construction may also have an effect on driver delay.

11.5.20 The average daily construction traffic flow is expected to be around 37 two-way trips at its peak. This vehicle flow in itself is not sufficient to cause any perceptible change in delay to drivers in the area.

11.5.21 The temporary traffic management and speed limit reductions will be required for short periods during the construction of the site and these will have a direct, short-term **minor negative** effect on driver delay as on average they are likely to cause less than a 60 second increase.

11.5.22 Overall the construction of the Comprehensive Development will have a **minor negative** effect on driver delay.

Mitigation

11.5.23 Construction access, traffic and temporary diversions will be controlled through a Construction Logistics Plan (CLP). This will set out how construction traffic will be managed and its impact minimised. Further details are set out in the Transport Assessment (Ref. 11.1) to which the CLP is appended.

Residual Effect

11.5.24 Overall the construction of the Comprehensive Development will have a **minor negative** effect on driver delay.

Pedestrian and Cycle Delay

11.5.25 Construction of the Comprehensive Development will result in the temporary closure and/or re-routing of some existing pedestrian and cycle routes across the Site which may extend some pedestrian and cycle routes. The construction period is also likely to involve temporary width restrictions on footpaths adjacent to the Site and it may also be necessary to temporarily close existing pedestrian crossings at some locations.

11.5.26 The construction traffic routes to the Comprehensive Development are generally on roads with some existing provision for pedestrians and cyclists. It is therefore considered that the construction traffic will have a direct, temporary **minor negative** effect on pedestrian and cycle delay.

Pedestrian and Cycle Amenity

11.5.27 Pedestrian and cycle amenity reflects the relative pleasantness of a journey for pedestrians and cyclists, which includes changes in traffic volume and pavement width/ separation from vehicles. Pedestrian and cycle amenity can also include consideration of whether routes for pedestrians and cyclists are available and the quality of those routes (such as whether the route is free of debris or whether adequate street lighting is available).

11.5.28 During construction of the Comprehensive Development, construction traffic will be routed along roads which have some existing provision for pedestrians and cyclists.

11.5.29 Other effects on pedestrian and cycle amenity due to the construction activities include:

- Closure of the existing pedestrian and cycle routes across the Site;

- Construction work adjacent to the footway;
- Temporary closure of pedestrian and cycle crossings in the vicinity of the site due to construction activity;
- Temporary closure or width restrictions on footways adjacent to the site; and
- Mud/ debris on footways.

11.5.30 There is likely to be a direct, temporary **minor negative** effect on pedestrian and cycle amenity as a result of the construction activities during construction of the Comprehensive Development.

Mitigation

11.5.31 Some disruption to footway and cycle routes is unfortunately unavoidable during construction of a project of this nature. Construction access, traffic and temporary diversions will be controlled through a Construction Logistics Plan (CLP). This will set out how construction traffic will be managed and its impact minimised. Further details are set out in the Transport Assessment (Ref. 11.1) to which the CLP is appended.

Residual Effect

11.5.32 There is likely to be a direct, temporary **minor negative** effect on pedestrian and cycle amenity as a result of the construction activities during construction of the Comprehensive Development.

Fear and Intimidation

11.5.33 The level of fear and intimidation experienced may change as a result of a change in the volume of traffic, its HGV composition and speed. The change in the traffic levels as a result of the construction traffic will be minimal as set out in Table 11.13, and whilst the HGV composition may increase slightly, the overall impact on the level of fear and intimidation will be **negligible**.

Mitigation

11.5.34 A CLP will be put in place from the outset to ensure pedestrians and cyclists are provided with an equivalent level of service as without the construction activities. The construction vehicles would be managed to ensure any impact on fear and intimidation is managed.

Residual Effect

11.5.35 The effect of construction traffic on fear and intimidation is considered to be **negligible**.

Accidents and Safety

11.5.36 The change in traffic levels as a result of the construction traffic will be minimal during each of the time periods under consideration. The total daily expected level of construction traffic is 58 light and 100 heavy vehicles per day. Whilst this level of additional traffic will have some impact on the roads immediately surrounding the development, it is not expected that it would have a material adverse effect on accidents and safety. It is considered that in general, construction traffic will have a **negligible** effect on accidents and safety.

Mitigation

11.5.37 Whilst the overall effect on accidents and safety is expected to be negligible due to the predicted traffic levels, it is considered appropriate to ensure that high levels of safety awareness are at the core of construction operations on the surrounding network as HGV movements contribute to a large proportion of cycle deaths in London. As part of the CLP standards will be set for the compliance with the Freight Operator Recognition Scheme that includes driver awareness training. Further details are set out in the TA to which the CLP is appended.

Residual Effect

11.5.38 It is considered that in general, construction traffic will have a **negligible** effect on accidents and safety.

FDS Development Option

11.5.39 It is expected that the effects of the FDS Development Option will be the same as the site wide development option set out above, except that the temporary nature of the effects will be over a shorter period.

Severance

11.5.40 The construction traffic routes to the FDS Development Option are illustrated on **Figure 11.2**. Routing construction traffic along these roads means that the traffic is kept on parts of the highway network which already have relatively high traffic flows.

11.5.41 **Tables 11.12** and **11.13** above summarise the links where traffic flows change as a result of the construction traffic during each time period.

11.5.42 Based on these changes in link flows, the construction traffic for the FDS Development Option will have a negligible effect on severance as none of the changes in flow are more than 30%.

11.5.43 It is likely that the implementation of temporary pedestrian routes across the site during constriction will have a direct, temporary short-term **minor negative** effect on severance.

11.5.44 Overall it is considered that the construction of the FDS Development will have a direct, temporary short-term **minor negative** effect on severance.

Mitigation

11.5.45 Construction access, traffic and temporary diversions will be controlled through a Construction Logistics Plan (CLP). This will set out how construction traffic will be managed and its impact minimised. Further details are set out in the Transport Assessment (Ref. 11.1) to which the CLP is appended.

Residual Effect

11.5.46 It is considered that the construction of the FDS Development will have a direct, temporary short-term **minor negative** effect on severance.

Driver Delay

11.5.47 During construction, driver delay will be affected by temporary traffic management in the vicinity of the FDS Development, and the potential temporary closure of existing routes in the vicinity of the proposed development. The increase in heavy vehicle flows in the vicinity of the Site during construction may also have an effect on driver delay.

11.5.48 The average daily construction traffic flow is expected to be around 37 two-way trips at its peak. This vehicle flow in itself is not sufficient to cause any perceptible change in delay to drivers in the area.

11.5.49 The temporary traffic management and speed limit reductions will be required for short periods during the construction of the site and these will have a direct, short-term **minor negative** effect on driver delay as on average they are likely to cause less than a 60 second increase.

11.5.50 Overall the construction of the FDS Development will have a **minor negative** effect on driver delay.

Mitigation

11.5.51 Construction access, traffic and temporary diversions will be controlled through a Construction Logistics Plan (CLP). This will set out how construction traffic will be managed and its impact minimised. Further details are set out in the Transport Assessment (Ref. 11.1) to which the CLP is appended.

Residual Effect

11.5.52 Overall the construction of the FDS Development will have a **minor negative** effect on driver delay.

Pedestrian and Cycle Delay

11.5.53 Construction of the FDS Development will result in the temporary closure and/or re-routing of some existing pedestrian and cycle routes across the Site which may extend some pedestrian and cycle routes. The construction period is also likely to involve temporary width restrictions on footpaths adjacent to the Site and it may also be necessary to temporarily close existing pedestrian crossings at some locations.

11.5.54 The construction traffic routes to the FDS Development are generally on roads with some existing provision for pedestrians and cyclists. It is therefore considered that the construction traffic will have a direct, temporary **minor negative** effect on pedestrian and cycle delay.

Pedestrian and Cycle Amenity

11.5.55 Pedestrian and cycle amenity reflects the relative pleasantness of a journey for pedestrians and cyclists, which includes changes in traffic volume and pavement width/ separation from vehicles. Pedestrian and cycle amenity can also include consideration of whether routes for pedestrians and cyclists are available and the quality of those routes (such as whether the route is free of debris or whether adequate street lighting is available).

11.5.56 During construction of the FDS Development, construction traffic will be routed along roads which have some existing provision for pedestrians and cyclists.

11.5.57 Other effects on pedestrian and cycle amenity due to the construction activities include:

- Closure of the existing pedestrian and cycle routes across the Site;
- Construction work adjacent to the footway;
- Temporary closure of pedestrian and cycle crossings in the vicinity of the site due to construction activity;
- Temporary closure or width restrictions on footways adjacent to the site; and
- Mud/ debris on footways.

11.5.58 There is likely to be a direct, temporary **minor negative** effect on pedestrian and cycle amenity as a result of the construction activities during construction of the FDS Development.

Mitigation

11.5.59 Some disruption to footway and cycle routes is unfortunately unavoidable during construction of a project of this nature. Construction access, traffic and temporary diversions will be controlled through a Construction Logistics Plan (CLP). This will set out how construction traffic will be managed and its impact minimised. Further details are set out in the Transport Assessment (Ref. 11.1) to which the CLP is appended.

Residual Effect

11.5.60 There is likely to be a direct, temporary **minor negative** effect on pedestrian and cycle amenity as a result of the construction activities during construction of the FDS Development.

Fear and Intimidation

11.5.61 The level of fear and intimidation experienced may change as a result of a change in the volume of traffic, its HGV composition and speed. The change in the traffic levels as a result of the construction traffic will be minimal as set out in Table 11.13, and whilst the HGV composition may increase slightly, the overall impact on the level of fear and intimidation will be **negligible**.

Mitigation

11.5.62 A CLP will be put in place from the outset to ensure pedestrians and cyclists are provided with an equivalent level of service as without the construction activities. The construction vehicles would be managed to ensure any impact on fear and intimidation is managed.

Residual Effect

11.5.63 The effect of construction traffic on fear and intimidation is considered to be **negligible**.

Accidents and Safety

11.5.64 The change in traffic levels as a result of the construction traffic will be minimal during each of the time periods under consideration. The total daily expected level of construction traffic is 58 light and 100 heavy vehicles per day. Whilst this level of additional traffic will have some impact on the roads immediately surrounding the development, it is not expected that it would have a material adverse effect on accidents and safety. It is considered that in general, construction traffic will have a **negligible** effect on accidents and safety.

Mitigation

11.5.65 Whilst the overall effect on accidents and safety is expected to be negligible due to the predicted traffic levels, it is considered appropriate to ensure that high levels of safety awareness are at the core of construction operations on the surrounding network as HGV movements contribute to a large proportion of cycle deaths in London. As part of the CLP standards will be set for the compliance with the Freight Operator Recognition Scheme that includes driver awareness training. Further details are set out in the TA to which the CLP is appended.

Residual Effect

11.5.66 It is considered that in general, construction traffic will have a **negligible** effect on accidents and safety.

Operation

Site Wide Development Option

11.5.67 Once the Comprehensive Development is completed, the main effects on transport and access will be as a result of the additional trips that the Comprehensive Development will generate. The level of additional trip activity associated with the Comprehensive Development will be phased over a period of up to 20 years. Within this section the final transport effects of the completed development is presented, representing the cumulative impact of the development proposal over the planned build-out period.

11.5.68 The modelled traffic flows include all new access points and new internal roads; however the improvements to junctions on Albany Road are identified as mitigation measures and have been included in the assessment of residual effects. This is because the improvements are likely to be constructed independently from the site proposals and are likely to be delivered either by or in agreement with LBS as they are within the Highway. The Albany Road proposals, set out in detail in the Transport assessment (Ref. 11.1), are to improve pedestrian environment and connectivity rather than improve traffic flow.

11.5.69 Elsewhere, only the residual effects have been assessed. Pedestrian infrastructure within the development will primarily comprise a comprehensive network of footway routes facilitating a high degree of permeability and enabling non-motorised users to move around the development with ease. Such routes will link into the existing network of footpaths around the development site and are shown on the Parameter Plans.

Severance

11.5.70 Following the completion of the Comprehensive Development the main impact on severance will be as a result of the additional traffic that the Comprehensive Development will generate. **Tables 11.14** and **11.15** provide full details of the predicted changes in peak hour link flows on the main links at the assessed junctions within the study area. It also sets out the significance of the effects in the absence of mitigation.

Table 11.14Traffic Flows on links: Significance of Effect AM Peak (2014 Do Nothing vs 2014 Do Minimum)

Link	From	To	Do Nothing	Do Minimum	Flow Change	% Flow Change	Significance
A201 New Kent Road	Rodney Place	-	2355	2357	2	0.1%	Negligible
A201 New Kent Road	Rodney Place	A2 Old Kent Road	2127	2127	0	0.0%	Negligible
Rodney Place	A201 New Kent Road	Heygate Street	266	268	2	0.8%	Negligible
A215 Walworth Road	Heygate Street	-	1144	1150	6	0.5%	Negligible
Heygate Street	Rodney Place	A215 Walworth Road	408	410	2	0.5%	Negligible
Rodney Road	Rodney Place	East Street	795	801	6	0.8%	Negligible
A2 Old Kent Road	East Street	A201 New Kent Road	2371	2377	6	0.3%	Negligible
East Street	Thurlow Street	A2 Old Kent Road	604	609	5	0.8%	Negligible
East Street	Thurlow Street	-	63	63	0	0.0%	Negligible
Hendre Road	A2 Oid Kent Road	-	1	1	0	0.0%	Negligible
A215 Walworth Road	Heygate Street	East Street	777	786	9	1.2%	Negligible
A215 Walworth Road	Fielding Street	Merrow Street	845	853	8	0.9%	Negligible
Fielding Street	A215 Walworth Road	-	93	93	0	0.0%	Negligible
Portland Street	Merrow Street	-	336	339	3	0.9%	Negligible
Thurlow Street	East Street	Area 3/4 Access	819	827	8	1.0%	Negligible
A2 Old Kent Road	East Street	B203 Dunton Road	2385	2388	3	0.1%	Negligible
Merrow Street	A215 Walworth Road	Portland Street	113	113	0	0.0%	Negligible

Link	From	To	Do Nothing	Do Minimum	Flow Change	% Flow Change	Significance
Merrow Street	Portland Street	-	12	12	0	0.0%	Negligible
A215 Walworth Road	Merrow Street	John Ruskin Street	913	922	9	1.0%	Negligible
John Ruskin Street	A215 Walworth Road	-	395	397	2	0.5%	Negligible
A215 Walworth Road	John Ruskin Street	B214 Albany Road	1126	1136	10	0.9%	Negligible
Portland Street	Merrow Street	B214 Albany Road	525	531	6	1.1%	Negligible
Urlwin Street	A215 Walworth Road	-	45	45	0	0.0%	Negligible
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	2098	2098	0	0.0%	Negligible
A215 Camberwell Road	A214 Albany Road	-	1202	1211	9	0.7%	Negligible
B214 Albany Road	A215 Walworth Road	Area 1 Access	939	956	17	1.8%	Negligible
B214 Albany Road	Portland Street	Wells Way	1277	1297	20	1.6%	Negligible
Wells Way	B214 Albany Road	-	1096	1100	4	0.4%	Negligible
B214 Albany Road	Wells Way	Thurlow Street	1540	1561	21	1.4%	Negligible
B214 Albany Road	A2 Old Kent Road	Area 2 Access	1405	1417	12	0.9%	Negligible
B204 Humphrey Road	A2 Old Kent Road	-	1197	1200	3	0.3%	Negligible
A2 Old Kent Road	B214 Albany Road	-	2503	2506	3	0.1%	Negligible
Thurlow Street	Area 3/4 Access	B214 Albany Road	938	961	23	2.5%	Negligible
B214 Albany Road	Area 2 Access	Thurlow Street	1367	1382	15	1.1%	Negligible
B214 Albany Road	Area 1 Access	Portland Street	911	931	20	2.2%	Negligible
Steedman Street	A215 Walworth Road	-	58	58	0	0.0%	Negligible
Boyson Road	A215 Walworth Road	-	16	16	0	0.0%	Negligible
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	216	220	4	1.9%	Negligible
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	1188	1195	7	0.6%	Negligible

Table 11.15Traffic Flows on links: Significance of Effect PM Peak (2014 Do Nothing vs 2014 Do Minimum)

Link	From	To	Do Nothing	Do Minimum	Flow Change	% Flow Change	Significance
A201 New Kent Road	Rodney Place	-	2230	2230	0	0.0%	Negligible
A201 New Kent Road	Rodney Place	A2 Old Kent Road	2138	2138	0	0.0%	Negligible
Rodney Place	A201 New Kent Road	Heygate Street	134	134	0	0.2%	Negligible
A215 Walworth Road	Heygate Street	-	1229	1233	5	0.4%	Negligible

Link	From	To	Do Nothing	Do Minimum	Flow Change	% Flow Change	Significance
Heygate Street	Rodney Place	A215 Walworth Road	584	586	3	0.5%	Negligible
Rodney Road	Rodney Place	East Street	680	682	3	0.4%	Negligible
A2 Old Kent Road	East Street	A201 New Kent Road	2469	2474	5	0.2%	Negligible
East Street	Thurlow Street	A2 Old Kent Road	442	447	4	1.0%	Negligible
East Street	Thurlow Street	-	86	86	0	0.0%	Negligible
Hendre Road	A2 Oid Kent Road	-	3	3	0	0.0%	Negligible
A215 Walworth Road	Heygate Street	East Street	784	791	7	0.9%	Negligible
A215 Walworth Road	Fielding Street	Merrow Street	807	815	8	1.0%	Negligible
Fielding Street	A215 Walworth Road	-	76	76	0	0.0%	Negligible
Portland Street	Merrow Street	-	295	298	3	0.9%	Negligible
Thurlow Street	East Street	Area 3/4 Access	722	725	3	0.4%	Negligible
A2 Old Kent Road	East Street	B203 Dunton Road	2577	2580	3	0.1%	Negligible
Merrow Street	A215 Walworth Road	Portland Street	70	71	1	0.9%	Negligible
Merrow Street	Portland Street	-	6	6	0	0.0%	Negligible
A215 Walworth Road	Merrow Street	John Ruskin Street	760	768	9	1.1%	Negligible
John Ruskin Street	A215 Walworth Road	-	312	313	1	0.4%	Negligible
A215 Walworth Road	John Ruskin Street	B214 Albany Road	995	1005	10	1.0%	Negligible
Portland Street	Merrow Street	B214 Albany Road	354	359	5	1.3%	Negligible
Urlwin Street	A215 Walworth Road	-	51	51	0	0.0%	Negligible
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	2389	2390	1	0.0%	Negligible
A215 Camberwell Road	A214 Albany Road	-	1189	1197	8	0.7%	Negligible
B214 Albany Road	A215 Walworth Road	Area 1 Access	836	850	14	1.7%	Negligible
B214 Albany Road	Portland Street	Wells Way	1069	1087	18	1.7%	Negligible
Wells Way	B214 Albany Road	-	1025	1028	3	0.3%	Negligible
B214 Albany Road	Wells Way	Thurlow Street	1501	1520	19	1.3%	Negligible
B214 Albany Road	A2 Old Kent Road	Area 2 Access	1239	1248	9	0.7%	Negligible
B204 Humphrey Road	A2 Old Kent Road	-	1121	1124	3	0.3%	Negligible
A2 Old Kent Road	B214 Albany Road	-	3066	3068	2	0.1%	Negligible
Thurlow Street	Area 3/4 Access	B214 Albany Road	948	965	18	1.9%	Negligible
B214 Albany Road	Area 2 Access	Thurlow Street	1237	1248	11	0.9%	Negligible
B214 Albany Road	Area 1 Access	Portland Street	871	889	18	2.0%	Negligible
Steedman Street	A215 Walworth Road	-	75	75	0	0.0%	Negligible

Link	From	To	Do Nothing	Do Minimum	Flow Change	% Flow Change	Significance
Boyson Road	A215 Walworth Road	-	30	30	0	0.0%	Negligible
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	127	130	3	2.4%	Negligible
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	1112	1118	5	0.5%	Negligible

11.5.71 In both the AM and the PM peaks the change in traffic flow as a result of the completed development is negligible. The proposals are for the increase in residential density on an existing area of housing where the car only accounts for around 10% of trips. The effect of the Comprehensive Development on severance effects is therefore limited and the effect is considered **negligible**.

Mitigation

11.5.72 As the Comprehensive Development has no adverse effect on severance, no mitigation measures are proposed.

Residual Effects

11.5.73 The residual effect of the Comprehensive Development on severance is **negligible**.

Driver Delay

11.5.74 The effect of the Comprehensive Development on driver delay will be as a result of the following:

- Increases in vehicle flows at junctions;
- Provision of an increased number of pedestrian crossings;
- Increases in pedestrian flows at pedestrian crossings;
- Increases in the number of stopping buses and bus dwell times as a result of increased bus passengers.

11.5.75 The junction models enable a comparison of the delay associated with each junction as a per vehicle statistic. **Table 11.16** shows the comparison of the Do Nothing and Do Minimum scenarios

Table 11.16 Change in Delay at Junction (2014 Do Nothing vs 2014 Do Minimum)

Scenario	Do Nothing (seconds)	Do Minimum (seconds)	Net Change (seconds)	Effect Significance
Albany Road/ Camberwell Road				
AM Peak	56.3	60.9	+4.6	Negligible
PM Peak	56.7	66.7	+10.0	Negligible
Albany Road/ Portland Street				
AM Peak	34.4	35.7	+1.3	Negligible
PM Peak	31.5	31.9	+0.4	Negligible
Albany Road/ Wells Way				
AM Peak	16.8	17.1	+0.3	Negligible
PM Peak	15.8	16.0	+0.2	Negligible
Albany Road/ Thurlow Street				
AM Peak	27.9	29.5	+1.6	Negligible
PM Peak	19.0	19.9	+0.9	Negligible
Old Kent Road/ Albany Road/ Humphrey Street/ Shorncliffe Street				
AM Peak	47.0	48.4	+1.4	Negligible

Scenario	Do Nothing (seconds)	Do Minimum (seconds)	Net Change (seconds)	Effect Significance
PM Peak	51.5	55.6	+4.1	Negligible
Thurlow Street/ East Street				
AM Peak	13.5	13.7	+0.2	Negligible
PM Peak	10.7	10.8	+0.1	Negligible
Old Kent Road/ East Street/ Hendre Road				
AM Peak	17.8	18.6	+0.8	Negligible
PM Peak	14.2	14.7	+0.5	Negligible
Camberwell Road/ John Ruskin Street				
AM Peak	17.3	17.6	+0.3	Negligible
PM Peak	12.0	12.1	+0.1	Negligible
Walworth Road/ Fielding Street/ Merrow Street				
AM Peak	10.7	10.7	0.0	Negligible
PM Peak	9.4	9.5	+0.1	Negligible
Walworth Road/ Heygate Street				
AM Peak	85.6	84.9	-0.5	Negligible
PM Peak	46.8	47.0	+0.2	Negligible
Heygate Street/ Rodney Place				
AM Peak	9.0	9.1	+0.1	Negligible
PM Peak	9.3	9.3	0.0	Negligible
New Kent Road/ Rodney Place				
AM Peak	35.2	37.6	+2.4	Negligible
PM Peak	13.5	13.5	0.0	Negligible
Portland Street/ Merrow Street				
AM Peak	6.8	6.8	0.0	Negligible
PM Peak	6.8	6.9	+0.1	Negligible

11.5.76 The driver delay data indicates that the traffic from the Comprehensive Development is predicted to have a negligible impact on the operation 12 of the 13 junctions tested. The worst case junction performance is at the Albany Road/ Camberwell Road junction, where the average delay is predicted to increase by 10 seconds per vehicle in the evening peak. The over effect before mitigation is therefore considered to be **negligible**.

Mitigation

11.5.77 A scheme to improve the urban realm for pedestrians and cyclists is proposed on Albany Road. Further details of the development of this design is set out in the Transport Assessment (Ref. 11.1). The predicted changes in delay at the modified Albany Road junctions (Portland Street, Wells Way and Thurlow Street) are set out in **Table 11.17** below.

Table 11.17Change in Delay at Junction (2014 Do Nothing vs 2014 Do Something)

Scenario	Do Nothing (seconds)	Do Something (seconds)	Net Change (seconds)	Effect Significance
Albany Road/ Portland Street				
AM Peak	34.4	33.4	-1.0	Negligible
PM Peak	31.5	58.3	+26.8	Negligible
Albany Road/ Wells Way				

Scenario	Do Nothing (seconds)	Do Something (seconds)	Net Change (seconds)	Effect Significance
AM Peak	16.8	69.2	+52.4	Minor Negative
PM Peak	15.8	26.0	+10.2	Negligible
Albany Road/ Thurlow Street				
AM Peak	27.9	38.3	+10.4	Negligible
PM Peak	19.0	34.0	+15.0	Negligible

11.5.78 The Comprehensive Development has a negative impact on driver delay, as the Comprehensive Development has been designed to improve facilities for pedestrians and cyclists. A sensitivity test has also been undertaken in the Transport Assessment which assumes the current rate of decrease in car trips (0.8% points per year) continues in the future. In this scenario, the proposed urban realm scheme is predicted to have a minor negative impact on the Albany Road/ Wells Way junctions and a negligible impact on the Albany Road/ Thurlow Street and Albany Road/ Portland Street junctions.

Residual Effects

11.5.79 The residual effect of the development on driver delay is **minor negative**.

Pedestrian and Cyclist Delay

11.5.80 The effect of the Comprehensive Development on pedestrian and cycle delay is measured by the change in traffic volume and speed of traffic. **Table 11.18** provides details of the change in traffic flow and speeds on relevant links in the vicinity of the site proposals for the AM and PM peak hours.

Table 11.18 Links with changed traffic volume / speed (2014 Do Nothing vs 2014 Do Minimum)

Link	From	To	Do Nothing		Do Minimum		Change		Significance
AM Peak			**Flow**	**Speed**	**Flow**	**Speed**	**Flow**	**Speed**	
A201 New Kent Road	Rodney Place	-	2355	48	2361	48	6	0	Negligible
A201 New Kent Road	Rodney Place	A2 Old Kent Road	2127	48	2127	48	0	0	Negligible
Rodney Place	A201 New Kent Road	Heygate Street	266	32	272	32	6	0	Negligible
A215 Walworth Road	Heygate Street	-	1144	48	1155	48	12	0	Negligible
Heygate Street	Rodney Place	A215 Walworth Road	408	32	411	32	3	0	Negligible
Rodney Road	Rodney Place	East Street	795	32	807	32	12	0	Negligible
A2 Old Kent Road	East Street	A201 New Kent Road	2372	48	2383	48	11	0	Negligible
East Street	Thurlow Street	A2 Old Kent Road	605	32	615	32	11	0	Negligible
East Street	Thurlow Street	-	63	32	63	32	0	0	Negligible
Hendre Road	A2 Old Kent Road	-	1	32	1	32	0	0	Negligible
A215 Walworth	Heygate	East Street	777	32	792	32	15	0	Negligible

Link	From	To	Do Nothing		Do Minimum		Change		Significance
AM Peak			Flow	Speed	Flow	Speed	Flow	Speed	
Road	Street								
A215 Walworth Road	Fielding Street	Merrow Street	845	32	859	32	15	0	Negligible
Fielding Street	A215 Walworth Road	-	93	32	93	32	0	0	Negligible
Portland Street	Merrow Street	-	336	32	344	32	8	0	Negligible
Thurlow Street	East Street	Area 3/4 Access	819	32	836	32	17	0	Negligible
A2 Old Kent Road	East Street	B203 Dunton Road	2385	48	2390	48	4	0	Negligible
Merrow Street	A215 Walworth Road	Portland Street	113	32	113	32	0	0	Negligible
Merrow Street	Portland Street	-	12	32	13	32	1	0	Negligible
A215 Walworth Road	Merrow Street	John Ruskin Street	913	32	929	32	15	0	Negligible
John Ruskin Street	A215 Walworth Road	-	396	32	398	32	3	0	Negligible
A215 Walworth Road	John Ruskin Street	B214 Albany Road	1126	32	1144	32	18	0	Negligible
Portland Street	Merrow Street	B214 Albany Road	525	32	541	32	16	0	Negligible
Urlwin Street	A215 Walworth Road	-	45	32	45	32	0	0	Negligible
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	2098	48	2098	48	0	0	Negligible
A215 Camberwell Road	A214 Albany Road	-	1202	48	1219	48	17	0	Negligible
B214 Albany Road	A215 Walworth Road	Area 1 Access	939	32	975	32	36	0	Negligible
B214 Albany Road	Portland Street	Wells Way	1277	32	1327	32	50	0	Negligible
Wells Way	B214 Albany Road	-	1096	32	1105	32	8	0	Negligible
B214 Albany Road	Wells Way	Thurlow Street	1540	32	1594	32	54	0	Negligible
B214 Albany Road	A2 Old Kent Road	Area 2 Access	1405	32	1433	32	27	0	Negligible
B204 Humphrey Road	A2 Oid Kent Road	-	1197	48	1203	48	7	0	Negligible

Link	From	To	Do Nothing		Do Minimum		Change		Significance
AM Peak			**Flow**	**Speed**	**Flow**	**Speed**	**Flow**	**Speed**	
A2 Old Kent Road	B214 Albany Road	-	2503	48	2516	48	14	0	Negligible
Thurlow Street	Area 3/4 Access	B214 Albany Road	938	32	1019	32	81	0	Negligible
B214 Albany Road	Area 2 Access	Thurlow Street	1367	32	1403	32	37	0	Negligible
B214 Albany Road	Area 1 Access	Portland Street	911	32	943	32	32	0	Negligible
Steedman Street	A215 Walworth Road	-	58	32	58	32	0	0	Negligible
Boyson Road	A215 Walworth Road	-	16	32	16	32	0	0	Negligible
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	216	32	222	32	7	0	Negligible
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	1188	32	1208	32	20	0	Negligible
PM Peak			**Flow**	**Speed**	**Flow**	**Speed**	**Flow**	**Speed**	
A201 New Kent Road	Rodney Place	-	2230	48	2235	48	5	0	Negligible
A201 New Kent Road	Rodney Place	A2 Old Kent Road	2138	48	2138	48	0	0	Negligible
Rodney Place	A201 New Kent Road	Heygate Street	134	32	139	32	5	0	Negligible
A215 Walworth Road	Heygate Street	-	1229	48	1237	48	8	0	Negligible
Heygate Street	Rodney Place	A215 Walworth Road	584	32	587	32	4	0	Negligible
Rodney Road	Rodney Place	East Street	680	32	689	32	9	0	Negligible
A2 Old Kent Road	East Street	A201 New Kent Road	2469	48	2481	48	12	0	Negligible
East Street	Thurlow Street	A2 Old Kent Road	443	32	453	32	10	0	Negligible
East Street	Thurlow Street	-	86	32	86	32	0	0	Negligible
Hendre Road	A2 Old Kent Road	-	3	32	3	32	0	0	Negligible
A215 Walworth Road	Heygate Street	East Street	784	32	796	32	12	0	Negligible
A215 Walworth Road	Fielding Street	Merrow Street	807	32	820	32	13	0	Negligible
Fielding Street	A215 Walworth Road	-	76	32	76	32	0	0	Negligible
Portland Street	Merrow Street	-	295	32	302	32	6	0	Negligible
Thurlow Street	East Street	Area 3/4	721	32	735	32	14	0	Negligible

Link	From	To	Do Nothing		Do Minimum		Change		Significance
AM Peak			Flow	Speed	Flow	Speed	Flow	Speed	
		Access							
A2 Old Kent Road	East Street	B203 Dunton Road	2577	48	2581	48	3	0	Negligible
Merrow Street	A215 Walworth Road	Portland Street	70	32	71	32	1	0	Negligible
Merrow Street	Portland Street	-	6	32	6	32	0	0	Negligible
A215 Walworth Road	Merrow Street	John Ruskin Street	760	32	773	32	13	0	Negligible
John Ruskin Street	A215 Walworth Road	-	312	32	315	32	3	0	Negligible
A215 Walworth Road	John Ruskin Street	B214 Albany Road	995	32	1011	32	16	0	Negligible
Portland Street	Merrow Street	B214 Albany Road	354	32	367	32	13	0	Negligible
Urlwin Street	A215 Walworth Road	-	51	32	51	32	0	0	Negligible
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	2389	48	2390	48	1	0	Negligible
A215 Camberwell Road	A214 Albany Road	-	1189	48	1206	48	17	0	Negligible
B214 Albany Road	A215 Walworth Road	Area 1 Access	837	32	870	32	34	0	Negligible
B214 Albany Road	Portland Street	Wells Way	1069	32	1116	32	47	0	Negligible
Wells Way	B214 Albany Road	-	1025	32	1034	32	9	0	Negligible
B214 Albany Road	Wells Way	Thurlow Street	1501	32	1553	32	52	0	Negligible
B214 Albany Road	A2 Old Kent Road	Area 2 Access	1239	32	1266	32	26	0	Negligible
B204 Humphrey Road	A2 Oid Kent Road	-	1121	48	1128	48	7	0	Negligible
A2 Old Kent Road	B214 Albany Road	-	3066	48	3080	48	14	0	Negligible
Thurlow Street	Area 3/4 Access	B214 Albany Road	948	32	1027	32	79	0	Negligible
B214 Albany Road	Area 2 Access	Thurlow Street	1237	32	1272	32	35	0	Negligible
B214 Albany Road	Area 1 Access	Portland Street	872	32	904	32	32	0	Negligible
Steedman Street	A215 Walworth	-	75	32	75	32	0	0	Negligible

Link	From	To	Do Nothing		Do Minimum		Change		Significance
AM Peak			Flow	Speed	Flow	Speed	Flow	Speed	
	Road								
Boyson Road	A215 Walworth Road	-	30	32	30	32	0	0	Negligible
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	127	32	131	32	5	0	Negligible
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	1112	32	1133	32	21	0	Negligible

11.5.81 Of the 39 links considered throughout the area and across both time periods the majority of links have a negligible impact on traffic flows (a change in traffic flows of +/- 200 vehicles per hour). The impact on speeds across both time periods is mainly negligible, with no links experiencing change in speed of greater than +/- 5mph. The quantification of these impacts as provided in the tables provides an overall indication of the performance of the links in respect of pedestrian and cycle delay, however the overall assessment and conclusion is based on assessor judgement.

11.5.82 The improved permeability offered by the Comprehensive Development and the additional/improved crossing facilities that are being provided will make more direct routes available to pedestrians and cyclists. These would offer a **moderate beneficial** benefit to pedestrians and cyclists compared to what is currently available.

Mitigation

11.5.83 The mitigation measures proposed on Albany Road will improve the facilities for pedestrians and cyclists at the junctions being affected, however the overall effect of these improvements across the development will not be significantly different than without. The overall effect of the mitigation measures will be to maintain a **moderate beneficial** effect.

Residual Effects

11.5.84 The effect on pedestrian and cyclist delay is **moderate beneficial**, therefore there are no residual negative effects.

Pedestrian and Cyclist Amenity

11.5.85 The main effects on pedestrian amenity as a result of the Comprehensive Development will be as a result of the following:

- Increased traffic flows alongside pedestrian and cycle routes;
- Ability of pedestrians and cyclists to cross the road;
- Quality of the facilities available for pedestrians and cyclists;
- Increased numbers of pedestrians using existing footways and footpaths; and
- Availability of pedestrian and cycle routes.

11.5.86 With regard the traffic flows alongside the pedestrian routes the effect on amenity is assessed against the change in the number of vehicles per minute on each of the assessed links. **Table 11.19** provides a summary of the results. It is considered that the change in traffic flow as a result of the proposed development will have a negligible effect on pedestrian and cyclist amenity on existing routes.

Table 11.19 Summary of change in number of vehicles per minute (2014 Do Nothing vs 2014 Do Minimum)

Link	From	To	AM Peak			Significance
			Do N	Do M	Change	
A201 New Kent Road	Rodney Place	-	39.3	39.3	0.1	Negligible
A201 New Kent Road	Rodney Place	A2 Old Kent Road	35.5	35.5	0.0	Negligible
Rodney Place	A201 New Kent Road	Heygate Street	4.4	4.5	0.1	Negligible
A215 Walworth Road	Heygate Street	-	19.1	19.3	0.2	Negligible
Heygate Street	Rodney Place	A215 Walworth Road	6.8	6.8	0.0	Negligible
Rodney Road	Rodney Place	East Street	13.2	13.4	0.2	Negligible
A2 Old Kent Road	East Street	A201 New Kent Road	39.5	39.7	0.2	Negligible
East Street	Thurlow Street	A2 Old Kent Road	10.1	10.3	0.2	Negligible
East Street	Thurlow Street	-	1.1	1.1	0.0	Negligible
Hendre Road	A2 Old Kent Road	-	0.0	0.0	0.0	Negligible
A215 Walworth Road	Heygate Street	East Street	13.0	13.2	0.2	Negligible
A215 Walworth Road	Fielding Street	Merrow Street	14.1	14.3	0.2	Negligible
Fielding Street	A215 Walworth Road	-	1.6	1.6	0.0	Negligible
Portland Street	Merrow Street	-	5.6	5.7	0.1	Negligible
Thurlow Street	East Street	Area 3/4 Access	13.6	13.9	0.3	Negligible
A2 Old Kent Road	East Street	B203 Dunton Road	39.8	39.8	0.1	Negligible
Merrow Street	A215 Walworth Road	Portland Street	1.9	1.9	0.0	Negligible
Merrow Street	Portland Street	-	0.2	0.2	0.0	Negligible
A215 Walworth Road	Merrow Street	John Ruskin Street	15.2	15.5	0.3	Negligible
John Ruskin Street	A215 Walworth Road	-	6.6	6.6	0.0	Negligible
A215 Walworth Road	John Ruskin Street	B214 Albany Road	18.8	19.1	0.3	Negligible
Portland Street	Merrow Street	B214 Albany Road	8.8	9.0	0.3	Negligible

Link	From	To	AM Peak			Significance
Urlwin Street	A215 Walworth Road	-	0.8	0.8	0.0	Negligible
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	35.0	35.0	0.0	Negligible
A215 Camberwell Road	A214 Albany Road	-	20.0	20.3	0.3	Negligible
B214 Albany Road	A215 Walworth Road	Area 1 Access	15.7	16.3	0.6	Negligible
B214 Albany Road	Portland Street	Wells Way	21.3	22.1	0.8	Negligible
Wells Way	B214 Albany Road	-	18.3	18.4	0.1	Negligible
B214 Albany Road	Wells Way	Thurlow Street	25.7	26.6	0.9	Negligible
B214 Albany Road	A2 Old Kent Road	Area 2 Access	23.4	23.9	0.5	Negligible
B204 Humphrey Road	A2 Oid Kent Road	-	19.9	20.1	0.1	Negligible
A2 Old Kent Road	B214 Albany Road	-	41.7	41.9	0.2	Negligible
Thurlow Street	Area 3/4 Access	B214 Albany Road	15.6	17.0	1.3	Negligible
B214 Albany Road	Area 2 Access	Thurlow Street	22.8	23.4	0.6	Negligible
B214 Albany Road	Area 1 Access	Portland Street	15.2	15.7	0.5	Negligible
Steedman Street	A215 Walworth Road	-	1.0	1.0	0.0	Negligible
Boyson Road	A215 Walworth Road	-	0.3	0.3	0.0	Negligible
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	3.6	3.7	0.1	Negligible
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	19.8	20.1	0.3	Negligible
Link	**From**	**To**	**PM Peak**			**Significance**
			Do N	**Do M**	**Change**	
A201 New Kent Road	Rodney Place	-	37.2	37.3	0.1	Negligible
A201 New Kent Road	Rodney Place	A2 Old Kent Road	35.6	35.6	0.0	Negligible
Rodney Place	A201 New Kent Road	Heygate Street	2.2	2.3	0.1	Negligible
A215 Walworth	Heygate Street	-	20.5	20.6	0.1	Negligible

Link	From	To	AM Peak			Significance
Road						
Heygate Street	Rodney Place	A215 Walworth Road	9.7	9.8	0.1	Negligible
Rodney Road	Rodney Place	East Street	11.3	11.5	0.2	Negligible
A2 Old Kent Road	East Street	A201 New Kent Road	41.2	41.4	0.2	Negligible
East Street	Thurlow Street	A2 Old Kent Road	7.4	7.5	0.2	Negligible
East Street	Thurlow Street	-	1.4	1.4	0.0	Negligible
Hendre Road	A2 Old Kent Road	-	0.1	0.1	0.0	Negligible
A215 Walworth Road	Heygate Street	East Street	13.1	13.3	0.2	Negligible
A215 Walworth Road	Fielding Street	Merrow Street	13.5	13.7	0.2	Negligible
Fielding Street	A215 Walworth Road	-	1.3	1.3	0.0	Negligible
Portland Street	Merrow Street	-	4.9	5.0	0.1	Negligible
Thurlow Street	East Street	Area 3/4 Access	12.0	12.3	0.2	Negligible
A2 Old Kent Road	East Street	B203 Dunton Road	43.0	43.0	0.1	Negligible
Merrow Street	A215 Walworth Road	Portland Street	1.2	1.2	0.0	Negligible
Merrow Street	Portland Street	-	0.1	0.1	0.0	Negligible
A215 Walworth Road	Merrow Street	John Ruskin Street	12.7	12.9	0.2	Negligible
John Ruskin Street	A215 Walworth Road	-	5.2	5.3	0.0	Negligible
A215 Walworth Road	John Ruskin Street	B214 Albany Road	16.6	16.9	0.3	Negligible
Portland Street	Merrow Street	B214 Albany Road	5.9	6.1	0.2	Negligible
Urlwin Street	A215 Walworth Road	-	0.9	0.9	0.0	Negligible
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	39.8	39.8	0.0	Negligible
A215 Camberwell Road	A214 Albany Road	-	19.8	20.1	0.3	Negligible
B214 Albany	A215	Area 1 Access	13.9	14.5	0.6	Negligible

Link	From	To	AM Peak			Significance
Road	Walworth Road					
B214 Albany Road	Portland Street	Wells Way	17.8	18.6	0.8	Negligible
Wells Way	B214 Albany Road	-	17.1	17.2	0.1	Negligible
B214 Albany Road	Wells Way	Thurlow Street	25.0	25.9	0.9	Negligible
B214 Albany Road	A2 Old Kent Road	Area 2 Access	20.7	21.1	0.4	Negligible
B204 Humphrey Road	A2 Oid Kent Road	-	18.7	18.8	0.1	Negligible
A2 Old Kent Road	B214 Albany Road	-	51.1	51.3	0.2	Negligible
Thurlow Street	Area 3/4 Access	B214 Albany Road	15.8	17.1	1.3	Negligible
B214 Albany Road	Area 2 Access	Thurlow Street	20.6	21.2	0.6	Negligible
B214 Albany Road	Area 1 Access	Portland Street	14.5	15.1	0.5	Negligible
Steedman Street	A215 Walworth Road	-	1.3	1.3	0.0	Negligible
Boyson Road	A215 Walworth Road	-	0.5	0.5	0.0	Negligible
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	2.1	2.2	0.1	Negligible
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	18.5	18.9	0.4	Negligible

11.5.87 The above assessment only considers existing routes, however the Comprehensive Development includes a number of improvements to enhance provision and facilities for pedestrians and cyclists that connect with existing pedestrian routes on key desire lines. A beneficial impact in this respect is therefore afforded through the Comprehensive Development.

11.5.88 The number of pedestrians on key pedestrian routes has not been assessed in detail, however data in respect of existing usage was collected. Enhancements have been provided where necessary within the development to ensure adequate provision on the existing routes and desire lines to accommodate increased pedestrian and cycle flows. The quality of the facilities for pedestrians and cyclists within and connecting to outside the site will offer a significant improvement over existing provision. The main improvement for pedestrian and cycle amenity is the more permeable street network that will be introduced by the development. This street network will provide additional pedestrian and cyclist routes, and will allow pedestrians/ cyclists to use more lightly trafficked routes to reach their destination.

11.5.89 Overall it is therefore considered that the impact of pedestrian and cyclist amenity will be a **moderate beneficial** effect.

Mitigation

11.5.90 The mitigation measures proposed on Albany Road will improve the facilities for pedestrians and cyclists at the junctions being affected, however the overall effect of these improvements across the development will not be significantly different than without. The overall effect of the mitigation measures will be to maintain a **moderate beneficial** effect.

Residual Effects

11.5.91 The effect on pedestrian and cyclist amenity is **moderate beneficial**, there are therefore no residual effects of the Comprehensive Development.

Fear and Intimidation

11.5.92 Fear and intimidation relates to the volume of traffic, its HGV composition and the speed to traffic on links. The change in the volume and speed of traffic impacts have already been considered in respect of the pedestrian and cyclist delay section and showed an overall negligible impact. In respect of fear and intimidation it could be expected that the impact would be negligible.

11.5.93 The nature of the Comprehensive Development means that the HGV composition of the traffic flows will remain the same as the Do Nothing scenario. In respect of assessing fear and intimidation there would therefore be no impact.

11.5.94 The measures used do not assess fear and intimidation levels do not provide an assessment in relation to the overall openness, lighting and ambience of a route. The development proposals will provide a significant improvement to the attractiveness of walking by providing internal routes that are open and well lit. Compared with the existing provision this will offer a significant improvement.

11.5.95 The impact of the development proposals on fear and intimidation is therefore considered to be **moderate beneficial.**

Mitigation

11.5.96 As part of the application a Delivery and Servicing Plan will be prepared to control and inform larger vehicle movements to uses within the site. This will assist in limiting larger vehicle movements in unsuitable areas. Following mitigation it is considered to remain a **moderate beneficial** effect.

Residual Effects

11.5.97 The effect on fear and intimidation is **moderate beneficial**, there are therefore no residual effects of the development proposals.

Accidents and Safety

11.5.98 The effect of the Comprehensive Development on accidents and safety will primarily be as a result of the following:

- Increased traffic flows, pedestrian flows and cyclist flows with a corresponding increase in the potential for conflicts between these modes;
- Potential for conflicts as a result of changed road layout;
- Changes in vehicle speeds resulting in a change in accident severity;
- Changes in the environment for vulnerable road users (pedestrians and cyclists).

11.5.99 The proposed development will increase the total number of vehicles using the highway network in the vicinity of the site and it will also lead to an increase in the number of pedestrians and cyclists. The number of potential conflict points is therefore increased due to the provision being made for pedestrians and cyclists in the area. Notable locations where increased activity may occur are:

- Albany Road;
- Portland Street; and
- Thurlow Street;

11.5.100 However, the quality of the provision being made for pedestrians and cyclists will be higher than what is already in place. In particular, the urban realm improvements on Albany Road have focused on improved facilities for pedestrians and cyclists.

11.5.101 In addition, the desire lines of pedestrians and cyclists have been built into the site master planning which will limit the need for crossing busy streets un-aided.

11.5.102 The change in vehicle speeds has already been considered and showed that there would be **negligible** impact.

Mitigation

11.5.103 The environment being provided for pedestrians and cyclists will offer significant improvements over the Do-Nothing scheme. However there will be a greater population in the same area. The effect on accidents and safety is therefore considered to be **negligible**.

11.5.104 Overall it is considered that the impact of the Comprehensive Development on accidents and safety will be **negligible**.

Residual Effects

11.5.105 The effect on accidents and safety is **negligible**, there are therefore no residual effects of the Comprehensive Development.

FDS Development Option

Severance

11.5.106 Following the completion of the FDS Application site the main impact on severance will be as a result of the additional traffic that the FDS Application site will generate. Tables **11.20** and **11.21** provide full details of the predicted changes in peak hour link flows on the main links within the study area. It also sets out the significance of the effects in the absence of mitigation.

Table 11.20Traffic Flows on links: Significance of Effect AM Peak (2014 Do Nothing vs 2014 Do Minimum)

Link	From	To	Do Nothing	FDS	Flow Change	% Flow Change	Significance
A201 New Kent Road	Rodney Place	-	2355	2355	0	0.0%	Negligible
A201 New Kent Road	Rodney Place	A2 Old Kent Road	2127	2127	0	0.0%	Negligible
Rodney Place	A201 New Kent Road	Heygate Street	266	266	0	0.0%	Negligible
A215 Walworth Road	Heygate Street	-	1144	1148	4	0.3%	Negligible
Heygate Street	Rodney Place	A215 Walworth Road	408	410	2	0.5%	Negligible
Rodney Road	Rodney Place	East Street	795	797	0	0.3%	Negligible
A2 Old Kent Road	East Street	A201 New Kent Road	2371	2371	0	0.0%	Negligible
East Street	Thurlow Street	A2 Old Kent Road	604	605	1	0.2%	Negligible

Link	From	To	Do Nothing	FDS	Flow Change	% Flow Change	Significance
East Street	Thurlow Street	-	63	63	0	0.0%	Negligible
Hendre Road	A2 Oid Kent Road	-	1	1	0	0.0%	Negligible
A215 Walworth Road	Heygate Street	East Street	777	782	5	0.6%	Negligible
A215 Walworth Road	Fielding Street	Merrow Street	845	850	5	0.6%	Negligible
Fielding Street	A215 Walworth Road	-	93	93	0	0.0%	Negligible
Portland Street	Merrow Street	-	336	339	3	0.9%	Negligible
Thurlow Street	East Street	Area 3/4 Access	819	820	1	0.1%	Negligible
A2 Old Kent Road	East Street	B203 Dunton Road	2385	2387	2	0.1%	Negligible
Merrow Street	A215 Walworth Road	Portland Street	113	113	0	0.0%	Negligible
Merrow Street	Portland Street	-	12	12	0	0.0%	Negligible
A215 Walworth Road	Merrow Street	John Ruskin Street	913	913	6	0.0%	Negligible
John Ruskin Street	A215 Walworth Road	-	395	395	0	0.0%	Negligible
A215 Walworth Road	John Ruskin Street	B214 Albany Road	1126	1132	6	0.5%	Negligible
Portland Street	Merrow Street	B214 Albany Road	525	528	3	0.6%	Negligible
Urlwin Street	A215 Walworth Road	-	45	45	0	0.0%	Negligible
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	2098	2098	0	0.0%	Negligible
A215 Camberwell Road	A214 Albany Road	-	1202	1207	5	0.4%	Negligible
B214 Albany Road	A215 Walworth Road	Area 1 Access	939	950	11	1.2%	Negligible
B214 Albany Road	Portland Street	Wells Way	1277	1285	8	0.6%	Negligible
Wells Way	B214 Albany Road	-	1096	1098	2	0.2%	Negligible
B214 Albany Road	Wells Way	Thurlow Street	1540	1546	6	0.4%	Negligible
B214 Albany Road	A2 Old Kent Road	Area 2 Access	1405	1409	4	0.3%	Negligible
B204 Humphrey Road	A2 Old Kent Road	-	1197	1197	0	0.0%	Negligible
A2 Old Kent Road	B214 Albany Road	-	2503	2504	1	0.0%	Negligible
Thurlow Street	Area 3/4 Access	B214 Albany Road	938	940	2	0.2%	Negligible
B214 Albany Road	Area 2 Access	Thurlow Street	1367	1371	4	0.3%	Negligible
B214 Albany Road	Area 1 Access	Portland Street	911	922	11	1.2%	Negligible
Steedman Street	A215 Walworth Road	-	58	58	0	0.0%	Negligible
Boyson Road	A215 Walworth Road	-	16	16	0	0.0%	Negligible
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	216	218	2	0.9%	Negligible

Link	From	To	Do Nothing	FDS	Flow Change	% Flow Change	Significance
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	1188	1190	2	0.2%	Negligible

Table 11.21Traffic Flows on links: Significance of Effect PM Peak (2014 Do Nothing vs 2014 Do Minimum)

Link	From	To	Do Nothing	Do Minimum	Flow Change	% Flow Change	Significance
A201 New Kent Road	Rodney Place	-	2230	2230	0	0.0%	Negligible
A201 New Kent Road	Rodney Place	A2 Old Kent Road	2138	2138	0	0.0%	Negligible
Rodney Place	A201 New Kent Road	Heygate Street	134	134	0	0.0%	Negligible
A215 Walworth Road	Heygate Street	-	1229	1231	2	0.2%	Negligible
Heygate Street	Rodney Place	A215 Walworth Road	584	584	0	0.0%	Negligible
Rodney Road	Rodney Place	East Street	680	680	0	0.0%	Negligible
A2 Old Kent Road	East Street	A201 New Kent Road	2469	2471	2	0.1%	Negligible
East Street	Thurlow Street	A2 Old Kent Road	442	443	1	0.2%	Negligible
East Street	Thurlow Street	-	86	86	0	0.0%	Negligible
Hendre Road	A2 Old Kent Road	-	3	3	0	0.0%	Negligible
A215 Walworth Road	Heygate Street	East Street	784	788	4	0.5%	Negligible
A215 Walworth Road	Fielding Street	Merrow Street	807	812	5	0.6%	Negligible
Fielding Street	A215 Walworth Road	-	76	76	0	0.0%	Negligible
Portland Street	Merrow Street	-	295	297	2	0.7%	Negligible
Thurlow Street	East Street	Area 3/4 Access	722	723	1	0.1%	Negligible
A2 Old Kent Road	East Street	B203 Dunton Road	2577	2579	2	0.1%	Negligible
Merrow Street	A215 Walworth Road	Portland Street	70	70	0	0.0%	Negligible
Merrow Street	Portland Street	-	6	6	0	0.0%	Negligible
A215 Walworth Road	Merrow Street	John Ruskin Street	760	765	5	0.7%	Negligible
John Ruskin Street	A215 Walworth Road	-	312	312	0	0.0%	Negligible
A215 Walworth Road	John Ruskin Street	B214 Albany Road	995	1000	5	0.5%	Negligible
Portland Street	Merrow Street	B214 Albany Road	354	356	2	0.6%	Negligible
Urlwin Street	A215 Walworth Road	-	51	51	0	0.0%	Negligible
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	2389	2389	0	0.0%	Negligible
A215 Camberwell Road	A214 Albany Road	-	1189	1193	4	0.3%	Negligible
B214 Albany Road	A215 Walworth Road	Area 1 Access	836	845	9	1.1%	Negligible
B214 Albany Road	Portland Street	Wells Way	1069	1075	6	0.6%	Negligible

Link	From	To	Do Nothing	Do Minimum	Flow Change	% Flow Change	Significance
Wells Way	B214 Albany Road	-	1025	1027	2	0.2%	Negligible
B214 Albany Road	Wells Way	Thurlow Street	1501	1505	4	0.3%	Negligible
B214 Albany Road	A2 Old Kent Road	Area 2 Access	1239	1242	3	0.2%	Negligible
B204 Humphrey Road	A2 Old Kent Road	-	1121	1121	0	0.0%	Negligible
A2 Old Kent Road	B214 Albany Road	-	3066	3066	0	0.0%	Negligible
Thurlow Street	Area 3/4 Access	B214 Albany Road	948	949	1	0.1%	Negligible
B214 Albany Road	Area 2 Access	Thurlow Street	1237	1240	3	0.2%	Negligible
B214 Albany Road	Area 1 Access	Portland Street	871	880	9	1.0%	Negligible
Steedman Street	A215 Walworth Road	-	75	75	0	0.0%	Negligible
Boyson Road	A215 Walworth Road	-	30	30	0	0.0%	Negligible
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	127	128	1	0.8%	Negligible
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	1112	1113	1	0.1%	Negligible

11.5.107 In both the AM and the PM peaks the change in traffic flow as a result of the FDS Application site is negligible. The proposals are for the increase in residential density on an existing area of housing where the car only accounts for around 10% of trips. The effect of the development on severance effects is therefore **negligible**.

Mitigation

11.5.108 As the FDS Application site has no adverse effect on severance, no mitigation measures are proposed.

Residual Effects

11.5.109 The residual effect of the FDS development on severance is **negligible**.

Driver Delay

11.5.110 The effect of the FDS Application site on driver delay will be as a result of the following:

- Increases in vehicle flows at junctions;
- Provision of an increased number of pedestrian crossings;
- Increases in pedestrian flows at pedestrian crossings;
- Increases in the number of stopping buses and bus dwell times as a result of increased numbers of bus passengers.

11.5.111 The junction models enable a comparison of the delay associated with each junction within the FDS Application site study area as a per vehicle statistic. **Table 11.18** shows the comparison of the Do Nothing and Do Minimum scenarios, based on the junctions where the FDS Application site is considered to have the greatest impact.

Table 11.22 Change in Delay at Junction (2014 Do Nothing vs 2014 Do Minimum)

Scenario	Do Nothing (seconds)	Do Minimum (seconds)	Net Change (seconds)	Effect Significance
Albany Road/ Camberwell Road				
AM Peak	56.3	58.0	+1.7	Negligible
PM Peak	56.7	58.8	+2.1	Negligible
Albany Road/ Portland Street				
AM Peak	34.4	34.2	-0.2	Negligible
PM Peak	31.5	31.5	0.0	Negligible
Albany Road/ Wells Way				
AM Peak	16.8	17.8	+1.0	Negligible
PM Peak	15.8	16.6	+0.8	Negligible

11.5.112 The driver delay data indicates that the traffic from the FDS Application site is predicted to have a negligible impact on the three junctions tested.

Mitigation

11.5.113 A scheme to improve the urban realm for pedestrians and cyclists is proposed on Albany Road, further details of the development of the design are set out in the Transport Assessment (Ref. 11.1). The section of this urban realm scheme to the west of Portland Street will be implemented as part of the FDS Application site. The predicted changes in delay at the modified Albany Road/ Portland Street junction is set out in **Table 11.19** below.

Table 11.23 Change in Delay at Junction (2014 Do Nothing vs 2014 Do Something)

Scenario	Do Nothing (seconds)	Do Something (seconds)	Net Change (seconds)	Effect Significance
Albany Road/ Portland Street				
AM Peak	16.8	77.7	+60.9	Moderate Negative
PM Peak	15.8	42.5	+26.7	Negligible

11.5.114 It is predicted that the proposed urban realm scheme would have a negative impact on driver delay at the Albany Road/ Portland Street junction, as the scheme has been designed to improve facilities for pedestrians and cyclists.

Residual Effects

11.5.115 The residual effect of the FDS Application site on driver delay is **moderate negative** at the Albany Road/ Portland Street junction and **negligible** elsewhere.

Pedestrian and Cycle Delay

11.5.116 The effect of the FDS Application site on pedestrian and cycle delay is measured by the change in traffic volume and speed of traffic. **Table 11.24** provides details of the change in traffic flow and speeds on links in the vicinity of the FDS Application site for the AM and PM peak hours.

Table 11.24 Links with changed traffic volume / speed (2014 Do Nothing vs 2014 Do Minimum)

Link	From	To	Do Nothing		Do Minimum		Change		Significance
AM Peak			**Flow**	**Speed**	**Flow**	**Speed**	**Flow**	**Speed**	
A201 New Kent Road	Rodney Place	-	2355	48	2355	48	0	0	Negligible
A201 New Kent Road	Rodney Place	A2 Old Kent Road	2127	48	2127	48	0	0	Negligible
Rodney Place	A201 New Kent Road	Heygate Street	266	32	266	32	0	0	Negligible
A215 Walworth Road	Heygate Street	-	1144	48	1148	48	4	0	Negligible
Heygate Street	Rodney Place	A215 Walworth Road	408	32	410	32	2	0	Negligible
Rodney Road	Rodney Place	East Street	795	32	797	32	0	0	Negligible
A2 Old Kent Road	East Street	A201 New Kent Road	2372	48	2371	48	0	0	Negligible
East Street	Thurlow Street	A2 Old Kent Road	605	32	605	32	1	0	Negligible
East Street	Thurlow Street	-	63	32	63	32	0	0	Negligible
Hendre Road	A2 Old Kent Road	-	1	32	1	32	0	0	Negligible
A215 Walworth Road	Heygate Street	East Street	777	32	782	32	5	0	Negligible
A215 Walworth Road	Fielding Street	Merrow Street	845	32	850	32	5	0	Negligible
Fielding Street	A215 Walworth Road	-	93	32	93	32	0	0	Negligible
Portland Street	Merrow Street	-	336	32	339	32	3	0	Negligible
Thurlow Street	East Street	Area 3/4 Access	819	32	820	32	1	0	Negligible
A2 Old Kent Road	East Street	B203 Dunton Road	2385	48	2387	48	2	0	Negligible
Merrow Street	A215 Walworth Road	Portland Street	113	32	113	32	0	0	Negligible
Merrow Street	Portland Street	-	12	32	12	32	0	0	Negligible
A215 Walworth Road	Merrow Street	John Ruskin Street	913	32	913	32	6	0	Negligible
John Ruskin Street	A215 Walworth Road	-	396	32	395	32	0	0	Negligible
A215 Walworth Road	John Ruskin Street	B214 Albany Road	1126	32	1132	32	6	0	Negligible
Portland Street	Merrow Street	B214 Albany Road	525	32	528	32	3	0	Negligible

Link	From	To	Do Nothing		Do Minimum		Change		Significance
AM Peak			**Flow**	**Speed**	**Flow**	**Speed**	**Flow**	**Speed**	
Urlwin Street	A215 Walworth Road	-	45	32	45	32	0	0	Negligible
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	2098	48	2098	48	0	0	Negligible
A215 Camberwell Road	A214 Albany Road	-	1202	48	1207	48	5	0	Negligible
B214 Albany Road	A215 Walworth Road	Area 1 Access	939	32	950	32	11	0	Negligible
B214 Albany Road	Portland Street	Wells Way	1277	32	1285	32	8	0	Negligible
Wells Way	B214 Albany Road	-	1096	32	1098	32	2	0	Negligible
B214 Albany Road	Wells Way	Thurlow Street	1540	32	1546	32	6	0	Negligible
B214 Albany Road	A2 Old Kent Road	Area 2 Access	1405	32	1409	32	4	0	Negligible
B204 Humphrey Road	A2 Oid Kent Road	-	1197	48	1197	48	0	0	Negligible
A2 Old Kent Road	B214 Albany Road	-	2503	48	2504	48	1	0	Negligible
Thurlow Street	Area 3/4 Access	B214 Albany Road	938	32	940	32	2	0	Negligible
B214 Albany Road	Area 2 Access	Thurlow Street	1367	32	1371	32	4	0	Negligible
B214 Albany Road	Area 1 Access	Portland Street	911	32	922	32	11	0	Negligible
Steedman Street	A215 Walworth Road	-	58	32	58	32	0	0	Negligible
Boyson Road	A215 Walworth Road	-	16	32	16	32	0	0	Negligible
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	216	32	218	32	2	0	Negligible
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	1188	32	1190	32	2	0	Negligible
PM Peak			**Flow**	**Speed**	**Flow**	**Speed**	**Flow**	**Speed**	
A201 New Kent Road	Rodney Place	-	2230	48	2230	48	0	0	Negligible
A201 New Kent Road	Rodney Place	A2 Old Kent Road	2138	48	2138	48	0	0	Negligible
Rodney Place	A201 New Kent Road	Heygate Street	134	32	134	32	0	0	Negligible
A215 Walworth Road	Heygate Street	-	1229	48	1231	48	2	0	Negligible

Link	From	To	Do Nothing		Do Minimum		Change		Significance
AM Peak			**Flow**	**Speed**	**Flow**	**Speed**	**Flow**	**Speed**	
Heygate Street	Rodney Place	A215 Walworth Road	584	32	584	32	0	0	Negligible
Rodney Road	Rodney Place	East Street	680	32	680	32	0	0	Negligible
A2 Old Kent Road	East Street	A201 New Kent Road	2469	48	2471	48	2	0	Negligible
East Street	Thurlow Street	A2 Old Kent Road	443	32	443	32	1	0	Negligible
East Street	Thurlow Street	-	86	32	86	32	0	0	Negligible
Hendre Road	A2 Old Kent Road	-	3	32	3	32	0	0	Negligible
A215 Walworth Road	Heygate Street	East Street	784	32	788	32	4	0	Negligible
A215 Walworth Road	Fielding Street	Merrow Street	807	32	812	32	5	0	Negligible
Fielding Street	A215 Walworth Road	-	76	32	76	32	0	0	Negligible
Portland Street	Merrow Street	-	295	32	297	32	2	0	Negligible
Thurlow Street	East Street	Area 3/4 Access	721	32	723	32	1	0	Negligible
A2 Old Kent Road	East Street	B203 Dunton Road	2577	48	2579	48	2	0	Negligible
Merrow Street	A215 Walworth Road	Portland Street	70	32	70	32	0	0	Negligible
Merrow Street	Portland Street	-	6	32	6	32	0	0	Negligible
A215 Walworth Road	Merrow Street	John Ruskin Street	760	32	765	32	5	0	Negligible
John Ruskin Street	A215 Walworth Road	-	312	32	312	32	0	0	Negligible
A215 Walworth Road	John Ruskin Street	B214 Albany Road	995	32	1000	32	5	0	Negligible
Portland Street	Merrow Street	B214 Albany Road	354	32	356	32	2	0	Negligible
Urlwin Street	A215 Walworth Road	-	51	32	51	32	0	0	Negligible
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	2389	48	2389	48	0	0	Negligible
A215 Camberwell Road	A214 Albany Road	-	1189	48	1193	48	4	0	Negligible
B214 Albany	A215	Area 1 Access	837	32	845	32	9	0	Negligible

Link	From	To	Do Nothing		Do Minimum		Change		Significance
AM Peak			**Flow**	**Speed**	**Flow**	**Speed**	**Flow**	**Speed**	
Road	Walworth Road								
B214 Albany Road	Portland Street	Wells Way	1069	32	1075	32	6	0	Negligible
Wells Way	B214 Albany Road	-	1025	32	1027	32	2	0	Negligible
B214 Albany Road	Wells Way	Thurlow Street	1501	32	1505	32	4	0	Negligible
B214 Albany Road	A2 Old Kent Road	Area 2 Access	1239	32	1242	32	3	0	Negligible
B204 Humphrey Road	A2 Oid Kent Road	-	1121	48	1121	48	0	0	Negligible
A2 Old Kent Road	B214 Albany Road	-	3066	48	3066	48	0	0	Negligible
Thurlow Street	Area 3/4 Access	B214 Albany Road	948	32	949	32	1	0	Negligible
B214 Albany Road	Area 2 Access	Thurlow Street	1237	32	1240	32	3	0	Negligible
B214 Albany Road	Area 1 Access	Portland Street	872	32	880	32	9	0	Negligible
Steedman Street	A215 Walworth Road	-	75	32	75	32	0	0	Negligible
Boyson Road	A215 Walworth Road	-	30	32	30	32	0	0	Negligible
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	127	32	128	32	1	0	Negligible
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	1112	32	1113	32	1	0	Negligible

11.5.117 The FDS Application site proposals are predicted to have a negligible effect on the 39 links considered throughout the area, across both time periods of links have a negligible impact on traffic flows (a change in traffic flows of +/- 200 vehicles per hour). The impact on speeds across both time periods is also predicted to be negligible, with no links predicted to experience a change in speed of greater than +/- 5mph. The quantification of these impacts as provided in the tables provides an overall indication of the performance of the links in respect of pedestrian and cycle delay; however the overall assessment and conclusion is based on assessor judgement.

11.5.118 Overall the FDS Application site will have a **negligible** effect on pedestrian and cycle delay as a result of the change in traffic flows and speeds associated with the FDS Application site.

Mitigation

11.5.119 The effect on pedestrian and cyclist delay is **negligible** there is therefore no further mitigation required or proposed.

Residual Effects

11.5.120 The effect on pedestrian and cyclist delay is **negligible**, there are therefore no residual effects of the development proposals.

Pedestrian and Cycle Amenity

11.5.121 The main effects on pedestrian amenity as a result of the FDS Application site will be as a result of the following:

- Increased traffic flows alongside pedestrian and cycle routes;
- Ability of pedestrians and cyclists to cross the road;
- Quality of the facilities available for pedestrians and cyclists;
- Increased numbers of pedestrians using existing footways and footpaths; and
- Availability of pedestrian and cycle routes.

11.5.122 With regard the traffic flows alongside the pedestrian routes the effect on amenity is assessed against the change in the number of vehicles per minute on each of the assessed links. **Table 11.25** provides a summary of the results for the AM and PM peaks. It is considered that the change in traffic flow as a result of the proposed development will have a **negligible** effect on pedestrian and cyclist amenity.

Table 11.25 Summary of change in number of vehicles per minute (2014 Do Nothing vs 2014 Do Minimum)

Link	From	To	AM Peak			Significance
			Do N	Do M	Change	
A201 New Kent Road	Rodney Place	-	39.3	39.3	0.0	Negligible
A201 New Kent Road	Rodney Place	A2 Old Kent Road	35.5	35.5	0.0	Negligible
Rodney Place	A201 New Kent Road	Heygate Street	4.4	4.4	0.0	Negligible
A215 Walworth Road	Heygate Street	-	19.1	19.1	0.1	Negligible
Heygate Street	Rodney Place	A215 Walworth Road	6.8	6.8	0.0	Negligible
Rodney Road	Rodney Place	East Street	13.2	13.3	0.0	Negligible
A2 Old Kent Road	East Street	A201 New Kent Road	39.5	39.5	0.0	Negligible
East Street	Thurlow Street	A2 Old Kent Road	10.1	10.1	0.0	Negligible
East Street	Thurlow Street	-	1.1	1.1	0.0	Negligible
Hendre Road	A2 Old Kent Road	-	0.0	0.0	0.0	Negligible
A215 Walworth Road	Heygate Street	East Street	13.0	13.0	0.1	Negligible
A215 Walworth Road	Fielding Street	Merrow Street	14.1	14.2	0.1	Negligible
Fielding Street	A215 Walworth Road	-	1.6	1.6	0.0	Negligible

Link	From	To	AM Peak			Significance
Portland Street	Merrow Street	-	5.6	5.7	0.1	Negligible
Thurlow Street	East Street	Area 3/4 Access	13.6	13.7	0.0	Negligible
A2 Old Kent Road	East Street	B203 Dunton Road	39.8	39.8	0.0	Negligible
Merrow Street	A215 Walworth Road	Portland Street	1.9	1.9	0.0	Negligible
Merrow Street	Portland Street	-	0.2	0.2	0.0	Negligible
A215 Walworth Road	Merrow Street	John Ruskin Street	15.2	15.2	0.0	Negligible
John Ruskin Street	A215 Walworth Road	-	6.6	6.6	0.0	Negligible
A215 Walworth Road	John Ruskin Street	B214 Albany Road	18.8	18.9	0.1	Negligible
Portland Street	Merrow Street	B214 Albany Road	8.8	8.8	0.1	Negligible
Urlwin Street	A215 Walworth Road	-	0.8	0.8	0.0	Negligible
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	35.0	35.0	0.0	Negligible
A215 Camberwell Road	A214 Albany Road	-	20.0	20.1	0.1	Negligible
B214 Albany Road	A215 Walworth Road	Area 1 Access	15.7	15.8	0.2	Negligible
B214 Albany Road	Portland Street	Wells Way	21.3	21.4	0.1	Negligible
Wells Way	B214 Albany Road	-	18.3	18.3	0.0	Negligible
B214 Albany Road	Wells Way	Thurlow Street	25.7	25.8	0.1	Negligible
B214 Albany Road	A2 Old Kent Road	Area 2 Access	23.4	23.5	0.1	Negligible
B204 Humphrey Road	A2 Oid Kent Road	-	19.9	20.0	0.0	Negligible
A2 Old Kent Road	B214 Albany Road	-	41.7	41.7	0.0	Negligible
Thurlow Street	Area 3/4 Access	B214 Albany Road	15.6	15.7	0.0	Negligible
B214 Albany Road	Area 2 Access	Thurlow Street	22.8	22.9	0.1	Negligible
B214 Albany Road	Area 1 Access	Portland Street	15.2	15.4	0.2	Negligible

Link	From	To	AM Peak			Significance
Steedman Street	A215 Walworth Road	-	1.0	1.0	0.0	Negligible
Boyson Road	A215 Walworth Road	-	0.3	0.3	0.0	Negligible
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	3.6	3.6	0.0	Negligible
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	19.8	19.8	0.0	Negligible
Link	**From**	**To**	**PM Peak**			**Significance**
			Do N	**Do M**	**Change**	
A201 New Kent Road	Rodney Place	-	37.2	37.2	0.0	Negligible
A201 New Kent Road	Rodney Place	A2 Old Kent Road	35.6	35.6	0.0	Negligible
Rodney Place	A201 New Kent Road	Heygate Street	2.2	2.2	0.0	Negligible
A215 Walworth Road	Heygate Street	-	20.5	20.5	0.0	Negligible
Heygate Street	Rodney Place	A215 Walworth Road	9.7	9.7	0.0	Negligible
Rodney Road	Rodney Place	East Street	11.3	11.3	0.0	Negligible
A2 Old Kent Road	East Street	A201 New Kent Road	41.2	41.2	0.0	Negligible
East Street	Thurlow Street	A2 Old Kent Road	7.4	7.4	0.0	Negligible
East Street	Thurlow Street	-	1.4	1.4	0.0	Negligible
Hendre Road	A2 Old Kent Road	-	0.1	0.1	0.0	Negligible
A215 Walworth Road	Heygate Street	East Street	13.1	13.1	0.1	Negligible
A215 Walworth Road	Fielding Street	Merrow Street	13.5	13.5	0.1	Negligible
Fielding Street	A215 Walworth Road	-	1.3	1.3	0.0	Negligible
Portland Street	Merrow Street	-	4.9	5.0	0.0	Negligible
Thurlow Street	East Street	Area 3/4 Access	12.0	12.1	0.0	Negligible
A2 Old Kent Road	East Street	B203 Dunton Road	43.0	43.0	0.0	Negligible
Merrow Street	A215 Walworth Road	Portland Street	1.2	1.2	0.0	Negligible
Merrow Street	Portland	-	0.1	0.1	0.0	Negligible

Link	From	To	AM Peak			Significance
	Street					
A215 Walworth Road	Merrow Street	John Ruskin Street	12.7	12.8	0.1	Negligible
John Ruskin Street	A215 Walworth Road	-	5.2	5.2	0.0	Negligible
A215 Walworth Road	John Ruskin Street	B214 Albany Road	16.6	16.7	0.1	Negligible
Portland Street	Merrow Street	B214 Albany Road	5.9	5.9	0.0	Negligible
Urlwin Street	A215 Walworth Road	-	0.9	0.9	0.0	Negligible
A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	39.8	39.8	0.0	Negligible
A215 Camberwell Road	A214 Albany Road	-	19.8	19.9	0.1	Negligible
B214 Albany Road	A215 Walworth Road	Area 1 Access	13.9	14.1	0.2	Negligible
B214 Albany Road	Portland Street	Wells Way	17.8	17.9	0.1	Negligible
Wells Way	B214 Albany Road	-	17.1	17.1	0.0	Negligible
B214 Albany Road	Wells Way	Thurlow Street	25.0	25.1	0.1	Negligible
B214 Albany Road	A2 Old Kent Road	Area 2 Access	20.7	20.7	0.1	Negligible
B204 Humphrey Road	A2 Oid Kent Road	-	18.7	18.7	0.0	Negligible
A2 Old Kent Road	B214 Albany Road	-	51.1	51.1	0.0	Negligible
Thurlow Street	Area 3/4 Access	B214 Albany Road	15.8	15.8	0.0	Negligible
B214 Albany Road	Area 2 Access	Thurlow Street	20.6	20.7	0.1	Negligible
B214 Albany Road	Area 1 Access	Portland Street	14.5	14.7	0.1	Negligible
Steedman Street	A215 Walworth Road	-	1.3	1.3	0.0	Negligible
Boyson Road	A215 Walworth Road	-	0.5	0.5	0.0	Negligible
Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	2.1	2.1	0.0	Negligible
B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	18.5	18.6	0.0	Negligible

Mitigation

11.5.123 The ability of pedestrians to cross the road is linked to increases in traffic flows and the availability of pedestrian crossing facilities on desire lines. The FDS Application site includes a number of improvements to enhance provision and facilities for pedestrians and cyclists that connect with existing pedestrian routes on key desire lines. A beneficial impact in this respect is therefore afforded through the FDS Application site.

11.5.124 Overall it is therefore considered that the impact of pedestrian and cyclist amenity will be **minor beneficial**.

Residual Effects

11.5.125 The effect on pedestrian and cyclist amenity is **minor beneficial**, there are therefore no residual effects of the FDS Application site.

Fear and Intimidation

11.5.126 Fear and intimidation relates to the volume of traffic, its HGV composition and the speed to traffic on links. The change in the volume and speed of traffic impacts have already been considered in respect of the pedestrian and cyclist delay section and showed an overall negligible impact. In respect of fear and intimidation it could be expected that the impact would be negligible.

11.5.127 The nature of FDS Application site means that the HGV composition of the traffic flows will remain the same as the Do Nothing scenario. In respect of assessing fear and intimidation there would therefore be no impact.

11.5.128 The measures used do not assess fear and intimidation levels do not provide an assessment in relation to the overall openness, lighting and ambience of a route. The development proposals will provide a significant improvement to the attractiveness of walking by providing internal routes that are open and well lit. Compared with the existing provision this will offer a significant improvement.

11.5.129 The impact of the development proposals on fear and intimidation is therefore considered to be **Minor beneficial.**

Mitigation

11.5.130 The effect on fear and intimidation is **minor beneficial** there is therefore no further mitigation required or proposed.

Residual Effects

11.5.131 The effect of the FDS Application site proposals on fear and intimidation is **minor beneficial**, there are therefore no residual effects of the FDS Application site.

Accidents and Safety

11.5.132 The effect of the FDS Application site on accidents and safety will primarily be as a result of the following:

- Increased traffic flows, pedestrian flows and cyclist flows with a corresponding increase in the potential for conflicts between these modes;
- Potential for conflicts as a result of changed road layout;
- Changes in vehicle speeds resulting in a change in accident severity;
- Changes in the environment for vulnerable road users (pedestrians and cyclists).

11.5.133 The proposed FDS Application site will increase the total number of vehicles using the highway network in the vicinity of the site and it will also lead to an increase in the number of pedestrians and cyclists. The number of potential conflict points is therefore increased due to the provision being made for pedestrians and cyclists in the area. Notable locations where increased activity may occur are:

- Albany Road; and
- Portland Street.

11.5.134 However, the quality of the provision being made for pedestrians and cyclists will be higher than what is already in place. In particular, the urban realm improvements on Albany Road have focused on improved facilities for pedestrians and cyclists.

11.5.135 In addition, the desire lines of pedestrians and cyclists have been built into the site master planning which will limit the need for crossing busy streets un-aided.

11.5.136 The change in vehicle speeds has already been considered and showed that there would be **negligible** impact.

Mitigation

11.5.137 The environment being provided for pedestrians and cyclists will offer significant improvements over the Do-Nothing scheme. However there will be a greater population in the same area. The effect on accidents and safety is therefore considered to be **negligible**.

11.5.138 Overall it is considered that the impact of the FDS Application site on accidents and safety will be **negligible**.

Residual Effects

11.5.139 The effect on accidents and safety is negligible, there are therefore no residual effects of the FDS Application site.

11.6 Summary

Site Wide Development Option

11.6.1 The development of the transport aspects of the Comprehensive Development have been led by the proposals set out in the AAAP and through design development in consultation with LBS. The transport proposals seek to prioritise walking and cycling friendly streets as a core principle. The overall effect of the proposals is therefore an improvement in the public realm, improvements to pedestrian and cycle amenity and improvements with respect to fear and intimidation. Due to the focus of the Comprehensive Development being to improve the public realm, connections to the park and prioritising pedestrian and cycle movements, the Comprehensive Development does result in an increase in driver delay along Albany Road.

FDS Development Option

11.6.2 The development of the transport aspects of the FDS Application site have been led by the proposals set out in the AAAP and through design development in consultation with LBS. The transport proposals seek to prioritise walking and cycling friendly streets as a core principle. The overall effect of the proposals is therefore an improvement in the public realm, improvements to pedestrian and cycle amenity and improvements with respect to fear and intimidation. Due to the focus of the scheme being to improve the public realm, connections to the park and prioritising pedestrian and cycle movements, the FDS Application site does result in an increase in driver delay along Albany Road.

Table 11.26: Summary of Transportation and Access Effects

Site Wide Development Option

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
Severance	**Minor**	**Negative**	T	D	MT/LT	Construction Logistics Plan	**Minor**	**Negative**	T	D	MT	n/a	n/a
Driver Delay	**Minor**	**Negative**	T	D	MT/LT	Construction Logistics Plan	**Minor**	**Negative**	T	D	MT	n/a	n/a
Pedestrian and Cyclist Delay	**Minor**	**Negative**	T	D	MT/LT	Construction Logistics Plan	**Minor**	**Negative**	T	D	MT	n/a	n/a
Pedestrian and Cyclist Amenity	**Minor**	**Negative**	T	D	MT/LT	Construction Logistics Plan	**Minor**	**Negative**	T	D	MT	n/a	n/a
Fear and Intimidation	**Negligible**	n/a	n/a	n/a	n/a	n/a	**Negligible**	n/a	n/a	n/a	n/a	n/a	n/a
Accidents and Safety	**Negligible**	n/a	n/a	n/a	n/a	n/a	**Negligible**	n/a	n/a	n/a	n/a	n/a	n/a
Operation													
Severance	**Negligible**	n/a	n/a	n/a	n/a	n/a	**Negligible**	n/a	n/a	n/a	n/a	n/a	n/a
Driver Delay	**Negligible**	n/a	n/a	n/a	n/a	New Streets and Urban Realm	**Minor**	**Negative**	P	D	LT	n/a	n/a
Pedestrian and Cyclist Delay	**Negligible**	n/a	n/a	n/a	n/a	New Streets and Urban Realm	**Moderate**	**Positive**	P	D	LT	n/a	n/a
Pedestrian and Cyclist Amenity	**Negligible**	n/a	n/a	n/a	n/a	New Streets and Urban Realm	**Moderate**	**Positive**	P	D	LT	n/a	n/a
Fear and Intimidation	**Negligible**	n/a	n/a	n/a	n/a	New Streets and Urban Realm	**Moderate**	**Positive**	P	D	LT	n/a	n/a
Accidents and Safety	**Negligible**	n/a	n/a	n/a	n/a	n/a	**Negligible**	n/a	n/a	n/a	n/a	n/a	n/a

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

Table 11.27: Summary of Transportation and Access Effects

FDS Development Option

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
Severance	**Minor**	**Negative**	T	D	ST	Construction Logistics Plan	**Minor**	**Negative**	T	D	ST	n/a	n/a
Driver Delay	**Minor**	**Negative**	T	D	ST	Construction Logistics Plan	**Minor**	**Negative**	T	D	ST	n/a	n/a
Pedestrian and Cyclist Delay	**Minor**	**Negative**	T	D	ST	Construction Logistics Plan	**Minor**	**Negative**	T	D	ST	n/a	n/a
Pedestrian and Cyclist Amenity	**Minor**	**Negative**	T	D	ST	Construction Logistics Plan	**Minor**	**Negative**	T	D	ST	n/a	n/a
Fear and Intimidation	**Negligible**	n/a	n/a	n/a	n/a	n/a	**Negligible**	n/a	n/a	n/a	n/a	n/a	n/a
Accidents and Safety	**Negligible**	n/a	n/a	n/a	n/a	n/a	**Negligible**	n/a	n/a	n/a	n/a	n/a	n/a
Operation													
Severance	**Negligible**	n/a	n/a	n/a	n/a	n/a	**Negligible**	n/a	n/a	n/a	n/a	n/a	n/a
Driver Delay	**Negligible**	n/a	n/a	n/a	n/a	New Streets and Urban Realm	**Moderate**	**Negative**	P	D	LT	n/a	n/a
Pedestrian and Cyclist Delay	**Negligible**	n/a	n/a	n/a	n/a	New Streets and Urban Realm	**Negligible**	n/a	n/a	n/a	n/a	n/a	n/a
Pedestrian and Cyclist Amenity	**Negligible**	n/a	n/a	n/a	n/a	New Streets and Urban Realm	**Minor**	**Positive**	P	D	LT	n/a	n/a
Fear and Intimidation	**Negligible**	n/a	n/a	n/a	n/a	New Streets and Urban Realm	**Minor**	**Positive**	P	D	LT	n/a	n/a
Accidents and Safety	**Negligible**	n/a	n/a	n/a	n/a	n/a	**Negligible**	n/a	n/a	n/a	n/a	n/a	n/a

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

11.7 References

Ref. 11.1 WSP (2014), Aylesbury Estate – Transport Assessment

Ref. 11.2 Department for Communities and Local Government (2012), National Planning Policy Framework

Ref. 11.3 Greater London Authority (2011), The London Plan

Ref. 11.4 Greater London Authority (2010), Mayor's Transport Strategy

Ref. 11.5 Southwark Council (2010), Aylesbury Area Action Plan

Ref. 11.6 Southwark Council (2012), Sustainable Transport Supplementary Planning Document

Ref. 11.7 The Institute of Environmental Assessment (now IEMA) (1993), Guidelines for the Environmental Assessment of Road Traffic

Ref. 11.8 Department for Transport (various), The Design Manual for Roads and Bridges

Ref. 11.9 Transport for London (2006), Pedestrian Environment Review System, Review Handbook Version 2

Ref. 11.10 JMP Consultants Ltd (2013), Aylesbury Estate, Southwark, Traffic and Parking Impact Assessment

12 Noise and Vibration

12.1 Introduction

12.1.1 This Chapter reports the assessment of the likely significant environmental effects of the Site Wide Development Option and the FDS Development Option in respect of noise and vibration. In particular, it considers the potential effects on human receptors within and surrounding the Site, in terms of:

- Noise and vibration from demolition and construction;
- Noise from changes in road traffic attributable to the Comprehensive Development; and
- Noise from building services plant associated with the Comprehensive Development.

12.1.2 Given that the residential-led Comprehensive Development includes essentially the same uses as those that currently exist on the Site, the suitability of the Site for the proposed uses cannot be in doubt. However, an assessment of the noise levels affecting the Site has still been undertaken, with the purpose of determining the need for, and extent of, any mitigation to ensure that a suitable noise climate will exist for future residents.

12.1.3 This Chapter (and its associated figures and appendices) is not intended to be read as a standalone assessment and reference should be made to the Front End of this ES (**Chapters 1 to 5**), as well as **Chapter 17 'Cumulative Effects'**.

12.1.4 A glossary of acoustic terms is provided in **Appendix 12.1**.

12.2 Legislation, Policy and Guidance

Legislative Framework

12.2.1 The applicable legislative framework is summarised in bullet point form below, with further detail provided in **Appendix 12.2**. In the context of this assessment, the CoPA addresses the control of noise and vibration arising from demolition and construction activities, whilst the EPA deals more generally with statutory nuisance.

- Control of Pollution Act (CoPA) 1974, Part III (Ref. 12.1)
- Environmental Protection Act (EPA) 1990, Part III (Ref. 12.2)

Planning Policy

12.2.2 Planning policy at the national, regional, county and local level and its relevance to environmental design and assessment is discussed in **Chapter 4 'Planning Policy and Context'**. Applicable national and regional policy documents are summarised in bullet point form below, with further detail provided in **Appendix 12.2**.

National Policy

- National Planning Policy Framework (NPPF) 2012 (Ref. 12.3)
- Noise Policy Statement for England (NPSE) 2010 (Ref. 12.4)
- Planning Practice Guidance (PPG) 2014 (Ref. 12.5)

Regional Policy

- The London Plan: Spatial Development Strategy for Greater London (2011) (Revised 2013) (Ref. 12.6)

- The London Ambient Noise Strategy (2004) (Ref. 12.7)

12.2.3 These documents set out planning policies, strategies and guidance at national and regional level, which collectively provide a framework within which local people and councils can produce their own local and neighbourhood plans.

Local Policy

12.2.4 The local planning authority, the London Borough of Southwark (LBS), has certain legal responsibilities to prepare documents that control and regulate the use of land. The *Southwark Plan* (Ref. 12.8) was adopted in 2007 and was the primary policy tool within the Borough until the adoption of the LBS *Core Strategy* (Ref. 12.9) in April 2011, when a number of the policies contained within Plan expired. Policies relevant to noise and vibration within each document are described below.

The Southwark Plan

12.2.5 Strategic policy SP12 entitled *Pollution* required that all developments should, where appropriate, reduce pollution and improve the environmental performance of buildings especially for energy, water and waste management. This policy, however, has been replaced by Core Strategy policies (see **Paragraph 12.2.6** below) and was not saved. Three specific policies that were saved and are relevant to this Chapter are described in **Table 12.1** along with the reasons for the policy.

Table 12.1: Schedule of Relevant Saved Southwark Plan Policies

Policy	Requirements	Reasons
Policy 3.1 - Environmental effects	Planning permission for the establishment of uses that would cause material adverse effects on the environment will not be granted, and proposals for activities that will have a material adverse impact on the environment and quality of life will be refused.	All new development has some kind of effect on the environment. This includes effects on ecosystems, natural resources (land, air and water), buildings and people. Effects can be temporary, permanent or cumulative. All effects need to be considered in assessing a planning application to determine whether the proposal is acceptable and whether any adverse effects will be able to be avoided or mitigated.
Policy 3.2 - Protection of amenity	Planning permission for development will not be granted where it would cause loss of amenity, including disturbance from noise, to present and future occupiers in the surrounding area or on the application site.	To protect the amenity of an area and the quality of life for people living, or working in, or visiting the borough.
Policy 4.2 - Quality of residential accommodation	Planning permission will be granted for residential development, including dwellings within mixed use schemes, provided that they: i. Achieve good quality living conditions; and ii. Include high standards of: ■ Accessibility, including seeking to ensure that all new housing is built to Lifetime Homes standards; ■ Privacy and outlook; ■ Natural daylight and sunlight; ■ Ventilation; ■ Space including suitable outdoor/ green space; ■ Safety and security; and ■ Protect from pollution, including noise and light pollution.	Good quality housing is necessary to provide for the accommodation needs of the borough, while also meeting the health, safety, quality of life and amenity needs of current and future residents.

Core Strategy

12.2.6 The Core Strategy is one of the most important documents in a set of planning documents called the local development framework. The Core Strategy sets out Southwark Council's long-term vision, spatial strategy and strategic policies with an implementation plan up until 2026 to deliver sustainable development.

12.2.7 Strategic Policy 13 entitled "*High environmental standards*" requires that development should help us live and work in a way that "*respects the limits of the planet's natural resources, reduces pollution and damage to the environment and help us adapt to climate change*". Ten specific measures are identified, with the eighth being "*Setting high standards and supporting measures for reducing air, land, water, noise and light pollution and avoiding amenity and environmental problems that affect how we enjoy the environment in which we live and work*".

Aylesbury Area Action Plan

12.2.8 The Aylesbury Area Action Plan (AAAP) (Ref. 12.10) forms a part of Southwark Council's Local Development Framework (LDF) and is made up of two parts. Firstly, there is the Action Area Core (the Aylesbury Estate itself), which is to be completely redeveloped. Secondly, there is the wider area immediately surrounding the Estate, which includes East Street, Walworth Road, Old Kent Road and Burgess Park, where there will be improvements to transport, schools and open space.

12.2.9 The AAAP takes account of environmental factors generically, but does not include any specific guidance in relation to noise and vibration. However, the AAAP refers to supplementary planning documents (SPDs) that explain the Southwark Plan policies in greater detail and goes on to state that SPDs will also be taken into account when deciding planning applications in the AAAP area.

SPD Sustainable Design and Construction

12.2.10 This SPD (Ref. 12.11) provides guidance on how new development in Southwark should be designed and built so that it has a positive impact on the environment. Amongst other things it provides guidance (in section 5) on avoiding pollution and environmental nuisance through site selection, the design of the development, planning construction activity and the operation and use of the finished development. Guidance relevant to noise and vibration is described in **Table 12.2**.

Table 12.2: SPD Guidance Relevant to Noise and Vibration

Guidance relevant to noise and vibration	
Designing out pollution and nuisance (SPD Section 5.2)	
Site layout, building form and massing	■ Existing sources of high and frequent noise near the site need to be considered when planning the layout of a site and the form and massing of buildings. Noise sensitive uses, such as hospitals, schools and residential developments, and amenity areas should be separated from noise sources. ■ The most effective solution is likely to be by considering how the design and layout of the development can buffer background noise levels, for example by acting as a shield to a busy road. Buildings should not make background noise levels worse by channelling or amplifying existing noise – for example by creating a canyon effect.
Landscaping	■ Consideration should be given as to how landscaping can screen and contain noise and light, such as through earth mounds……
Building design and materials	■ Development should maximise the use of passive design features that provide natural ventilation. These include making effective use of landscaping, the site's microclimate and the layout of buildings. ■ Dwellings that only have windows that open onto busy roads or railways are not supported by the council. Glazing should be used on windows to reduce noise levels inside buildings. However, this will only be effective when windows are closed and so should be used in conjunction with other solutions.
Mechanical systems	■ Where mechanical ventilation is used, it should be designed to ensure no noise nuisance is caused to occupiers of other properties and that noise disturbance does not affect the property in which ventilation is situated.
Considerate construction activity (SPD Section 5.3)	
■ Construction sites should be carefully managed and maintained to ..... control dust and noise emissions and	

Guidance relevant to noise and vibration
vibrations causing nuisance to surrounding properties. The type of machinery used, hours that construction occurs and the times that deliveries are made should be carefully managed so as to reduce impacts.
Reducing pollution and amenity impacts during operation and use (SPD Section 5.4)
■ Noise generating development, such as entertainment venues, should be operated in a way that reduces noise and vibration impacts.

12.2.11 A simple checklist of noise issues for assessment is provided in section 10 of the SPD as reproduced in **Table 12.3**.

Table 12.3: SPD Checklist of Noise Issues

Selecting a site	Planning a site	Designing buildings	Mechanical systems	Demolition and construction	Occupancy
What are existing noise levels on the site and where are they coming from? Are adjoining land uses senstive to noise?	Are buildings located to provide buffer to existing noise and avoid exposing senstive land uses to noise? Are sensitive land uses located furthest from the noise?	Are openable windows provided to frontages that have low levels of noise? Have buffers been built into the design, such as landscaping and acoustic screens? Are windows appropriately glazed for the building location? Is appropriate noise insulation used?	Are mechanical systems chosen quiet?	Is construction and demolition carried out in a way that reduces noise disturbance, for example by limiting the times works are carried out or using quieter construction techniques?	Is noise pollution considered with regard to the possible negative impacts on the health of occupants?

12.2.12 Finally section 11.4 of the SPD provides standards for avoiding pollution and environmental nuisance. Guidance is provided under two headings – indoor noise levels and noise generating development as reproduced below.

Indoor noise levels

- Residential development should be designed to (sic) so that noise levels for indoor spaces are below
- LAeq 16hr 35 dB (07:00-23:00) and LAeq 8hr 30 dB
- LAFmax 45 dB (23:00-07:00).
- Non-residential buildings should be designed to meet the recommended levels set out in British Standard BS 8233: 1999 (in particular Table 5 and 6).
- For changes of use/conversions, the building should be adapted so that it meets the British Standard levels for the proposed use.
- Information on how a development has been designed to minimise noise impact and meet the guidance in section 5.2 should be included as part of the Design and Access Statement.
- Where noise sensitive uses are proposed in locations that may be affected by noise, such as from railways, busy roads and industrial activity, applications should include a formal acoustic study that explains how noise impacts have been mitigated.

Noise generating development

- Noise generating development, such as industrial uses, entertainment venues and commercial kitchens, should not result in an increase in background noise levels Applicants are encouraged to use the methodology set out in BS 4142: 1997 to assess their site.
- Applications will need to provide information on noise that will be generated and the times and duration that it will occur. This includes information on noise from plant, machinery and deliveries. The application will need to explain how this noise may impact upon nearby sensitive uses and demonstrate how this noise has been contained so that the British Standard levels are met.

12.2.13 With respect to the demolition and construction phase the SPD requires that the construction works be carried out in accordance with the Council's Environmental Code of Construction Practice and that the application should set out how noise and vibration impacts will be managed.

12.2.14 The SPD makes the point that the requirements above are minimum standards and that the development preferably should aim to achieve the following:

- For residential development noise levels for indoor spaces should be below:
- LAeq 16hr 30 dB (07:00-23:00) and LAeq 8hr 30 dB
- LAFmax 45 dB (23:00-07:00).
- Noise levels for outdoor spaces should be below:
- LAeq 16hr 50 dB (07:00-23:00).
- Non-residential development, noise levels should meet the "good" criteria in Table 5 and 6 of BS 8233: 1999).
- Sign up to Considerate Constructors Scheme.

Environmental Code of Construction Practice

12.2.15 LBS has published advice to developers and contractors on pollution control requirements for large construction sites in the form of an Environmental Code of Construction Practice (ECCP) (January 2001) (Ref. 12.12). The ECCP identifies, amongst other things, typical working hours and noise and vibration levels that might be adopted; good practice measures to control noise and vibration are also provided. Finally, the ECCP requires that the contractor should contact Southwark Council regarding the need to apply to the Council for formal prior consent for works in accordance with Section 61 of the Control of Pollution Act, 1974 (see **Appendix 12.2**, **Paragraph 2**).

Guidance

12.2.16 Where detailed guidance regarding the prediction and assessment of noise and vibration is not contained in the documents described above, appropriate guidance has been drawn from other publically available sources, as noted in the following paragraphs.

12.2.17 Guidance relating to the prediction and assessment of demolition and construction phase noise and vibration effects has been taken from the following documents.

- *BS 5228: 2009 +A1: 2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise* (Ref. 12.13) provides recommendations for basic methods of noise control relating to construction sites where work activities/operations generate significant noise levels. The annexes provide information, amongst other things, on the following:
  - relevant legislation (Annex A);
  - typical noise sources and advice on mitigating them (Annex B);
  - sound level data for use in the prediction methods described in the standard (Annex C and D);
  - assessing the significance of noise effects (Annex E);

- the estimation of noise levels (Annex F); and
- how to implement noise monitoring (Annex G).

- *BS 5228: 2009 +A1: 2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration* (Ref. 12.14) is a companion standard for Part 1, providing recommendations for basic methods of vibration control relating to construction and open sites where work activities / operations generate significant vibration levels, including industry-specific guidance. Amongst other things, the annexes provide information on the following:
  - relevant legislation (Annex A);
  - assessing the significance of vibration effects (Annex B);
  - measured vibration levels for piling (Annex C and D); and
  - the prediction of vibration levels (Annex E).
- *BS 6472: 2008 Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting* (Ref. 12.15) presents recommended frequency weighted vibration spectra (for continuous vibration) and vibration dose values (VDV) (for intermittent vibration) above which adverse comment is likely to occur in residential properties.

12.2.18 The following documents are relevant to the prediction and assessment of traffic noise affecting existing and proposed developments:

- *Calculation of Road Traffic Noise* (*CRTN*) (Ref. 12.16) describes procedures for predicting and measuring noise from road traffic in terms of the L_{A10} – the level exceeded for 10% of the time – and is suitable for environmental assessments of schemes where road traffic noise may have an effect.
- *HD 213/11, revision 1, Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 7 Noise and Vibration* (Ref. 12.17). This advice note prepared by the Highways Agency, provides guidance on the assessment of the effects on noise and vibration that a road project might have. Where appropriate, this advice may be applied to existing roads.

12.2.19 The following documents are appropriate to the measurement of baseline noise levels and assessing noise of an industrial nature emanating from existing, new or proposed commercial premises.

- *BS 7445 Description and measurement of environmental noise – Part 1: 2003: Guide to quantities and procedures*, *Part 2: 1991: Guide to the acquisition of data pertinent to land use* and *Part 3: 1991: Guide to application to noise limits* (Ref. 12.18) define parameters, procedures and instrumentation required for noise measurement and analysis.
- *BS 4142: 1997 Method for rating industrial noise affecting mixed residential and industrial areas* (Ref. 12.19) describes methods for determining and assessing noise levels from fixed plant with a view to determining the likelihood of complaints. This standard is due for revision and to this end a draft for public comment was published in February 2014. However, until the new standard is finally published, the 1997 version remains the appropriate reference.

12.2.20 The following documents are relevant when assessing noise affecting sensitive receptors, whether proposed or existing:

- *BS 8233: 2014 Guidance on sound insulation and noise reduction for buildings* (Ref. 12.20) provides criteria for the assessment of internal noise levels for various uses including dwellings and commercial properties.
- The World Health Organisation (WHO) document *Guidelines for Community Noise* (2000) (Ref. 12.21); provides criteria for the assessment of internal and external noise levels effecting (amongst others) dwellings.

12.3 Assessment Methodology and Significance Criteria

12.3.1 This assessment deals specifically with the Site Wide Development Option and FDS Development Option and has been undertaken to a level of detail that is sufficient to support each application. Accordingly, this Chapter:

- Details the existing baseline situation;
- Presents an assessment of the effects of the noise and vibration sources associated with the construction and operation of the Comprehensive Development upon existing and proposed sensitive receptors;
- Presents an assessment of the suitability of the Site for uses that are sensitive to noise, in particular the residential units;
- Identifies mitigation measures that will, where necessary, minimise any noise or vibration effect; and,
- Identifies residual effects assuming any proposed mitigation measures are in place.

Extent of the Study Area

12.3.2 A plan of the Site, including the red line boundary, is shown in **Figure 1.5**. Consideration has to be given to the constraints placed upon the Site by the existing noise climate as well as the effects that the Comprehensive Development might have on nearby sensitive locations. Therefore, the study area is defined by the Site boundary and the proximity of noise-sensitive receptors in the area immediately beyond the Site and along the key route corridors affected by traffic associated with the Comprehensive Development.

Consultation

12.3.3 An EIA Scoping Report was submitted to LBS on the 28th March 2014 (see **Appendix 2.1**) and the formal LBS Scoping Opinion was received on 5th June 2014 (see **Appendix 2.2**).

12.3.4 The Scoping Opinion included the following advice under the heading '*Noise and Vibration'*:

"Noise sources including demolition, construction, construction traffic, site plant, road, rail, and other offsite commercial, on-site commercial, plant and servicing (handling, collections & deliveries) will need to be assessed. Any development of this site should seek to resolve all existing and potential noise and vibration conflicts between existing and proposed uses. All 'ambient' sources of noise will need to be listed and mitigation strategies will need to be built into the design. The approach to assessing the significance of noise impacts should be agreed with the London Borough of Southwark as part of the scoping process."

12.3.5 A response to the LBS Scoping Opinion was issued to LBS (see **Appendix 2.3**). In that response the point was made that the approach to, and scope of, the noise and vibration assessment had been discussed with LBS on 27th May 2014. The note of that discussion, which confirmed the approach to the baseline noise survey and relevant criteria to use in the assessment, was included as Appendix 3 of the response to the LBS Scoping Opinion.

12.3.6 The issue of development generated road traffic was not discussed with LBS as it was considered that a significant uplift in vehicular movements would be unlikely to occur. However, for completeness, such as assessment has been undertaken, with the change in road traffic noise quantified in accordance with the methodology set out in the *CRTN*, and the significance of those noise changes being determined using the guidance contained in the *DMRB* (*HD 213/11*).

Scope of the Assessment

12.3.7 The scope of the assessment presented in this Chapter is consistent with the Scoping Opinion and consultation exercise summarised above.

Method of Baseline Data Collation

12.3.8 **Appendix 12.3** describes how baseline conditions have been derived through a combination of noise measurements and computer-aided modelling. A brief description of the noise survey is included in that appendix, along with the rationale for utilising modelling techniques. The appendix also describes the methods used to predict noise and vibration for each of those issues requiring consideration (see **Section 12.1**).

Significance Criteria

12.3.9 The assessment of potential effects resulting from the Comprehensive Development has considered both the construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the Comprehensive Development and the sensitivity of the affected receptor to that change or effect. The magnitude of change and the sensitivity of the affected receptor are both assessed on a scale of high, medium, low and negligible.

12.3.10 The following terms have been used to define the significance of effects:

- **Major effect**: where the Comprehensive Development could be expected to have a very significant effect (either positive or negative) on noise and vibration levels at the sensitive receptor;
- **Moderate effect**: where the Comprehensive Development could be expected to have a noticeable effect (either positive or negative) on noise and vibration levels at the sensitive receptor;
- **Minor effect**: where the Comprehensive Development could be expected to result in a small, barely noticeable effect (either positive or negative) on noise and vibration levels at the sensitive receptor; and
- **Negligible**: where no discernible noise or vibration effect is expected as a result of the Comprehensive Development at the sensitive receptor.

12.3.11 Major and moderate effects are considered to be significant, whilst minor and negligible effects are considered insignificant. The aim is to minimise any significant effects that have been identified to the point where they would be considered insignificant.

12.3.12 **Chapter 2 'Approach to the EIA'** of this ES includes a matrix for determining the significance of effects, based on the magnitude of the change or effect and the sensitivity of the receptor to that change or effect. A slightly amended version of this matrix has been adopted for this assessment where all receptors (see **Section 12.4**) are considered as highly sensitive to noise and vibration.

Table 12.4: Matrix for Determining the Significance of Noise and Vibration

Magnitude of change	Significance of effect
High	Major
Medium	Moderate
Low	Minor
Negligible	Negligible

12.3.13 Bearing in mind the above and taking account of relevant guidance, appropriate significance scales are described in more detail in **Appendix 12.4** and summarised in the tables below.

Effect of the Comprehensive Development on Receptors Sensitive to Noise and Vibration

12.3.14 A summary of the significance scales adopted for this assessment is presented in **Table 12.5**.

Table 12.5: Significance of Effect Scales for Receptors Sensitive to Noise and Vibration

Magnitude of effect	Demolition and construction effects		Operational effects [1, 2]	Significance of effect [3]
	Noise level [3]	Vibration level	Change in road traffic noise level [4]	
Negligible	≤ 70 dB $L_{Aeq,T}$	< 0.5 mm·s^{-1} PPV	0.1 – 0.9 dB	Negligible
Low		0.5 – 1 mm·s^{-1} PPV	1.0 – 2.9 dB	Minor
Medium	> 70 dB $L_{Aeq,T}$	> 1 mm·s^{-1} PPV	3.0 – 4.9 dB	Moderate
High			≥ 5.0 dB	Major

Notes:

1. Providing the fixed building services plant associated with the Comprehensive Development can be designed, selected, located and configured such that the proposed plant noise emission criteria are achieved, it is assumed that at worst only negligible residual effects would remain.
2. The significance of effect is based on a receptor having a high sensitivity to noise and/or vibration.
3. This level relates to a point 1 metre externally from the building façade. For receptors under free-field conditions, the threshold level would reduce from 70 dB to 67 dB $L_{Aeq,T}$.
4. This scale applies to short-term changes in road traffic noise; for long term changes see **Table 4** of **Appendix 12.4**.

Effect of Existing Noise Levels on the Comprehensive Development – Residential

12.3.15 A summary of the design targets for proposed residential receptors is presented in **Table 12.6**.

Table 12.6: Design Targets for Proposed Residential Receptors

Period	Duration	Noise [1]
Day	07:00 – 23:00	35 dB $L_{Aeq,16h}$
Night	23:00 – 07:00	30 dB $L_{Aeq,8h}$
		45 dB L_{AFmax}

Notes:

1. The design targets relate to internal noise levels. With respect to outdoor living areas, an ideal target of 55 dB $L_{Aeq,16h}$ applies to avoid serious annoyance during the day and evening.

12.4 Sensitive Receptors

12.4.1 The Site lies within a densely populated residential area of the London Borough of Southwark. This area is in transition, being in the early stages of re-generation. As might be expected, therefore, the Site is surrounded on all sides and in close proximity by both established and more recently constructed residential uses. The exception is to the south, where Burgess Park lies beyond Albany Road.

12.4.2 As well as those surrounding the Site, consideration must also be given to residents living on the Site. Such receptors fall into two categories:

- Those residents living in existing dwellings on Site, yet to be decanted, but located near to other parts of the Site being developed in earlier phases. An example would be residents living in existing dwellings on Phase 3 of the Masterplan Application site (see **Chapter 5 'Demolition and Construction'** for the construction phasing), which shares a common boundary with the FDS Application site to the west; and
- Those residents living in dwellings constructed during earlier phases, located near to those parts of the Site being developed in later phases. An example would be the reverse of the situation described above where residents might be living in newly constructed dwellings on the FDS Application site when works commence on Phase 3 of the Masterplan Application site to the east.

12.4.3 The nearest potentially affected receptor locations considered in the assessment are shown in **Figure 12.1**.

12.4.4 Further afield, other sensitive receptors would be those located close to roads which experience a significant change in volume, mix or speed as a result of development generated traffic.

12.5 Baseline Conditions

12.5.1 An environmental noise survey was carried out in June 2014 to:

- Gain some appreciation of the diurnal pattern of noise levels prevailing across the Site;
- Check the validity of the output from the noise model; and
- Use as a basis for determining the noise emission criteria for fixed building services plant associated with the Comprehensive Development.

12.5.2 Long-term, unattended measurements were undertaken over a seven day period at the positions described below and identified in **Figure 12.2**.

- *Position 1*: Façade measurement, 1.5 metres above the floor of the balcony elevated approximately 10-11 metres above ground level. The microphone was located approximately 20 metres from the kerb of Albany Road, with a clear line of sight of the road. This position was installed on Monday 23rd June 2014 and retrieved on Monday 30th June 2014.
- *Position 2*: Façade measurement, 1.5 metres above the floor of the balcony, elevated approximately 10-11 metres above ground level. The microphone was located a little over 100 metres from Albany Road and was screened by buildings. The microphone overlooked an open communal garden area, with a large tower block to the east and smaller blocks to the south and west. This position was installed on Monday 23rd June 2014 and collected on Monday 30th June 2014.

12.5.3 Lack of secure monitoring locations along Thurlow Street necessitated a different approach. Here, short-term attended measurements in accordance with the *CRTN*[1] were undertaken at two positions on the east side of Thurlow Street as described below and identified in **Figure 12.2**.

- *Position 3*: Free-field measurement, 1.5 metres above ground level approximately 4 metres from the kerb of Thurlow Street, with a clear view of vehicles approaching (and passing) the position from both directions. The microphone was located approximately 30 metres south of the junction with Inville Road on the opposite side of the road. Measurements at this position were taken between 11:05 and 14:05 hours on Thursday 26th June 2014.
- *Position 4*: Free-field measurement, 1.5 metres above ground level approximately 7 metres from the kerb of Thurlow Street, with a clear view of vehicles approaching and passing the position from both directions. The microphone was located approximately 100 metres from the junction with Albany Road. Measurements at this position were taken between 11:05 and 14:05 hours on Thursday 26th June 2014.

12.5.4 All microphones were protected with a foam windshield throughout the measurements.

12.5.5 All sound level meters were calibrated at the commencement and conclusion of each survey using a calibrator that had itself been calibrated by a UKAS accredited laboratory within the previous twelve months. No significant drift in the calibration signal was noted. The equipment used during the survey is identified in **Appendix 12.5**.

12.5.6 The weather conditions during the noise survey remained mostly dry and bright. Some showers were present towards to the end of the monitoring period (on Thursday evening, Saturday afternoon and Sunday afternoon) and wind speeds were slightly increased during the day on the Friday, although these circumstances

[1] The *CRTN* includes a number of measurement techniques, one of which – the Shortened Measurement Procedure (*CRTN* Paragraphs 43 and 44) – outlines a procedure for estimating the $L_{A10,18h}$ level from $L_{A10,1h}$ measurements made over three consecutive one hour periods between 10:00 and 17:00 hours. The $L_{A10,18h}$ is estimated by subtracting 1 dB from the arithmetic average of the three $L_{A10,1h}$ values.

appear not to have affected the measurement results significantly. A summary of the daily weather conditions during the survey can be found in **Appendix 12.6**.

12.5.7 The survey results for Positions 1 and 2 are summarised in **Table 12.7** below. A full set of hourly measurements is provided in **Appendix 12.7**.

Table 12.7: Long-term Noise Measurement Results – $L_{Aeq,T}$ dB

Day	Date	Façade noise level (ambient $L_{Aeq,T}$ dB)			
		Position 1		Position 2	
		Day ($L_{Aeq,16h}$)	Night ($L_{Aeq,8h}$)	Day ($L_{Aeq,16h}$)	Night ($L_{Aeq,8h}$)
Monday	23 June 14	62 [1]	58	56 [1]	50
Tuesday	24 June 14	62	59	55	47
Wednesday	25 June 14	63	58	53	47
Thursday	26 June 14	62	59	52	51
Friday	27 June 14	63	60	57	52
Saturday	28 June 14	63	59	55	50
Sunday	29 June 14	61	60	54	48
Monday	30 June 14	63 [1]	-	54 [1]	-
Range		61 - 63	58 - 60	52 - 57	47 - 52
Note: 1 = part period only					

12.5.8 At Position 1 the measured daytime noise levels were consistent throughout the survey, although there was a slight reduction on the Sunday, reflecting the likely reduction in traffic volumes on that day. The noise levels at night were consistently lower than during the day. From the hourly data it is clear that the quietest part of the night-time period is that between 01:00 and 04:00 hours. In other words, noise levels are slow to reduce after the end of the evening period and quick to pick-up in the last two hours of the night-time period, preceding the morning rush-hour period.

12.5.9 At Position 2 noise levels were lower than at Position 1 and more variable, which is understandable as this location was more remote from the dominant road traffic source and potentially influenced to a greater extent by noise from sources other than road traffic (e.g. neighbourhood noise).

12.5.10 To facilitate an assessment of maximum noise levels potentially affecting bedrooms at night the typical maximum noise level has been determined and presented in **Table 12.8** below.

Table 12.8: Long-term Noise Measurement Results – L_{AFmax} dB

Day	Date	Typical night-time (23:00 – 07:00) maximum façade noise level (L_{AFmax}, dB)	
		Position 1	Position 2
Monday	23 June 14	70	61
Tuesday	24 June 14	70	57
Wednesday	25 June 14	70	57
Thursday	26 June 14	71	64
Friday	27 June 14	70	66
Saturday	28 June 14	69	62
Sunday	29 June 14	70	57
Monday	30 June 14		
Range		69 - 71	57 - 66

12.5.11 As noted above, short-term attended measurements were made over a period of three hours at two positions in Thurlow Street in line with the shortened measurement procedure set out in the *CRTN*. **Table 12.9** below presents the measured three hour values at both of the attended positions, and the corresponding estimated $L_{A10,18h}$ determined in accordance with the *CRTN*.

Table 12.9: Short-term Noise Measurement Results in Thurlow Street – $L_{A10,T}$ dB

Day	Time	Free-field noise level (ambient $L_{A10,T}$ dB)	
		Position 3	Position 4
Thursday 26 June 14	11:05 – 12:05	71.1	69.3
	12:05 – 13:05	70.1	68.8
	13:05 – 14:05	71.1	69.0
Calculated $L_{A10,3h}$	11:05 – 14:05	70.8	69.0
Estimated $L_{A10,18h}$	06:00 – 00:00	69.8	68.0

12.5.12 As the measured noise levels on Thurlow Street were dominated by road traffic and neighbourhood noise, it seems reasonable to estimate the daytime and night-time ambient noise levels (in terms of $L_{Aeq,T}$) using the relationships between the $L_{A10,18h}$ and $L_{Aeq,16h}$ and $L_{Aeq,8h}$ measured at Position 1 and Position 2, where the noise climate is dominated by similar sources.

12.5.13 The average difference between the measured $L_{A10,18h}$ and $L_{Aeq,16h}$ and between the measured $L_{Aeq,16h}$ and $L_{Aeq,8h}$ at Position 1 is presented in **Table 12.10** below.

Table 12.10: Noise Measurement Results – Position 1

Day	Date	Measured results – daytime (dB)			Measured results – night-time (dB)		
		$L_{A10,18h}$	$L_{Aeq,16h}$	Difference [1]	$L_{Aeq,16h}$	$L_{Aeq,8h}$	Difference [1]
Monday	23 June 14					58.2	
Tuesday	24 June 14	64.3	62.3	+2.0	62.3	58.5	
Wednesday	25 June 14	64.0	62.8	+1.2	62.8	57.5	
Thursday	26 June 14	63.6	62.2	+1.4	62.2	58.8	
Friday	27 June 14	65.1	62.9	+2.2	62.9	60.2	
Saturday	28 June 14	64.8	62.6	+2.2	62.6	59.1	
Sunday	29 June 14	64.0	61.0	+3.0	61.0	60.0	
Monday	30 June 14						
Average Difference				+2.0	62.3 [2]	59.0 [2]	+3.3

Notes:
1 = arithmetic difference
2 = logarithmic average

12.5.14 The average difference between the measured $L_{A10,18h}$ and $L_{Aeq,16h}$ and between the measured $L_{Aeq,16h}$ and $L_{Aeq,8h}$ at Position 2 is presented in **Table 12.11** below.

Table 12.11: Noise Measurement Results – Position 2

Day	Date	Measured results – daytime (dB)			Measured results – night-time (dB)		
		$L_{A10,18h}$	$L_{Aeq,16h}$	Difference [1]	$L_{Aeq,16h}$	$L_{Aeq,8h}$	Difference [1]
Monday	23 June 14					49.6	
Tuesday	24 June 14	57.1	55.5	+1.6	55.5	47.1	
Wednesday	25 June 14	52.3	52.5	-0.2	52.5	47.4	
Thursday	26 June 14	52.6	51.7	+0.9	51.7	51.0	
Friday	27 June 14	59.9	57.5	+2.4	57.5	52.2	
Saturday	28 June 14	56.7	55.1	+1.6	55.1	49.6	
Sunday	29 June 14	55.8	54.3	+1.5	54.3	48.1	
Monday	30 June 14						
Average Difference				+1.3	54.8 [2]	49.6 [2]	+5.2

Notes:
1 = arithmetic difference
2 = logarithmic average

12.5.15 Combining the data from the two measurement locations results in the following average differences:

- $L_{A10,18h} - 1.7 = L_{Aeq,16h}$; and
- $L_{Aeq,16h} - 4.4 = L_{Aeq,8h}$.

12.5.16 Based on the average differences as derived above, **Table 12.12** presents the estimated daytime and night-time $L_{Aeq,T}$ levels at Positions 3 and 4.

Table 12.12: Estimated $L_{Aeq,T}$ dB at Positions 3 and 4

Position	Estimated $L_{A10,18h}$	Daytime (07:00 – 23:00)		Night-time (23:00 – 07:00)	
		Difference	$L_{Aeq,16h}$	Difference	$L_{Aeq,8h}$
3	69.8 dB	-1.7 dB	68.1 dB	-4.4 dB	63.7 dB
4	68.0 dB	-1.7 dB	66.3 dB	-4.4 dB	61.9 dB

12.5.17 To facilitate an assessment of fixed plant associated with the Comprehensive Development, the minimum noise levels ($L_{A90,1h}$ during the day and $L_{A90,15min}$ during the night) have been extracted from the survey results and presented in **Table 12.13** below for each position.

Table 12.13: Minimum Measured $L_{A90,T}$ dB Façade Noise Level at Positions 1 and 2

Day	Date	Minimum measured noise level (dB)			
		Daytime $L_{A90,1h}$ (07:00 to 23:00)		Night-time $L_{A90,15min}$ (23:00 to 07:00)	
		Position 1	Position 2	Position 1	Position 2
Monday	23 June 14	43 [1]	44 [1]	32	43
Tuesday	24 June 14	44	44	35	43
Wednesday	25 June 14	44	45	35	43
Thursday	26 June 14	46	46	36	44
Friday	27 June 14	49	47	39	44
Saturday	28 June 14	45	44	35	43
Sunday	29 June 14	44	45	32	43
Monday	30 June 14	50 [1]	46 [1]		
Range		43 - 49	44 - 47	32 - 39	43 - 44
Note: 1 = part period only					

12.5.18 It can be seen that during the day, the minimum $L_{A90,1h}$ levels at the two locations are consistent, with a minimum level of 43 dB. During the night, the minimum $L_{A90,15min}$ at Position 2 is very consistent and significantly higher (by 5 to 11 dB) than the minimum $L_{A90,15min}$ at Position 1. This is the opposite of the situation with the ambient $L_{Aeq,T}$ (see **Table 12.7**) and rather unexpected. The very consistent nature of the night-time $L_{A90,15min}$ at Position 2 suggests that the noise levels here were affected each night by a steady and constant source of noise, such as might be generated by fixed building services plant. Consequently, during the night, the $L_{A90,15min}$ results from Position 1 (with a minimum level of 32 dB) are considered to better represent the current background noise levels within and surrounding the Site.

Future Baseline

12.5.19 The noise environment affecting the Site is dominated by road traffic. Should the Comprehensive Development not proceed, whether this is the Site Wide Development Option or FDS Development Option, then it is anticipated that changes in noise of mostly negligible significance would arise. This conclusion is based on calculations that include additional traffic relating to committed developments in the area, allied with the assumption that road traffic in this area is unlikely to increase significantly in future years. This is demonstrated by reference to **Table 12.18** and the first column of noise levels, which present the difference between the baseline situation in 2014 (scenario 1) and the situation in 2014 including committed developments (scenario 3). It can be seen that the difference in noise is no greater than 0.2 dB, with a single

exception – Rodney Place – where a short-term change of +1.0 dB would be described as being of minor adverse significance.

12.6 Assessment of Effects, Mitigation and Residual Effects

Demolition and Construction Phase

Demolition and Construction Noise

Demolition and Construction Noise Predictions and Assessment

12.6.1 *BS 5228-1:2009 +A1: 2014* provides guidance on the measurement and prediction of construction noise.

12.6.2 The *BS 5228-1* calculation procedures allow accurate noise levels to be determined for various construction activities. However, the value of any such predictions is necessarily limited by the number of assumptions that have to be made regarding the number and type of plant to be utilised, their location and detailed operating arrangements. Some of this information will be clarified as the project design progresses and later when resources are mobilised, but other information (such as exactly where the plant operates and for how long) will remain uncertain, even after the works have commenced.

12.6.3 The information that is available at this stage (see **Chapter 5 'Demolition and Construction'**) is considered sufficient to perform an indicative construction phase noise assessment, focussing on key activities, with the aim of identifying whether a significant, albeit temporary, noise effect might arise at the nearest sensitive receptors.

12.6.4 The generic demolition / construction sequence is presented below:

i. Demolition of the existing structures;

ii. Piling using CFA techniques;

iii. Excavation of pile-caps and preparation for underground services;

iv. Installation of drainage;

v. Construction of sub-structures;

vi. Construction of super-structures;

vii. Cladding works, internal fit-out and plant installation where relevant; and

viii. On-going external works – roadworks, landscaping, underground services etc.

12.6.5 Based on the sequence described above, the construction works have been divided into the following four key stages of activity:

- Demolition (i);
- Sub-structure works, including piling (ii) to (v);
- Construction of the superstructure and building envelope (vi); and
- Cladding works, internal fit-out, plant installations, external works including roadworks and landscaping (vii) to (viii).

12.6.6 Within each of these stages, various plant items will operate. Plant considered representative of those likely to be used in each stage have been identified based on those presented in **Table 5.6 of Chapter 5 'Demolition and Construction'**. The representative plant and their assumed sound power level are provided in **Table 12.14**, along with the origin of this information within *BS 5228-1*.

Table 12.14: Representative Demolition and Construction Plant and Source Noise Levels

Plant	Stage				dB L_{WA}	Origin of source information [1]
	Demolition	Sub-structure	Construction	Fit-out / External		
Tracked excavator (40t)	✓	✓		✓	114	Table C1-13
Tracked crusher	✓	✓			112	Table C1-15
Large lorry concrete mixer		✓	✓	✓	105	Table C4-21
Circular bench saw	✓			✓	113	Table C4-71
Mobile telescopic crane	✓	✓	✓	✓	110	Table C4-45
Lifting platform	✓		✓	✓	95	Table C4-57
Mini tracked excavator	✓				102	Table C4-67
Pulveriser mounted on excavator	✓				108	Table C1-3
Diesel generator	✓	✓	✓	✓	94	Table C4-78
Handheld cordless nail gun	✓	✓	✓	✓	101	Table C4-95
Telescopic handler	✓	✓	✓	✓	99	Table C2-35
Breaker mounted on excavator	✓	✓		✓	118	Table C1-9
Auger piling rig		✓			111	Table C3-14
Concrete pump		✓	✓	✓	106	Table C3-25
Dozer				✓	110	Table D5-15
Articulated dump truck	✓	✓		✓	109	Table C2-33
Road sweeper	✓	✓	✓	✓	104	Table C4-90

Note:
1. Reference relates to *BS 5228-1: 2009 +A1: 2014*, Annex C and Annex D

12.6.7 In practice, the plant items identified for each stage will move around the Site, operating at different times, for different durations and at different locations on any one day. As a consequence, noise levels at any receptor may vary quite considerably day-by-day. Hence, it is necessary to rationalise the geographic and temporal spread of activities to obtain a meaningful prediction (and subsequent assessment) and to this end, various assumptions have been made as described in the following paragraphs.

12.6.8 The most important assumptions relate to the location of construction plant and their operational 'on-time' during the period of interest, in this case over a 10-hour period in line with the proposed 70 dB $L_{Aeq,10h}$ threshold used to determine the likelihood of significant effects at nearby sensitive receptors (see **Table 12.5**).

12.6.9 With respect to the geographical location of the plant, two different assumptions have been made:

- To represent a 'worst case' scenario - the three plant items with the highest sound power level from the full complement of plant are assumed to operate together at a single point at the centre of the closest building being demolished/constructed to each noise sensitive receptor. The amount of time that each plant operates (the 'on-time') is assumed to be 20%, which equates to two hours of operation over a ten hour construction working day.
- To represent a more realistic 'typical case' scenario – the full complement of plant is assumed to operate together at a single point at the approximate centre of the development plot closest to each noise sensitive receptor. The on-time for each plant is assumed to be 50%, which equates to five hours of operation over a

ten hour construction working day, with the exception of the diesel generator which is assumed to operate 100% of the time.

12.6.10 The lower on-time for the worst case scenario may seem counter-intuitive, but this reflects the fact that construction plant rarely operates for long periods during any day in very close proximity to receptors, but will tend to move around the Site.

12.6.11 Other assumptions which have been made with respect to the construction noise predictions are:

- For each construction stage, one plant item of each type has been assumed;
- No barriers, whether purpose-built or existing structures, have been included;
- No absorbent ground cover has been assumed between the noise source and receptor;
- No atmospheric absorption has been included;
- 3 dB has been added to all predictions to account for façade reflections;
- Source and receptors have both been taken to be 1.5 metres high; and
- Meteorological conditions have been taken to be 'neutral'.

Site Wide Development Option

12.6.12 On the basis described above, preliminary construction noise calculations have been made for each stage of each development phase at the nearest sensitive receptors, existing and future (see **Chapter 5 'Demolition and Construction'** for the proposed phasing). The results are presented in **Table 12.15**. No allowance has been made in these calculations for any mitigation; in this regard relevant measures are described in **Paragraph 12.6.18** onwards. The range of distances between the construction works and the nearest identified receptors in each phase are presented in brackets in the scenario column.

Table 12.15: Construction Noise Predictions at Nearby Receptors, without Mitigation

Site works	Noise sensitive receptor	Scenario [2]	Construction stage façade noise level $L_{Aeq,10h}$ [1]			
			Demolition	Sub-structure	Construction	Fit Out / External
FDS Application site						
Phase 1b and 1c	■ Bradenham Close ■ Westmoreland Road ■ Phelp Street ■ Existing receptors Phase 4 ■ Adventure Playground ■ Portland Street ■ Michael Faraday School	Worst case (15-50m)	74 - 85 dB	74 - 85 dB	66 - 77 dB	74 - 85 dB
		Typical case (85-170m)	69 - 75 dB	69 - 75 dB	61 - 67 dB	69 - 75 dB

Site works	Noise sensitive receptor	Scenario [2]	Construction stage façade noise level $L_{Aeq,10h}$ [1]			
			Demolition	Sub-structure	Construction	Fit Out / External
Masterplan Application site						
Phase 2	■ Surrey Square ■ Alvery Street ■ Surrey Grove ■ Kinglake Street ■ Bagshot Street ■ Sedan Way ■ Merrow Street ■ Existing receptors Phase 3 ■ Existing receptors Phase 4	Worst case (15-30m)	79 - 85 dB	79 - 85 dB	71 - 77 dB	79 - 85 dB
		Typical case (90-250m)	66 - 75 dB	66 - 75 dB	58 - 66 dB	66 - 75 dB
Phase 3	■ Thurlow Street ■ Flint Street ■ East Street ■ Dawes Street ■ Sacred Heart School ■ Merrow Street ■ Future receptors Phase 2	Worst case (15-45m)	75 - 85 dB	75 - 85 dB	67 - 77 dB	75 - 85 dB
		Typical case (75-130m)	72 - 76 dB	71 - 76 dB	63 - 68 dB	71 - 76 dB
Phase 4	■ Adventure Playground ■ Michael Faraday School ■ Portland Street ■ Merrow Street ■ Future receptors Phase 1b and 1c ■ Future receptors Phase 2	Worst case (15-45m)	75 - 85 dB	75 - 85 dB	67 - 77 dB	75 - 85 dB
		Typical case (130-300m)	64 - 72 dB	64 - 71 dB	56 - 63 dB	64 - 71 dB

Notes:

1. All noise levels are in terms of dB $L_{Aeq,10h}$ at 1 metre from the building façade. The noise levels have been calculated to the nearest 0.1 dB(A) and then rounded to the nearest whole number for presentation.
2. The figures in brackets relate to the range of distances between the construction works and the nearest identified receptors in each phase.

12.6.13 The significance of the noise effects during demolition and construction can be determined by comparing the predicted noise levels shown in **Table 12.15** to the proposed construction noise threshold of 70 dB $L_{Aeq,10h}$, as outlined in **Table 12.5**.

12.6.14 For the 'worst case' scenario, effects of **moderate to major negative** significance are anticipated at the majority of existing and future receptors, with the following exceptions:

- Dwellings on Phelp Street during the construction stage of Phase 1b and 1c (FDS Application site) when effects of **minor negative** significance are anticipated.
- Dwellings on Merrow Street during the construction stage of Phase 3 (Masterplan Application site) when effects of **minor negative** significance are anticipated.

- The Michael Faraday School (outside the Masterplan Application site boundary) during the construction stage of Phase 1b and 1c (FDS Application site) and Phase 4 (Masterplan Application site) when effects of **minor negative** significance are anticipated.

12.6.15 For the 'typical case' scenario for Phase 1b and 1c (FDS Application site) and Phase 3 (Masterplan Application site), effects of **moderate negative** significance are anticipated at the majority of existing and future receptors, with the following exceptions:

- The Michael Faraday School during all stages of Phase 1b and 1c when effects of **negative to minor negative** significance are anticipated.
- All noise sensitive receptors during the construction stage when effects of **negative to minor negative** significance are anticipated.
- Dwellings on Thurlow Street and Dawes Street during all stages of Phase 3 other than construction, when effects of **major negative** significance are anticipated.

12.6.16 For the 'typical case' scenario for Phase 2 and Phase 4 (Masterplan Application site), effects of **negligible to minor negative** significance are anticipated at the majority of existing and future receptors, with the following exceptions:

- Dwellings on Surrey Square, Surrey Grove, Kinglake Street and Bagshot Street during the demolition, sub-structure and fit-out stages of Phase 2 when effects of **moderate negative** significance are anticipated.
- The Michael Faraday School during the demolition, sub-structure and fit-out stages of Phase 4 when effects of **moderate negative** significance are anticipated.

FDS Development Option

12.6.17 The range of construction noise levels predicted at existing and future receptors when the FDS Application site is developed (Phase 1b and 1c) are presented as the first section of **Table 12.15**, with the significance of effects being identified in the paragraphs beneath that table. The findings with respect to Phase 1b and 1c are equally valid whether they relate to the FDS Development as part of the Site Wide Development Option or in isolation.

Mitigation

12.6.18 In the preliminary calculations presented in **Table 12.15**, no consideration has been given to the use of temporary screens or hoardings. A 2.4 metre high solid hoarding positioned at the construction Site boundary can provide up to 10 dB acoustic benefit for all ground floor activities where the line of sight to the nearest receptors is completely obscured. The benefit will be reduced at first floor level and most probably be insignificant at levels above this.

12.6.19 However, some attenuation will be realised at ground floor locations and if hoarding is erected, it should consist of plywood sheets (19 mm thick) or similar, with all knot holes, cracks and other joints, including that with ground, sealed to minimise the passage of sound.

12.6.20 Ultimately to ensure construction noise levels are reduced wherever possible, it is recommended that the following 'best practice' measures are employed by the contractor:

- Discussions should be held with LBS and other interested parties prior to the commencement of any Site works and thereafter be maintained throughout the duration of the works to ensure that appropriate measures are put in place to alleviate any potential disturbance to surrounding noise-sensitive receptors;
- The contractor and their sub-contractors should at all times apply the principle of Best Practicable Means as defined in Section 72 of the *Control of Pollution Act* and carry out all work in such a manner as to avoid or reduce any disturbance from noise and vibration as far as is practicable;
- Guidance given in *BS 5228-1* (Section 8 – *Control of noise* and Annex B – *Noise sources, remedies and their effectiveness*) should be followed as far as is practicable and advice and training on noise minimisation given to staff during Site induction procedures;

- Site hours should be limited to 08:00 to 18:00 hours Monday to Friday and 08:00 to 13:00 hours on Saturday. No works audible beyond the Site boundary should be undertaken out of these normal hours without prior agreement with the LBS;
- Noisy work in the vicinity of the Michael Faraday Primary School and the Sacred Heart Roman Catholic Secondary School should occur outside of school term wherever practicable and/or should be programmed to minimise disturbance during lesson periods;
- All plant brought on to Site should comply with the relevant EC / UK noise limits applicable to that equipment or should be no noisier than would be expected based on the noise levels quoted in *BS 5228-1*. Each plant item should be well maintained and operated in accordance with manufacturers' recommendations and in such a manner as to minimise noise emissions;
- Electrically powered plant should be preferred, where practicable, to mechanically powered alternatives. All mechanically powered plant should also be fitted with suitable silencers, as appropriate;
- Items of plant on Site operating intermittently should be shut down in the intervening periods between use;
- Where feasible, all stationary plant should be located so that the noise effect at receptors is minimised and, if practicable, every item of static plant when in operation should be sound attenuated using methods based on the guidance and advice given in *BS 5228-1*;
- Careful selection of construction methods and plant should be investigated and utilised, for example, breaking-out of concrete structures, where possible, using low noise methods such as munching or similar, rather than percussion breaking;
- Temporary acoustic barriers where appropriate and other noise containment measures such as screens, sheeting and acoustic hoarding at the Site boundary should be erected to minimise noise breakout and reduce noise levels at potentially affected receptors;
- Deliveries should be programmed to arrive during Site operating hours only and care should be taken when unloading vehicles to minimise noise. Deliveries should be routed so as to minimise disturbance to local residents and delivery vehicles should be prohibited from waiting within or near the Site with their engines running;
- On-site haul roads should be constructed and maintained so that the road surface is smooth and the gradient minimal which should minimise noise and vibration from traffic haul roads;
- Neighbourhood liaison should be undertaken with occupiers of residential, educational and business properties that are likely to be affected by the works, informing them in advance of the nature and expected duration of the works and the proposed hours of work. A noticeboard should be displayed in a prominent position near the Site detailing named contacts who are able to provide further information and deal with any complaints as appropriate during all working hours; and
- If a temporary significant noise or vibration effect cannot reasonably be prevented and the works being undertaken are crucial to progressing a particular phase of the project, then separate liaison with the LBS is likely to be necessary to ensure an acceptable compromise is reached.

12.6.21 The environmental management control measures detailed above and the issues set out in LBS's *Environmental Code of Construction Practice*, should act as a guide when undertaking environmental controls and monitoring during the works.

12.6.22 Prior to commencement of the construction works, it is recommended that liaison is undertaken with LBS's Environmental Health Department, to ensure that appropriate and adequate means of mitigation and control are applied throughout the construction of the Comprehensive Development. This liaison should confirm the requirement for a Section 61 prior consent application under the *Control of Pollution Act*.

12.6.23 In any case a Site specific Construction Environmental Management Plan (CEMP), or similar, will be prepared and submitted to LBS for approval. The need for noise monitoring and the setting of noise and vibration action levels to assist in controlling noise and vibration at potentially sensitive receptor locations will be identified, as noted in LBS's *Environmental Code of Construction Practice*.

Residual Effects

12.6.24 By adopting the measures described above and a neighbourly approach throughout the demolition and construction works (for example, adhering to the construction Site working hours, keeping residents and the schools informed, ensuring that best practicable means are adopted at all times to minimise noise and vibration levels) it is anticipated that all demolition and construction related activities can be undertaken whilst minimising disturbance to those living and working nearby.

12.6.25 Mostly effects of **minor negative** significance are expected following the implementation of mitigation measures, although occasional effects of **moderate to major negative** significance are still likely to occur during some activities when works are at their closest to nearby sensitive receptors.

Demolition and Construction Traffic Noise

Demolition and Construction Traffic Noise Predictions and Assessment

12.6.26 The likely change in traffic noise on the road network due to demolition and construction traffic associated with the Comprehensive Development has been determined in accordance with the *CRTN* methodology and using traffic data supplied by WSP UK Ltd.

12.6.27 The *CRTN* methodology allows the prediction of noise over a 1-hour period and the 18-hour period between 06:00-24:00 hours (see **Appendix 12.3**, **Paragraph 16** onwards). For this assessment 18-hour AAWT[2] traffic data have been utilised.

Site Wide Development Option

12.6.28 Additional traffic movements associated with the development of Phase 1b and 1c (the FDS Application site) have been provided. The traffic data relating to the FDS Application site (which will be the first phase of development within the Site Wide Development Option) have been taken as indicative of the movements likely to be generated during subsequent phases of development within the Masterplan Application site. The assessment of noise level changes resulting from the additional demolition and construction traffic associated with the FDS Application site is presented in the following section.

FDS Development Option

12.6.29 Two traffic scenarios have been considered:

[1] 2014 baseline; and

[2] 2014 baseline plus FDS demolition and construction traffic flows.

12.6.30 **Table 12.16** presents the difference in the BNL between scenarios [2] and [1] from which the significance of the change in noise attributable to demolition and construction traffic associated with the FDS can be derived.

12.6.31 The BNL predictions (see **Appendix 12.3**, **Paragraph 18**) are in terms of $L_{A10,18h}$ at 10 metres from the kerb and with a receptor height of 1.5 metres and incorporate the 18-hour vehicle flow, the proportion of heavy duty vehicles and vehicle speed as provided, along with the following assumptions:

- The gradient for all roads is unchanged between scenarios; and
- A standard bituminous, impervious surface (e.g. hot rolled asphalt) is assumed on all roads for all scenarios.

12.6.32 Where appropriate the *CRTN* low flow correction has been applied. Where the 18-hour vehicle flow falls below the threshold required by *CRTN* (1000 vehicles in the 18-hour period), the BNL has not been determined (hence the gap in the sequence of ID numbers).

[2] Annual Average Weekday Traffic

Table 12.16: Predicted Difference in the Basic Noise Level (BNL), in terms of $L_{A10,18h}$, as a result of FDS demolition and construction traffic

ID	Road	Between		Difference in BNL (dB) scenario [2] – [1]
1	A201 New Kent Road	Rodney Place	-	0.0
2	A201 New Kent Road	Rodney Place	A2 Old Kent Road	0.0
3	Rodney Place	A201 New Kent Road	Heygate Street	+0.8
4	A215 Walworth Road	Heygate Street	-	+0.1
5	Heygate Street	Rodney Place	A215 Walworth Road	+0.1
6	Rodney Road	Rodney Place	East Street	+0.1
7	A2 Old Kent Road	East Street	A201 New Kent Road	0.0
8	East Street	Thurlow Street	A2 Old Kent Road	+0.1
9	East Street	Thurlow Street	-	0.0
11	A215 Walworth Road	Heygate Street	East Street	+0.1
12	A215 Walworth Road	Fielding Street	Merrow Street	+0.1
13	Fielding Street	A215 Walworth Road	-	0.0
14	Portland Street	Merrow Street	-	0.0
15	Thurlow Street	East Street	Area 3/4 Access	0.0
16	A2 Old Kent Road	East Street	B203 Dunton Road	0.0
17	Merrow Street	A215 Walworth Road	Portland Street	0.0
19	A215 Walworth Road	Merrow Street	John Ruskin Street	+0.1
20	John Ruskin Street	A215 Walworth Road	-	0.0
21	A215 Walworth Road	John Ruskin Street	B214 Albany Road	+0.1
22	Portland Street	Merrow Street	B214 Albany Road	0.0
24	A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	0.0
25	A215 Camberwell Road	A214 Albany Road	-	+0.1
26	B214 Albany Road	A215 Walworth Road	Area 1 Access	+0.3
27	B214 Albany Road	Portland Street	Wells Way	+0.4
28	Wells Way	B214 Albany Road	-	0.0
29	B214 Albany Road	Wells Way	Thurlow Street	+0.2
30	B214 Albany Road	A2 Old Kent Road	Area 2 Access	+0.2
31	B204 Humphrey Road	A2 Old Kent Road	-	0.0
32	A2 Old Kent Road	B214 Albany Road	-	0.0
33	Thurlow Street	Area 3/4 Access	B214 Albany Road	+0.1
34	B214 Albany Road	Area 2 Access	Thurlow Street	+0.2
35	B214 Albany Road	Area 1 Access	Portland Street	+0.5
38	Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	+0.4
39	B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	+0.2

12.6.33 It can be seen that for all links the short-term change in road traffic noise, comparing the 2014 baseline situation (scenario 1) with the situation including demolition and construction traffic associated with the FDS (scenario 2), is no greater than +0.8 dB.

12.6.34 Comparison of results with the adopted significance criteria presented in **Table 12.5** reveals that, at worst, the increase in road traffic noise arising from the demolition and construction of the FDS would result in an effect of **negligible** significance along all roads.

Mitigation

12.6.35 As no significant demolition and construction related road traffic noise effects are anticipated, no particular mitigation measures are considered necessary.

Residual Effects

12.6.36 As no mitigation measures are considered necessary residual effects of **negligible** significance remain.

Demolition and Construction Vibration

Demolition and Construction Vibration Predictions and Assessment

12.6.37 The foundations associated with all new buildings will be constructed using continuous flight auger (CFA) piling. As vibration associated with CFA piling is likely to be minimal, an assessment has been undertaken to quantify the level of vibration likely to result should any vibratory rollers or compactors be used.

12.6.38 The vibration predictions have been determined at the nearest receptor locations (both existing and future), using the relevant propagation algorithms set out Annex E of *BS 5228-2: 2009 +A1: 2014* for the use of vibratory rollers or compactors (**see Appendix 12.8**).

Site Wide Development Option

12.6.39 The assessment has been undertaken based on the assumption that there is a 33% probability of the predicted peak particle velocity (PPV) vibration level being exceeded (and a 67% probability that it is not). As for the noise assessment two scenarios have been considered – a 'worst case' situation where the vibratory compactor or roller is located at the centre of the closest building being constructed to each vibration sensitive receptor and a more 'typical case' where the vibratory compactor or roller is located at the approximate centre of the development plot closest to each vibration sensitive receptor. The predictions have been undertaken for both the steady state and the start up and run down state at existing and future receptors, and the results are presented in **Table 12.17**. The range of distances between the construction works and the nearest identified receptors for each phase are presented in brackets in the scenario column.

Table 12.17: Predicted Vibratory Compactor and Roller Vibration Levels (PPV)

Site works	Vibration sensitive receptor	Scenario [1]	Steady state	Start up / run down
FDS Application site				
Phase 1b and 1c	■ Bradenham Close ■ Westmoreland Road ■ Phelp Street ■ Existing receptors Phase 4 ■ Adventure Playground ■ Portland Street ■ Michael Faraday School	Worst case (15-50m)	0.1 - 0.8 $mm \cdot s^{-1}$	0.2 - 1.0 $mm \cdot s^{-1}$
		Typical case (85-170m)	<0.1 $mm \cdot s^{-1}$	<0.1 - 0.1 $mm \cdot s^{-1}$

Site works	Vibration sensitive receptor	Scenario [1]	Steady state	Start up / run down
Masterplan Application site				
Phase 2	■ Surrey Square ■ Alvery Street ■ Surrey Grove ■ Kinglake Street ■ Bagshot Street ■ Sedan Way ■ Merrow Street ■ Existing receptors Phase 3 ■ Existing receptors Phase 4	Worst case (15-30m)	0.3 - 0.8 mm·s^{-1}	0.4 - 1.0 mm·s^{-1}
		Typical case (90-250m)	<0.1 mm·s^{-1}	<0.1 - 0.1 mm·s^{-1}
Phase 3	■ Thurlow Street ■ Flint Street ■ East Street ■ Dawes Street ■ Sacred Heart School ■ Merrow Street ■ Future receptors Phase 2	Worst case (15-45m)	0.2 - 0.8 mm·s^{-1}	0.3 - 1.0 mm·s^{-1}
		Typical case (75-130m)	<0.1 mm·s^{-1}	<0.1 - 0.1 mm·s^{-1}
Phase 4	■ Adventure Playground ■ Michael Faraday School ■ Portland Street ■ Merrow Street ■ Future receptors Phase 1b and 1c ■ Future receptors Phase 2	Worst case (15-45m)	0.2 - 0.8 mm·s^{-1}	0.3 - 1.0 mm·s^{-1}
		Typical case (130-300m)	<0.1 mm·s^{-1}	<0.1 mm·s^{-1}
Notes: 1. The figures in brackets relate to the range of distances between the construction works and the nearest identified receptors for each phase.				

12.6.40 Comparison of the predicted levels with the adopted significance criteria presented in **Table 12.5** reveals that:

- for the 'worst case' scenario described above, effects of **minor negative** significance are anticipated for all receptors for all development phases.
- for the 'typical case' scenario described above, effects of **negligible** significance are anticipated for all receptors for all development phases.

12.6.41 Since the levels of vibration which can cause significant damage to buildings are at least one order of magnitude higher than those for human disturbance, it may also be concluded that no significant negative effects are anticipated in terms of building damage from construction vibration.

FDS Development Option

12.6.42 The range of construction vibration levels predicted at existing and future receptors when the FDS Application site is developed (Phase 1b and 1c) are presented as the first section in **Table 12.17**, with the significance of effects being identified in the paragraphs beneath that table. These findings are equally valid whether they relate to the FDS Development as part of the Site Wide Development Option, or in isolation.

Mitigation

12.6.43 Although it has been concluded that no significant vibration effects are anticipated, the following good practice measures should be applied where necessary and practicable.

- Activities which, by their very nature, can impart significant levels of vibration into the ground should be substituted with alternatives which generate less vibration.
- If alternative plant cannot be sourced then vibration generating plant should be used sparingly.
- Given the propensity for more noticeable vibration during the start-up and shut down of plant which inherently can generate significant levels of vibration, it is recommended that wherever possible this equipment should, wherever practicable, be started or stopped at least 15 metres away from any vibration sensitive receptors and in any case as far away as possible.

12.6.44 It would also be prudent to monitor closely the construction process controls to ensure vibration effects on and off the Site are minimised, so far as is reasonably practicable. Such protocols should be incorporated in both the CEMP and construction method statements provided by the Principal Contractor.

Residual Effects

12.6.45 In general residual effects of **minor negative** significance are anticipated when works are at their closest to nearby vibration sensitive receptors. Vibration monitoring and implementation of the environmental management controls will serve to minimise any potential effects.

Operational Phase

12.6.46 Following completion of the Comprehensive Development, sensitive receptors could be affected by noise from additional vehicle movements on the local road network and also by noise from any new building services plant. The significance of these noise sources is considered below.

Operational Road Traffic Noise

Road Traffic Noise Predictions and Assessment

12.6.47 The likely change in traffic noise on the road network due to operational traffic associated with the Comprehensive Development has been determined in accordance with the *CRTN* methodology and using traffic data supplied by WSP UK Ltd.

12.6.48 The *CRTN* methodology allows the prediction of noise over a 1-hour period and the 18-hour period between 06:00-24:00 hours (see **Appendix 12.3**, **Paragraph 16** onwards). For this assessment 18-hour AAWT traffic data have been utilised. The BNL predictions are in terms of $L_{A10,18h}$ at 10 metres from the kerb and with a receptor height of 1.5 metres and incorporate the 18-hour vehicle flow, the proportion of heavy duty vehicles and vehicle speed as provided, along with the following assumptions:

- The gradient for all roads is unchanged between scenarios; and
- A standard bituminous, impervious surface (e.g. hot rolled asphalt) is assumed on all roads for all scenarios.

12.6.49 Where appropriate the *CRTN* low flow correction has been applied. Where the 18-hour vehicle flow falls below the threshold required by *CRTN* (1000 vehicles in the 18-hour period), the BNL has not been determined (hence the gap in the sequence of ID numbers in the tables following).

Site Wide Development Option

12.6.50 Three traffic scenarios have been considered (the numbering of the scenarios follows on from the previous road traffic noise assessment concerning demolition and construction movements associated with the FDS Application site):

[1] 2014 baseline;

[3] 2014 baseline plus committed developments; and

[4] 2014 baseline plus committed developments plus Site Wide Development Option.

12.6.51 **Table 12.18** presents the difference in the BNL between scenarios [3] and [1] from which the significance of the change attributable to committed developments can be derived (see **Paragraph 12.5.19** relating to the future baseline situation) and between scenarios [4] and [3] from which the significance of the change attributable to the Site Wide Development Option can be derived. As no traffic growth is expected in the area in the future, no assessment has been undertaken of any future years.

Table 12.18: Predicted Difference in the Road Traffic Basic Noise Level (BNL), dB $L_{A10,18h}$

ID	Road	Between		Difference in BNL	
				scenario [3] – [1]	scenario [4] – [3]
1	A201 New Kent Road	Rodney Place	-	+0.1	0.0
2	A201 New Kent Road	Rodney Place	A2 Old Kent Road	+0.1	0.0
3	Rodney Place	A201 New Kent Road	Heygate Street	+1.0	+0.1
4	A215 Walworth Road	Heygate Street	-	+0.1	0.0
5	Heygate Street	Rodney Place	A215 Walworth Road	+0.2	0.0
6	Rodney Road	Rodney Place	East Street	0.0	0.0
7	A2 Old Kent Road	East Street	A201 New Kent Road	0.0	0.0
8	East Street	Thurlow Street	A2 Old Kent Road	0.0	0.0
9	East Street	Thurlow Street	-	+0.2	0.0
11	A215 Walworth Road	Heygate Street	East Street	0.0	0.0
12	A215 Walworth Road	Fielding Street	Merrow Street	0.0	0.0
13	Fielding Street	A215 Walworth Road	-	0.0	0.0
14	Portland Street	Merrow Street	-	+0.1	+0.1
15	Thurlow Street	East Street	Area 3/4 Access	0.0	0.0
16	A2 Old Kent Road	East Street	B203 Dunton Road	0.0	0.0
17	Merrow Street	A215 Walworth Road	Portland Street	0.0	0.0
19	A215 Walworth Road	Merrow Street	John Ruskin Street	0.0	0.0
20	John Ruskin Street	A215 Walworth Road	-	0.0	0.0
21	A215 Walworth Road	John Ruskin Street	B214 Albany Road	0.0	0.0
22	Portland Street	Merrow Street	B214 Albany Road	+0.2	+0.1
24	A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	0.0	0.0
25	A215 Camberwell Road	A214 Albany Road	-	0.0	0.0
26	B214 Albany Road	A215 Walworth Road	Area 1 Access	+0.1	+0.1
27	B214 Albany Road	Portland Street	Wells Way	0.0	+0.1
28	Wells Way	B214 Albany Road	-	0.0	0.0
29	B214 Albany Road	Wells Way	Thurlow Street	0.0	+0.1
30	B214 Albany Road	A2 Old Kent Road	Area 2 Access	0.0	+0.1
31	B204 Humphrey Road	A2 Old Kent Road	-	0.0	0.0
32	A2 Old Kent Road	B214 Albany Road	-	0.0	0.0

ID	Road	Between		Difference in BNL	
				scenario [3] – [1]	scenario [4] – [3]
33	Thurlow Street	Area 3/4 Access	B214 Albany Road	0.0	+0.2
34	B214 Albany Road	Area 2 Access	Thurlow Street	0.0	+0.1
35	B214 Albany Road	Area 1 Access	Portland Street	+0.1	+0.1
38	Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	0.0	+0.1
39	B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	0.0	+0.1

12.6.52 It can be seen that for all links the change in road traffic noise, comparing the baseline situation plus committed developments (scenario 3) with the same situation but including traffic associated with the Site Wide Development Option (scenario 4), is no greater than +0.2 dB.

12.6.53 Comparison of results with the adopted significance criteria presented in **Table 12.5** reveals that, at worst, the increase in operational traffic noise associated with the Site Wide Development Option would result in an effect of **negligible** significance along all roads.

FDS Development Option

12.6.54 Two scenarios have been considered (the numbering of the scenarios follows on from that above):

[3] 2014 baseline plus committed developments; and

[5] 2014 baseline plus committed developments plus FDS Development Option;

12.6.55 **Table 12.19** presents the difference in the BNL between scenarios [5] and [3] from which the significance of the change attributable to the FDS Development Option can be derived. As no traffic growth is expected in the area in the future, no assessment has been undertaken of any future years.

Table 12.19: Predicted Difference in the Road Traffic Basic Noise Level (BNL), dB $L_{A10,18h}$

ID	Road	Between		Difference in BNL
				scenario [5] – [3]
1	A201 New Kent Road	Rodney Place	-	0.0
2	A201 New Kent Road	Rodney Place	A2 Old Kent Road	0.0
3	Rodney Place	A201 New Kent Road	Heygate Street	0.0
4	A215 Walworth Road	Heygate Street	-	0.0
5	Heygate Street	Rodney Place	A215 Walworth Road	0.0
6	Rodney Road	Rodney Place	East Street	0.0
7	A2 Old Kent Road	East Street	A201 New Kent Road	0.0
8	East Street	Thurlow Street	A2 Old Kent Road	0.0
9	East Street	Thurlow Street	-	0.0
11	A215 Walworth Road	Heygate Street	East Street	0.0
12	A215 Walworth Road	Fielding Street	Merrow Street	0.0
13	Fielding Street	A215 Walworth Road	-	0.0
14	Portland Street	Merrow Street	-	0.0
15	Thurlow Street	East Street	Area 3/4 Access	0.0
16	A2 Old Kent Road	East Street	B203 Dunton Road	0.0

ID	Road	Between		Difference in BNL scenario [5] – [3]
17	Merrow Street	A215 Walworth Road	Portland Street	0.0
19	A215 Walworth Road	Merrow Street	John Ruskin Street	0.0
20	John Ruskin Street	A215 Walworth Road	-	0.0
21	A215 Walworth Road	John Ruskin Street	B214 Albany Road	0.0
22	Portland Street	Merrow Street	B214 Albany Road	0.0
24	A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	0.0
25	A215 Camberwell Road	A214 Albany Road	-	0.0
26	B214 Albany Road	A215 Walworth Road	Area 1 Access	0.0
27	B214 Albany Road	Portland Street	Wells Way	0.0
28	Wells Way	B214 Albany Road	-	0.0
29	B214 Albany Road	Wells Way	Thurlow Street	0.0
30	B214 Albany Road	A2 Old Kent Road	Area 2 Access	0.0
31	B204 Humphrey Road	A2 Old Kent Road	-	0.0
32	A2 Old Kent Road	B214 Albany Road	-	0.0
33	Thurlow Street	Area 3/4 Access	B214 Albany Road	0.0
34	B214 Albany Road	Area 2 Access	Thurlow Street	0.0
35	B214 Albany Road	Area 1 Access	Portland Street	0.0
38	Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	0.0
39	B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	0.0

12.6.56 It can be seen that for all links no change in road traffic noise is predicted, comparing the baseline situation including committed developments (scenario 3) with the same situation but including traffic associated with the FDS Development Option (scenario 5).

12.6.57 Comparison of results with the adopted significance criteria presented in **Table 12.5** reveals that there would be **no change** in operational road traffic noise associated with the FDS Development Option.

Mitigation

12.6.58 As no significant operational road traffic noise effects are anticipated, no particular mitigation measures are considered necessary.

Residual Effects

12.6.59 As no mitigation measures are considered necessary residual effect of no worse than **negligible** significance would remain.

Operational Building Services Plant Noise

12.6.60 The proposals currently include an energy centre within the FDS Application site (in the south-east corner of Sub-Plot 5, on the ground floor of Block 5A with a second energy centre likely to be constructed to the east within Sub-Plot 4 of the Masterplan Application site at some point in the future.

12.6.1 It is also possible that other, isolated, items of mechanical services equipment could be required across the Site, comprising typically small ventilation fans or condensing units to serve any communal, commercial or retail premises included in the development.

12.6.2 Whilst some information on fixed plant is available at this stage (for example, details of the plant emissions of the FDS Application site energy centre for the air quality assessment), the specific type and configuration of these plant are still to be determined. Therefore, the detailed predictions to determine the significance of the likely noise effect would not be possible at this stage. Nevertheless, preliminary plant noise emission criteria have been identified to which all fixed plant associated with the Comprehensive Development (and in particular the proposed energy centres) should adhere. Furthermore, some indicative noise predictions relating to the plant located within the FDS Application site energy centre have also been undertaken, based on standard acoustic principles, to help gain some understanding of the likely extent of any mitigation.

Proposed Noise Criteria

12.6.3 The consultation exercise conducted in May 2014 confirmed that fixed plant, including that associated with the energy centre, should be designed such that the rating level of the fixed plant is at least 10 dB below the existing background noise level ($L_{A90,T}$), based on the procedures contained in *BS 4142: 1997*.

12.6.4 Therefore, the specific noise level of all fixed plant, assessed in accordance with the methodology set out within *BS 4142*, should ordinarily be 10 dB below the existing background noise level (i.e. $L_{Aeq,T} = L_{A90,T}$ - 10 dB). In the event that the plant noise contains any acoustic feature(s), the specific noise level should be reduced by a further 5 dB (i.e. $L_{Aeq,T} = L_{A90,T}$ -15 dB).

12.6.5 When identifying appropriate noise criteria, it is important to consider on-site as well as off-site receptors as the former are likely to be located closer to any new plant than the latter. Consequently, it is likely to be the background noise level at on-site receptors that ultimately will determine the plant noise emission criteria.

12.6.1 Whilst existing background noise levels have been measured over a number of days at two locations to the north and south of the proposed FDS Application site, the background noise levels are likely to be different in the future to those measured in 2014. This is because the layout and massing of the Comprehensive Development is likely to result in different screening and reflection effects across the FDS Application site and the Masterplan Application site, compared to those which exist now. Consequently, it is recommended that a noise survey be undertaken at a later date to confirm future background noise levels at on-site as well as off-site receptors. This survey should be used to inform a more detailed plant noise assessment, once more is known about the plant that is to be installed.

12.6.2 Based on the above, the criteria identified in the following paragraphs should be considered as preliminary.

12.6.3 The noise survey undertaken in May 2014 identified the lowest measured background noise level during the day to be 43 dB $L_{A90,1h}$ and at night to be 32 dB $L_{A90,15min}$ (rounded down to the nearest whole decibel, see **Table 12.13**).

12.6.4 On this basis, and in accordance with LBS requirements, the external atmospheric building services noise emission criteria applicable at 1 metre from any noise sensitive window of any existing or proposed residential building would be 33 dB $L_{Aeq,T}$ for daytime plant emissions and 22 dB $L_{Aeq,T}$ during the night. Any plant containing tonal or other acoustically distinguishable characteristics should be designed to a noise level 5 dB more stringent.

12.6.5 However, it should be noted that the *BS 4142* assessment method is not suitable when the background noise and rating noise levels are both very low, which is defined as "*background noise level below about 30 dB and rating levels below about 35 dB are considered to be very low*".

12.6.6 No standard guidance is available on how to proceed in such circumstances. Therefore, reference has been made to *BS 8233: 2014*, which provides suitable internal ambient noise criteria for residential dwellings (see **Table 12.6**).

12.6.7 *BS 8233* also states that a level difference of up to 15 dB can be expected between a façade noise level and an internal space via a partially open window assuming a steady, anonymous noise source. Cautiously this difference reduces to 12 dB, considering a free-field noise level.

12.6.8 On this basis, to achieve the *BS 8233* internal noise criteria in living rooms during the day (35 dB $L_{Aeq,16h}$) and bedrooms during the night (30 dB $L_{Aeq,8h}$) with windows open, the free-field façade incident noise level should not exceed 47 dB $L_{Aeq,16h}$ during the day and 42 dB $L_{Aeq,8h}$ during the night.

12.6.9 However, as mentioned above, the *BS 8233* criteria are intended for anonymous sources of noise, i.e. sources that cannot be attributed to a particular person or property. Therefore, a level 5 dB below the target internal noise criteria is recommended.

12.6.10 Consequently, the following external plant noise emission criteria should apply. At these external noise levels, the internal noise levels (due to fixed plant) would be expected not to exceed 30 dB $L_{Aeq,T}$ during the day or 25 dB $L_{Aeq,T}$ during the night, when windows are open, which is considered unlikely to result in disturbance.

Table 12.20: Indicative Fixed Plant Noise Emission Criteria

Period	Day (07:00 – 23:00 hours)	Night (23:00 – 07:00 hours)
Cumulative, free-field plant noise criteria at 1 metre external to noise sensitive windows	42 dB $L_{Aeq,T}$	37 dB $L_{Aeq,T}$

Fixed Building Services Plant Noise Predictions and Assessment

Site Wide Development Option

Fixed Building Services Plant within the Comprehensive Development

12.6.11 Ultimately, it will be necessary to design, select, locate and/or attenuate collectively all building services plant on the Site such that the performance criteria, as specified above (or as agreed with LBS in the event that future background noise levels differ from those that currently exist) are achieved.

12.6.12 The plant noise emission criteria apply to all plant and individual plant items may need to be designed to meet a lower level such that the overall noise emission criteria are achieved.

12.6.13 As noted above, the proposed noise emission criteria are provided for indicative purposes only. A comprehensive noise survey and detailed assessment should be undertaken as the post planning scheme design evolves, in order that plant may be appropriately specified.

12.6.14 The lack of detail at this time precludes any quantification of noise levels likely to arise from fixed plant, with the exception of that associated with the energy centre within the FDS Application site, as described below. However, if the proposed noise emission criteria are not achieved, effects of **moderate** and even **major negative** significance could arise at nearby sensitive locations as a result of fixed building services plant.

Fixed Building Services Plant Associated with the FDS Application Site Energy Centre on Sub-Plot 5

12.6.15 Some indicative noise predictions have been undertaken for fixed plant within the FDS Application site energy centre to help gain some understanding of the likely extent of any mitigation. However, as noted above, a comprehensive noise survey and detailed assessment should be undertaken as the post planning scheme design evolves, in order that plant may be appropriately specified. Hence, at this stage, the anticipated noise levels and the feasibility of compliance with LBS requirements should be considered preliminary.

12.6.16 The proposed energy centre within the FDS Application site is to be located in the south-east corner of Sub-Plot 5, on the southern edge of the Site boundary. The nearest noise sensitive receptors to the proposed energy centre will be the new residential premises in the same block on the floors above, approximately six

metres adjacent, and the new residential in Block 4D on Sub-Plot 4 to the north-east, approximately 20 metres from the energy centre and with a direct line of sight.

12.6.17 Therefore, the background noise levels measured at Position 1 (see **Table 12.13**) and the derived plant noise criteria (see **Table 12.20**) are deemed relevant for the nearest noise sensitive receptor to the proposed energy centre.

12.6.18 The energy centre is assumed to have masonry walls with an element of louvered area to provide sufficient ventilation. Assuming noise levels within the energy centre are compliant with relevant health and safety legislation and allowing for typical levels of sound insulation that may be afforded by the building construction, indicative noise emissions are given below in **Table 12.21**.

Table 12.21: Indicative Noise Levels Arising from the FDS Application Site Energy Centre

	Receptor location	
	Second floor residential units in FDS Application site Block 5A	**Residential units in FDS Application site Block 4D**
Assumed internal reverberant sound pressure level [1]	80 dB $L_{Aeq,T}$	
Assumed nominal sound insulation [2]	- 14 dB	
Indicative noise level at 1 metre from façade of energy centre	66 dB $L_{Aeq,T}$	
Distance attenuation	- 8 dB	- 15 dB
Noise level at receptor location	58 dB $L_{Aeq,T}$	51 dB $L_{Aeq,T}$
Notes: 1 = equivalent to the lower exposure action level of the Control of Noise at Work Regulations 2005 (Ref. 12.22) 2 = assumes nominally 40% of façade area is louvred and not acoustically treated		

12.6.19 It is assumed that any other fixed building services plant in the FDS Application site (and indeed within the Masterplan Application site) will be sufficiently distant from the energy centre such that provided it also complies with the noise criteria, it would not have any cumulative impact on the noise levels predicted above.

12.6.20 It can be seen by reference to the indicative plant noise levels set out in **Table 12.21** and the preliminary plant noise criteria set out in **Table 12.20** that fixed plant associated with the energy centre on the FDS Application site has the potential to give rise to effects of **moderate** and even **major negative** significance at nearby sensitive locations.

FDS Development Option

12.6.21 The information and detail set out in the preceding section concerning the Site Wide Development Option is equally valid whether it relates to the FDS Development as part of the Site Wide Development Option or in isolation.

Mitigation

Fixed Building Services Plant within the Comprehensive Development

12.6.22 Indicative noise emission criteria have been identified based on the background noise level and the requirements of the LBS. It will be necessary to design, select, locate and / or attenuate all plant within the Comprehensive Development to meet these criteria during detailed design.

12.6.23 Compliance with the specified noise criteria will be subject to the type, quantity and location of any such plant but will be likely to require consideration of the following measures:

- procurement of ‘quiet’ non-tonal fixed plant;
- locating plant and air vents away from noise-sensitive receptors;
- incorporation of acoustic enclosures where practical;
- incorporation of in-duct silencers as necessary;
- incorporation of acoustic louvres; and
- isolation of plant from building structures.

Fixed Building Services Plant Associated with the FDS Application Site Energy Centre on Sub-Plot 5

12.6.24 As the detailed design progresses, the mitigation measures identified above will need to be given due consideration in order to ensure that the noise levels from the proposed energy centre are sufficiently reduced at the nearby residential receptor locations.

12.6.25 In particular, the internal construction, layout and finishes of the energy centre shall be designed to ensure that the reverberant noise levels are within the lower exposure action limit of the Control of Noise at Work Regulations 2005.

12.6.26 The external façade of the energy centre will need to provide up to 35 dB sound reduction or be sufficient to reduce the break-out noise levels to no more than 45 dB at 1 metre from the façade.

12.6.27 Such a level of sound insulation is likely to require bespoke ventilation paths with minimal open areas rather than large areas of louvre. However, the target is considered feasible providing careful consideration is given to the plant selections, internal layouts and associated detailed design.

Residual Effects

12.6.28 Assuming that fixed building services plant is designed, selected, located and / or attenuated such that the specified plant noise emission criteria are satisfied, then it is anticipated that at worst residual effects of **negligible** significance would remain.

12.7 Site Suitability

Purpose of the Assessment

12.7.1 Proprietary noise mapping software (CadnaA) has been used to calculate the L_{Aeq} and L_{AFmax} road traffic noise levels across the Site to facilitate an assessment of the suitability of the Site for noise sensitive uses, in line with the requirements of LBS.

12.7.2 In fact, it has already been established that the residential-led Comprehensive Development includes essentially the same uses as those that currently exist on the Site and, therefore, that the suitability of the Site for the proposed uses cannot be in doubt. However, an assessment of the noise levels affecting the Site has still been undertaken, with the purpose of determining the need for, and extent of, any mitigation to ensure that a suitable noise climate will exist for future residents.

12.7.3 The consultation exercise with LBS confirmed that for dwellings within the Comprehensive Development, internal noise levels within habitable rooms should achieve 35 dB $L_{Aeq,16h}$ during the day and 30 dB $L_{Aeq,8h}$ and 45 dB L_{AFmax} during the night. These criteria are the same as those set out in LBS’s Supplementary Design and Construction SPD (see **Paragraph 12.2.12**). It is assumed that compliance with these design targets will ensure that residential units are appropriate for their intended use and that a suitable noise climate will exist for future residents.

Use and Calibration of the Noise Model

12.7.4 The use of computerised three-dimensional noise modelling allows:

- A large number of receptor points to be evaluated in an efficient manner, given the size and complexity of the area and noise sources under consideration;
- The influence of meteorological effects on noise levels to be discounted;
- The influence of the daily variation in traffic flows/conditions to be removed;
- The screening/reflection of noise from proposed buildings and barriers on Site to be taken into account; and
- Future road traffic patterns to be taken into account (the assessment below is based on a future scenario that includes traffic associated with committed and other developments in the area as well as with the Comprehensive Development).

12.7.5 Before the noise model results were used to determine future noise levels affecting the Comprehensive Development the noise survey results (see **Section 12.5**) were compared with the predicted noise levels for the base situation in 2014 to ensure that the results generated by the noise model represent a suitably accurate picture of the baseline situation (see **Appendix 12.9** for further details).

Site Wide Development Option

12.7.6 This section includes tables presenting the highest predicted free-field $L_{Aeq,16h}$ daytime and $L_{Aeq,8h}$ night-time noise levels at proposed building façades within the Site Wide Development Option. The maximum noise level at night might influence the mitigation requirements and so the highest L_{AFmax} level on each façade has also been reported. The $L_{Aeq,T}$ noise levels have been predicted using the noise model and based on traffic data supplied by WSP UK Ltd, which includes all traffic associated with committed development and the Comprehensive Development (in its entirety).

12.7.7 Also included in the following tables is the required sound reduction to ensure that 35 dB $L_{Aeq,16h}$ is achieved in living rooms during the day and 30 dB $L_{Aeq,8h}$ and 45 dB L_{AFmax} is achieved in bedrooms during the night. The highest of the three required sound reduction values is reported. **Table 12.22** provides an example using the predicted noise levels for Block 6D of Sub-Plot 6 on the FDS Application site.

Table 12.22: Determination of Required Sound Reduction Block 6D, Sub-Plot 6

Block	Façade	Parameter	Predicted noise level	Internal target noise level	Required sound reduction	Overall sound reduction
6D	S	$L_{Aeq,16h}$	65 dB	35 dB	30 dB	31 dB
		$L_{Aeq,8h}$	60 dB	30 dB	30 dB	
		L_{AFmax}	76 dB	45 dB	31 dB	
	W	$L_{Aeq,16h}$	59 dB	35 dB	24 dB	29 dB
		$L_{Aeq,8h}$	55 dB	30 dB	25 dB	
		L_{AFmax}	74 dB	45 dB	29 dB	
	E	$L_{Aeq,16h}$	59 dB	35 dB	24 dB	26 dB
		$L_{Aeq,8h}$	54 dB	30 dB	24 dB	
		L_{AFmax}	71 dB	45 dB	26 dB	

12.7.8 It can be seen that the tables below exclude some blocks within the designated plot and, indeed, some façades that are included have no results reported. Where blocks and/or façades are excluded or blanks appear in the tables, this is because the predicted $L_{Aeq,T}$ and/or L_{AFmax} are at a sufficiently low level not to require acoustically rated glazing (i.e. a required sound reduction of 24 dB or less). So, for example, based on the information presented in **Table 12.22** above, the $L_{Aeq,16h}$ and $L_{Aeq,8h}$ on the east facing façade would not have been reported.

Noise Predictions for Proposed Buildings in the FDS Application Site

12.7.9 **Table 12.23** to **Table 12.25** present the predicted worst case free-field noise levels affecting façades in on Sub-Plots 4 to 6, which lie immediately to the north of Albany Road within the FDS Application site. The overall sound reduction value required from each façade is also reported.

Table 12.23: Predicted Worst Case Free-Field Noise Levels (dB) – FDS Application Site, Sub-Plot 4

Blo	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
4A	SE	65	61	77	32
	SW	61	56	76	31
	NW				
	NE	63	59	76	31
4D	S	62	58	72	28
	W			70	25

Blo	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
4D	N				
	E				
4E	S	63	58	74	29
	N				
	E		55	73	28

Table 12.24: Predicted Worst Case Free-Field Noise Levels (dB) – FDS Application Site, Sub-Plot 5

Blo	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
5A	N				
	W	61	57	75	30
	S	65	61	77	32
	E	62	57	75	30
5E	E				
	S	65	60	77	32

Blo	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
5E	W	62	57	75	30
	N				
5F*	N				
	E			73	28
	S	64	59	75	30
*Block unlabled, but adjoins to Block 5E to the east					

Table 12.25: Predicted Worst Case Free-Field Noise Levels (dB) – FDS Application Site, Sub-Plot 6

Blo	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
6A	S	65	60	76	31
	W	61	56	75	30
	N				
	E	60	56	74	29
6D	S	65	60	76	31
	W		55	74	29

Blo	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
6D	N				
	E			71	26
6E*	S	65	60	76	31
	N				
	E	60	56	74	29
*Block unlabled, but adjoins to Block 6D to the east					

12.7.10 With a single exception, there are no particular sound reduction performance requirements for Sub-Plots 1 to 3, as these lie further from the dominant road traffic source (Albany Road) and would be screened by the proposed buildings on Sub-Plots 4 to 6. The single exception is the east façade of Block 3B (facing towards Portland Street) where the predicted $L_{Aeq,16h}$ is 62 dB (requiring a sound reduction performance of 27 dB to achieve 35 dB internally) and the $L_{Aeq,8h}$ is 58 dB (requiring a sound reduction performance of 28 dB to achieve 30 dB internally).

12.7.11 It can be seen that the façades most affected by noise (i.e. those with a sound reduction requirement of at least 31 dB) are those facing south/south-east towards Albany Road. None of the façades requires a sound reduction performance in excess of 32 dB.

12.7.12 The quieter façades (i.e. those with sound reduction requirements of 24 dB or less) either face inwards towards the centre of each plot or are screened from road sources by other nearby buildings. In particular, Sub-Plot 1 contains extra care residential accommodation and communal uses. This plot is well screened from dominant sources and so there would be no requirement for acoustically rated glazing. The same conclusion is reached for the learning disability unit located in Sub-Plot 2.

Noise Predictions for Proposed Buildings in the Masterplan Application Site

12.7.13 This section includes tables presenting the highest predicted free-field $L_{Aeq,16h}$ daytime and $L_{Aeq,8h}$ night-time noise levels at proposed building façades within the Masterplan Application site. As the maximum noise level at night could influence the mitigation requirements, the highest L_{AFmax} level on each façade has also been reported.

12.7.14 Also included in the tables is the required sound reduction to ensure that 35 dB $L_{Aeq,16h}$ is achieved in living rooms during the day and 30 dB $L_{Aeq,8h}$ and 45 dB L_{AFmax} are achieved in bedrooms during the night. The highest of the three required sound reduction values is reported.

12.7.15 This analysis is based on the sub-plots outlined in the parameter plans (**Figures 3.17 – 3.25**). Specifically the maximum extents have been assumed in terms of building footprint and height on the basis that this represents a reasonable worst case situation with regard to noise.

12.7.16 There are, in fact, a number of sub-plots where no particular sound reduction performance requirements would be necessary. The following thirteen Sub-Plots – 5b, 5c, 6b, 7b, 8a, 10a, 11b, 13a, 13b, 13c, 15b, 17a, and 17b – do not directly front Albany Road, Thurlow Street or Portland Street and hence there would be no particular acoustic performance requirements.

12.7.17 In addition, there will be some façades on the remaining sub-plots where no particular sound reduction performance requirements would be necessary. Only façades that might require acoustically rated glazing are included in the tables that follow.

12.7.18 **Table 12.26** to **Table 12.30** present the predicted worst-case free-field noise levels affecting façades on sub-plots fronting particular roads running through or past the Masterplan Application site. The overall sound reduction value required from each façade is also reported. In the following tables the first column – designated "SP" – includes to the sub-plot number. Furthermore, north-west facing façades include those facing north and in a similar fashion, north-east facing façades include those facing east, south-east facing façades include those facing south and south-west facing façades include those facing west.

Table 12.26: Predicted Worst Case Free-Field Noise Levels (dB) – Portland Street

SP	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
10b	NW	61	56		26
	SE	61	56		26
	SW	63	59		29

SP	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
11a	NW	60	56		26
	SW	63	59		29

Table 12.27: Predicted Worst Case Free-Field Noise Levels (dB) – Albany Road (West of Thurlow St)

SP	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
14a	NW	62	58	73	28
	NE	68	63	77	33
	SE	66	62	73	32
	SW	61	57	71	27
14b	NE	60	56	71	26
	SE	66	62	73	32
	SW	62	58	72	28
16a	NE	60	56	71	26

SP	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
16a	SE	65	60	75	30
	SW	63	59	73	29
16b	NE	63	59	71	29
	SE	65	61	72	31
	SW		55	71	26
17c	NE	62	58	72	28
	SE	67	63	74	33
	SW	62	57	71	27

Table 12.28: Predicted Worst Case Free-Field Noise Levels (dB) – Albany Road (East of Thurlow St)

SP	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
4a	NW	63	59	74	29
	NE	60	56	72	27
	SE	66	62	74	32
	SW	68	63	76	33
4b	NE			72	27
	SE	64	60	74	29
	SW	60	56	71	26

Table 12.29: Predicted Worst Case Free-Field Noise Levels (dB) – Thurlow Street (West Side)

SP	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
8b	NW	63	59	74	29
	NE	67	62	76	32
	SE	62	57	73	28
9a	NW	62	58	73	28
	NE	67	62	75	32
	SE	62	57	73	28
9b	NW	62	57	73	28
	NE	68	63	77	33
	SE	65	60	76	31
9c	NW		55	73	28
	NE	68	63	78	33
	SE	65	61	77	32
12a	NW	62	57	73	28
12a	NE	68	63	76	33
	SE	62	58	73	28
12b	NW	62	58	73	28
	NE	68	63	76	33
	SE	62	57	73	28
15a	NW	62	57	72	27
	NE	66	62	75	32
	SE	61	57	72	27
18a	NE	68	63	78	33
	SE	63	58	75	30
18b	NW	63	58	74	29
	NE	67	63	77	33
	SE	62	57	73	28

Table 12.30: Predicted Worst Case Free-Field Noise Levels (dB) – Thurlow Street (East Side)

SP	Fac	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	Reduction
5a	SW	61	57		27
6a	NW	63	58	75	30
	SE	63	58	74	29
	SW	68	64	77	34
6c	NW	63	59	74	29
6c	SE	64	59	76	31
	SW	68	64	78	34
7a	NW	64	60	76	31
	SE	63	58	74	29
	SW	67	63	78	33

12.7.19 It can be seen from the tables above that:

- South-east facing façades fronting Albany Road will typically require a sound reduction performance in the range 31-33 dB. Exceptions to this would be Sub-Plot 4b, which is better screened and further away from Albany Road, where a sound reduction of 29 dB is identified and Sub-Plot 16a, the southern arm of which encroaches close to Albany Road. Here a sound reduction performance of 30 dB is identified.
- South-west facing façades fronting Portland Street will typically require a sound reduction performance of 29 dB.
- Façades fronting Thurlow Street will typically require a sound reduction performance of 32-33 dB. Exceptions to this would be Sub-Plot 5a, which is well set back from the road, where a sound reduction of

27 dB is identified and Sub-Plot 6a and Sub-Plot 6c, which both lie sufficiently close to the road to require a slightly higher sound reduction performance of up to 34 dB.

Mitigation Measures

12.7.20 Based on the predicted noise levels, it is considered that:

- The areas designated in the FDS Application site for the extra care facility, communal area and the learning disability unit are entirely suited to these uses and no particular mitigation measures would be required; and
- Residential use is appropriate within all areas of the Site Wide Development Option, provided that a commensurate level of protection against noise is included in the building design to ensure a satisfactory internal noise environment which accords with the requirements of LBS.

12.7.21 It can be seen by reference to **Table 12.30** that the notional buildings on a couple of Sub-Plots – 6a and 6c – require a slightly higher sound reduction performance due to their slightly closer position to Thurlow Street than other buildings on other sub-plots. These findings are based on a worst case assumption regarding maximum extents, so any building on these sub-plots ultimately may not be located so close to the road. However, it is recommended that consideration should be given to the likely noise levels at all building façades fronting Thurlow Street and Albany Road during the detailed design and if necessary the build-line pulled-back as far as is practicable to minimise the level of noise impinging on any building façade.

12.7.22 Mitigation measures for residential buildings are considered below.

Glazing Specification

12.7.23 The worst case noise levels and sound reduction requirements reported above have been used to determine whether an adequate level of protection against noise can be included in the building design. Given that windows are usually the weakest component acoustically in the overall building envelope, it is appropriate, in the first instance, to consider the sound insulation provided by the glazing elements.

12.7.24 As noted earlier in this Chapter, it is proposed that internal noise levels within habitable rooms should achieve 35 dB $L_{Aeq,16h}$ in living rooms during the day and 30 dB $L_{Aeq,8h}$ and 45 dB L_{AFmax} during the night.

12.7.25 It is clear that ambient noise levels vary across the Site, being dependent on the distance to, and screening of, road sources and so different glazing units will need to be specified accordingly.

12.7.26 *BS 8233: 2014* identifies two methods to determine the degree of noise attenuation required from a building façade based on a known external noise level, one of which is a 'simple calculation' and the other a 'more rigorous calculation' which considers the frequency spectrum of the noise source and the acoustic absorption in the room. With respect to the simple calculation, *BS 8233* (Annex G, Section G.1) includes the following advice:

"Strictly, the insulation values used here relate to a pink noise spectrum, and actual values achieved are lower for traffic noise. Furthermore, the method does not take account of the absorption (e.g. furnishings) in the room. However, the R_W values will suffice for a rough calculation, although it is likely to underestimate the level in the room by up to 5 dBA. Where the estimate is within 5 dBA of the limit, a more rigorous calculation should be carried out using octave bands……"

12.7.27 The simplified method has been used to determine a notional glazing specification that should ensure the required sound reduction and the internal noise levels required by LBS are achieved. To this end, the 5 dB adjustment to allow for the frequency content of the road traffic noise source and the room acoustics has cautiously been included.

12.7.28 **Table 12.31** matches, across a number of glazing categories, a notional glazing configuration with the sound reduction required from the building façade in order to meet the $L_{Aeq,16h}$ daytime and $L_{Aeq,8h}$ and L_{Amax} night-time criteria. So, for example, if 27 dB sound reduction is required, the notional glazing specification would be a 6/12/4 unit with a R_W performance of 32 dB (i.e. glazing category 1).

Table 12.31: Categorisation of Glazing Units

Sound reduction range	Sound reduction	BS 8233: 2014 adjustment	Rw [1]	Glazing configuration	Source	Glazing category
≤ 24 dB	24 dB	5 dB	29 dB	4 / 12 / 4	*BS 6262-2: 2005* (Ref. 12.23)	0
25 – 27 dB	27 dB	5 dB	32 dB	6 / 12 / 4		1
28 – 30 dB	30 dB	5 dB	35 dB	10 / 12 / 4		2
31 – 33 dB	33 dB	5 dB	38 dB	10 / 12 / 6.4		3
34 – 36 dB	36 dB	5 dB	41 dB	8 / 10 / 10.8A	St Gobain	4
37 – 39 dB	39 dB	5 dB	44 dB	8 / 16 / 16.8A		5

Note:

1. The weighted sound reduction index (Rw) is a single figure rating used to describe the sound reduction of a building element when measured in a laboratory. The Rw is calculated from the measured values in each one-third octave band. As with all single figure indices the specified acoustic performance is not always achieved when applied to real noise exposure; hence the introduction of the adaptation terms C and C_{tr}. The noise level in a room resulting from outside noise intrusion depends mainly on the level and frequency spectrum of the noise and the sound reduction characteristics of the window(s). The weighted sound reduction index cannot be used directly to estimate the noise level in the room, but where a road traffic noise source exists, the spectrum adaptation term, C_{tr}, can be added to the Rw to provide an indication of the sound reduction of the window (in dB).

12.7.29 The tables below identify the sound reduction required on a façade-by-façade basis based on the glazing categories identified in the preceding table. For façades not listed (where a sound reduction of 24 dB or less is required) a thermal double-glazed unit – 4/12/4 or similar – would suffice.

Table 12.32: Sound Reduction Requirements – FDS Application Site

Category [1]	Category [2]	Category [3]	Category [4]	Category [5]
25 – 27 dB	**28 – 30 dB**	**31 – 33 dB**	**34 – 36 dB**	**37 – 39 dB**
(6/12/4)	**(10/12/4)**	**(10/12/6.4)**	**(8/10/10.8A)**	**(8/16/16.8A)**
4D – W	3B – E	4A – SE / SW / NE		
6D – E	4D – S	5A – S		
	4E – S / E	5E – S		
	5A – W / E	6A – S		
	5E – W	6D – S		
	5F [1] – E / S	6E [2] – S		
	6A – W / E			
	6D – W			
	6E [2] – E			

Notes:

1. Block unlabled, but adjoins to Block 5E to the east
2. Block unlabled, but adjoins to Block 6D to the east

Table 12.33: Sound Reduction Requirements – Masterplan Application Site – Albany Street

Category [1]	Category [2]	Category [3]	Category [4]	Category [5]
25 – 27 dB	**28 – 30 dB**	**31 – 33 dB**	**34 – 36 dB**	**37 – 39 dB**
(6/12/4)	**(10/12/4)**	**(10/12/6.4)**	**(8/10/10.8A)**	**(8/16/16.8A)**
4a – NE	4a – NW	4a – SE / SW		
4b – NE / SW	4b – SE	14a – E / NE / SE		
14a – W / SW	14a – NW	14b – SE		
14b – NE	14b – SW	16b – SE		
16a – NE	16a – SE / SW	17c – SE		
16b – W / SW	16b – E / NE			
17c – W / SW	17c – E / NE			

Table 12.34: Sound Reduction Requirements – Masterplan Application Site – Portland Street

Category [1]	Category [2]	Category [3]	Category [4]	Category [5]
25 – 27 dB	**28 – 30 dB**	**31 – 33 dB**	**34 – 36 dB**	**37 – 39 dB**
(6/12/4)	**(10/12/4)**	**(10/12/6.4)**	**(8/10/10.8A)**	**(8/16/16.8A)**
10b – N / NW / S / SE	10b – W			
11a – NW	11a – W / SW			

Table 12.35: Sound Reduction Requirements – Masterplan Application Site – Thurlow Street

Category [1]	Category [2]	Category [3]	Category [4]	Category [5]
25 – 27 dB	**28 – 30 dB**	**31 – 33 dB**	**34 – 36 dB**	**37 – 39 dB**
(6/12/4)	**(10/12/4)**	**(10/12/6.4)**	**(8/10/10.8A)**	**(8/16/16.8A)**
5a – SW	6a – NW / SE	6c – SE	6a – SW	
10b – N / NW / S / SE	6c – NW	7a – NW / W / SW	6c – SW	
11a – NW	7a – SE	7c – NE		
15a – NW / SE	8b – NW / SE	9a – NE		
	9a – NW / SE	9b – NE / SE		
	9b – NW	9c – NE / SE		
	9c – NW	12a – NE		
	10b – NW	12b – NE		
	11a – W / SW	15a – NE		
	12a – NW / S / SE	18a – NE		
	12b – NW / SE	18b – NE		
	18a – SE			
	18b – NW / SE			

Ventilation

12.7.30 The noise insulation performance of the specified glazing unit assumes that windows remain closed. Consequently, it is necessary to consider how adequate ventilation is to be provided to the most noise exposed building façades. On ventilation, *BS 8233: 2014* advises that:

'The Building Regulations on ventilation…recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.'

12.7.31 **Table 12.36** matches, across the same categories as for glazing, notional background ventilation methods with the sound reduction required from the building façade in order to meet the $L_{Aeq,16h}$ daytime and $L_{Aeq,8h}$ and L_{Amax} night-time criteria. So, for example, if 30 dB sound reduction is required, acoustic window mounted trickle vents are proposed with a $D_{n,e,w}$ performance of 35 dB (i.e. ventilation category 2).

Table 12.36: Categorisation of Background Ventilation Units

Sound reduction range	Target $D_{n,e,w}$ [1]	Typical background ventilation method	Ventilation category
≤ 15 dB	-	Open windows	00
16 – 24 dB	28 dB	Hit and miss window trickle vents	0
25 – 27 dB	32 dB	Standard window trickle vents	1
28 – 30 dB	35 dB	Acoustic window trickle vents	2
31 – 33 dB	38 dB	Through wall hit and miss passive vents	3
34 – 36 dB	41 dB	Through wall acoustically cowled passive vents	4
37 – 39 dB	44 dB	Through wall high performance passive vents	5

Note:

1. The weighted, element-normalized level difference ($D_{n,e,w}$) is the level difference corresponding to a reference value of absorption area in the receiving room with sound transmission through the small technical element only.

12.7.32 The maximum sound insulation requirements identified for any of the proposed façades fall into ventilation (and glazing) category 4. All background ventilation requirements for the development can therefore be achieved with passive ventilators, albeit, those on the façades exposed to higher noise levels are likely to require through-wall type rather than window mounted ventilators.

12.7.33 The categories above relate to background ventilation rates as defined in Approved Document F of the Building Regulations (Ref. 12.24) and will, in the majority of cases allow future occupants to have the option of keeping windows closed for most of the time and opening windows for rapid ventilation and summer cooling when required.

12.7.34 There is no guidance on ambient noise tolerance for rapid ventilation or summer cooling requirements; however, it is not unreasonable to expect a moderate increase in noise levels during those relatively short and infrequent periods where an occupant opts for rapid ventilation.

12.7.35 Open windows for rapid ventilation or summer cooling can be incorporated into the design when the sound insulation requirements call for ventilation category 0 or lower. Beyond category 0, potentially significant effects could arise, particularly on south facing façades where the demand for summer cooling is likely to be higher.

12.7.36 In these circumstances, an alternative means of enhanced ventilation for summer cooling should be considered. Passive means could include ducted systems that draw air into the habitable rooms from quieter façades. Alternatively, mechanical systems could be incorporated that would negate the need to open windows to prevent overheating.

12.7.37 The rapid ventilation and summer cooling ventilation requirements will need to be carefully considered during the detailed design phase with the relevant specialist consultants in order to achieve a balanced architectural, mechanical and acoustic solution.

External Amenity Areas

12.7.38 Consideration of external spaces is also required, specifically any balconies and outdoor living areas. The WHO guidance and *BS 8233: 2014* both identify that a level of 55 dB $L_{Aeq,16h}$ should ideally be achieved in external amenity areas, although the guidance in *BS 8233*, as reproduced below is relevant.

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might also be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."

12.7.39 A wide range of noise levels could affect private balconies. Some balconies, notably those close to and facing the dominant road sources in the area will be exposed to moderately high levels of traffic noise and here 55 dB $L_{Aeq,16h}$ is unlikely to be achieved. However, very many of the other locations (e.g. those further from the various noise sources and well screened by other buildings within the Comprehensive Development) would be much less affected by noise and here levels below 55 dB $L_{Aeq,16h}$ could be anticipated.

12.7.40 Regardless of the noise level, the provision of balconies ultimately affords future residential occupiers the flexibility, option and choice of utilising an external area if they wish to do so.

12.7.41 A number of open spaces (adopted and public) are included within the Masterplan Application site, varying in size from 224 sqm to 5,038 sqm. All of these, bar one, are remote from Albany Road and Thurlow Street and so would be set back and screened from these sources. Here noise levels would be expected to be suitable for amenity/leisure uses. The same conclusion can be drawn with respect to enclosed courtyard areas formed by individual buildings on particular plots and sub-plots.

12.7.42 The single exception would be the open space north-east of Thurlow Street (numbered 09 on Parameter Plan 05), in front of Sub-Plot 5a, where road traffic on Thurlow Street would result in noise levels that would not be ideal for amenity/leisure uses.

Conclusion

12.7.43 It has been demonstrated that subject to appropriate mitigation measures being applied, the daytime and night-time internal noise levels required by LBS, can be achieved. Consequently, it is concluded that the Site is suitable for residential development and that an appropriate suitable noise climate will exist for future residents.

FDS Development Option

12.7.44 The predicted noise levels relating to the FDS reported previously within the preceding Site Wide Development Option section will be virtually identical to those predicted when the FDS Development Option is considered. There are, however, some very small differences in the predicted noise levels brought about by the following:

- The slightly lower traffic flows associated with the FDS Development Option compared to the Site Wide Development Option.

- The slightly different screening and reflection effects from the existing buildings on the Masterplan Application site compared to the notional blocks that have been assumed on the sub-plots in the future under the Site Wide Development Option.

12.7.45 These changes translate into only very marginal differences in the predicted noise levels, with many values remaining the same as presented above and the remaining falling by 1 dB. The required sound reduction, however, remains the same in all bar one location, where the requirement falls again by 1 dB.

12.7.46 Therefore, given the very small and insignificant differences between the noise levels for this and the preceding option, the previously reported noise levels and mitigation measures within the FDS under the Site Wide Development Option can be taken to apply equally to the FDS Development Option.

12.8 Limitations and Assumptions

12.8.1 Certain limitations and assumptions apply to the assessments reported in this Chapter and these are described in **Appendix 12.10**.

12.9 Summary

12.9.1 This Chapter describes the results of the assessment of potential noise and vibration effects associated with the Comprehensive Development. In particular, it considers the potential effects on human receptors within and surrounding the Site, in terms of:

- Noise and vibration during demolition and construction;
- Noise from changes in road traffic attributable to the Comprehensive Development; and
- Noise from building services plant associated with the Comprehensive Development.

12.9.2 The Chapter also provides an assessment of the suitability of the Site for noise sensitive uses in terms of the likely ambient levels of noise in the future, and the need to provide an adequate internal and external noise environment for future occupants.

Site Wide Development Option

12.9.3 Temporary noise and vibration effects during demolition and construction activities have been assessed. With respect to demolition and construction noise effects of mostly minor negative significance are expected following the implementation of mitigation measures, although occasional effects of moderate to major negative significance are likely to occur during some activities when works are at their closest to nearby sensitive receptors. With respect to vibration, residual effects of mostly minor negative significance are anticipated when works are at their closest to nearby vibration sensitive receptors. The increase in road traffic noise arising during demolition and construction works is expected to result in an effect of negligible significance along all roads.

12.9.4 Operationally, the change in road traffic noise as a result of the Site Wide Development Option is anticipated to be negligible and therefore no mitigation measures are considered necessary and residual effects remain unchanged.

12.9.5 Noise emission criteria have been identified to minimise the effect of all new fixed building services plant, in line with the guidance set out in *BS 4142: 1997* and LBS's requirements. Providing care is taken in the selection, location, installation and attenuation of the fixed plant to ensure that the noise emission criteria are achieved, residual effects are anticipated to be negligible.

12.9.6 With respect to the suitability of the Site for noise sensitive uses, it has been demonstrated that subject to appropriate mitigation measures being applied, the daytime and night-time noise levels required by LBS, can be achieved. Consequently, it is concluded that the Site is suitable for the proposed uses and that an appropriate noise climate will exist for future residents.

12.9.7 A summary of the effects of the Site Wide Development Option with respect to noise and vibration is presented in **Table 12.37**.

FDS Development Option

12.9.8 Temporary noise and vibration effects during demolition and construction activities have been assessed. With respect to demolition and construction noise effects of mostly minor negative significance are expected following the implementation of mitigation measures, although occasional effects of moderate to major negative significance are likely to occur during some activities when works are at their closest to nearby sensitive receptors. With respect to vibration, residual effects of mostly minor negative significance are anticipated when works are at their closest to nearby vibration sensitive receptors. The increase in road traffic noise arising during demolition and construction works is expected to result in an effect of negligible significance along all roads.

12.9.9 Operationally, there would be no change in road traffic noise as a result of the FDS Development Option and therefore no mitigation measures are considered necessary and residual effects remain unchanged.

12.9.10 Noise emission criteria have been identified to minimise the effect of all new fixed building services plant, in line with the guidance set out in *BS 4142: 1997* and LBS's requirements. Providing care is taken in the selection, location, installation and attenuation of the fixed plant to ensure that the noise emission criteria are achieved, residual effects are anticipated to be negligible.

12.9.11 With respect to the suitability of the Site for noise sensitive uses, it has been demonstrated that subject to appropriate mitigation measures being applied, the daytime and night-time noise levels required by LBS, can be achieved. Consequently, it is concluded that the Site is suitable for the proposed uses and that an appropriate noise climate will exist for future residents.

12.9.12 A summary of the effects of the FDS Development Option with respect to noise and vibration is presented in **12.38**.

Table 12.37: Summary of Effects for Noise and Vibration – Site Wide Development Option

Description of Significant Effects	Receptor	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Effects					Relevant Policy	Relevant Legislation
		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		
Demolition and Construction														
Noise	Existing dwellings surrounding the Site, existing dwellings on Site, new dwellings on Site, Adventure Playground, Michael Faraday School and Sacred Heart School	Moderate and major when works are close, otherwise moderate and minor	Negative	T	D	MT to LT	Liaise with the LBS Environmental Health Department. Prepare and implement a Construction Environmental Management Plan. Erect a solid hoarding around the Site. Adopt the best practice measures specified in Paragraph 12.6.20 and Best Practicable Means at all times	Mostly minor, but occasion-ally moderate to major when works are at their closest	Negative	T	D	MT to LT	LBS Environmental Code of Construction Practice	Control of Pollution Act, 1974
Traffic *	Existing noise senstive receptors close to the road network	Negligible	N/A	P	D	MT to LT	None	Negligible	N/A	P	D	MT to LT	LBS Environmental Code of Construction Practice	Control of Pollution Act, 1974
Vibration	Existing dwellings surrounding the Site, existing dwellings on Site, new dwellings on Site, Adventure Playground, Michael Faraday School and Sacred Heart School	Minor when works are at their closest, otherwise negligible	Negative	T	D	MT to LT	Substitute vibration generating plant with alternatives that generate less vibration. Plant generating significant levels of vibration should not be started or stopped within 15 metres of an occupied building. Monitor works closely	Minor at worst	Negative	T	D	MT to LT	LBS Environmental Code of Construction Practice	Control of Pollution Act, 1974
Operation														
Road traffic noise	Existing noise sensitive receptors close to the road network	Negligible	N/A	P	D	LT	None required	Negligible	N/A	P	D	LT	NPPF London Plan Policy 7.15	N/A

Description of Significant Effects	Receptor	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Effects					Relevant Policy	Relevant Legislation
		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		
Fixed building services plant noise	Existing dwellings surrounding the Site, existing dwellings on Site, new dwellings on Site, Adventure Playground, Michael Faraday School and Sacred Heart School	Potentially major	Negative	P	D	LT	Careful selection, installation and noise attenuation of all fixed plant to ensure that the proposed plant noise emission criteria are achieved	Negligible	N/A	P	D	LT	LBS Southwark Plan Policy 3.1 *Environmental effects*	Environmental Protection Act, 1990
Site Suitability														
Ambient noise	Proposed dwellings	N/A	N/A	N/A	N/A	N/A	Provision of appropriate glazing and ventilation to ensure relevant internal daytime and night-time noise criteria are achieved	N/A	N/A	N/A	N/A	N/A	LBS Southwark Plan Policy 3.2 *Protection of amenity* and Policy 4.2 *Quality of residential accommoda-tion*	N/A

* Based on demolition and construction traffic data relating to the FDS Application site, which have been taken to be indicative of the likely effects during subsequent phases considered within the Masterplan Application site.

^ The Site suitability assessment does not utilise the four point scale of significance that has been used to assess the effects arising from the Site Wide Development Option, but instead is based on appropriate target values, which should be achieved through design.

Key to table:

P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

Table 12.38: Summary of Effects for Noise and Vibration – FDS Development Option

Description of Significant Effects	Receptor	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Effects					Relevant Policy	Relevant Legislation
		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		
Demolition and Construction														
Noise	Existing dwellings surrounding the Site, existing dwellings on Site, Adventure Playground and Michael Faraday School	Moderate and major when works are close, otherwise moderate and minor	Negative	T	D	ST	Liaise with the LBS Environmental Health Department. Prepare and implement a Construction Environmental Management Plan. Erect a solid hoarding around the Site. Adopt the best practice measures specified in Paragraph 12.6.20 and Best Practicable Means at all times	Mostly minor, but occasion-ally moderate to major when works are at their closest	Negative	T	D	ST	LBS Environmental Code of Construction Practice	Control of Pollution Act, 1974
Traffic	Existing noise senstive receptors close to the road network	Negligible	N/A	P	D	ST	None	Negligible	N/A	P	D	ST	LBS Environmental Code of Construction Practice	Control of Pollution Act, 1974
Vibration	Existing dwellings surrounding the Site, existing dwellings on Site, Adventure Playground and Michael Faraday School	Minor when works are at their closest, otherwise negligible	Negative	T	D	ST	Substitute vibration generating plant with alternatives that generate less vibration. Plant generating significant levels of vibration should not be started or stopped within 15 metres of an occupied building. Monitor works closely	Minor at worst	Negative	T	D	ST	LBS Environmental Code of Construction Practice	Control of Pollution Act, 1974
Operation														
Road traffic noise	Existing noise sensitive receptors close to the road network	Negligible	N/A	P	D	LT	None required	Negligible	N/A	P	D	LT	NPPF London Plan Policy 7.15	N/A

Description of Significant Effects	Receptor	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Effects					Relevant Policy	Relevant Legislation
		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		
Fixed building services plant noise	Existing dwellings surrounding the Site, existing dwellings on Site (especially those on Plot 4 and Plot 5), Adventure Playground and Michael Faraday School	Potentially major	Negative	P	D	LT	Careful selection, installation and noise attenuation of fixed plant to ensure that the proposed plant noise emission criteria are achieved	Negligible	N/A	P	D	LT	LBS Southwark Plan Policy 3.1 *Environmental effects*	Environmental Protection Act, 1990
Site Suitability ^														
Ambient noise	Proposed dwellings	N/A	N/A	N/A	N/A	N/A	Provision of appropriate glazing and ventilation to ensure relevant internal daytime and night-time noise criteria are achieved	N/A	N/A	N/A	N/A	N/A	LBS Southwark Plan Policy 3.2 *Protection of amenity* and Policy 4.2 *Quality of residential accommoda-tion*	N/A
^ The Site suitability assessment does not utilise the four point scale of significance that has been used to assess the effects arising from the FDS Development Option, but instead is based on appropriate target values, which should be achieved through design.														

Key to table:

P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

12.10 References

Ref. 12.1 UK Government (1974); *Control of Pollution Act*

Ref. 12.2 UK Government (1990); *Environmental Protection Act*

Ref. 12.3 Department for Communities and Local Government (2012); *National Planning Policy Framework*

Ref. 12.4 Department for Environment, Food and Rural Affairs (2010); *Noise Policy Statement for England*

Ref. 12.5 Department for Communities and Local Government (2014); *Planning Practice Guidance*

Ref. 12.6 Greater London Authority (2011); *The London Plan*

Ref. 12.7 Greater London Authority (2004); *London Ambient Noise Strategy*

Ref. 12.8 Southwark Council (2007); *The Southwark Plan*

Ref. 12.9 Southwark Council (2011); *Core Strategy*

Ref. 12.10 Southwark Council (2010); *Aylesbury Area Action Plan*

Ref. 12.11 Southwark Council (2009); Supplementary Planning Document – *Sustainable Design and Construction*

Ref. 12.12 Southwark Council (2001); *Environmental Code of Construction Practice*

Ref. 12.13 British Standards Institute (2009); BS 5228: *Code of practice for noise and vibration control on construction and open sites*. Part 1: *Noise*, as amended 2014 (*BS 5228-1: 2009 +A1: 2014*)

Ref. 12.14 British Standards Institute. (2009); BS 5228: *Code of practice for noise and vibration control on construction and open sites*. Part 2: *Vibration,* as amended 2014 (*BS 5228-2: 2009 +A1: 2014*)

Ref. 12.15 British Standards Institute. (2008); BS 6472: *Guide to evaluation of human exposure to vibration in buildings*. Part 1: *Vibration sources other than blasting*

Ref. 12.16 Department of Transport and Welsh Office (1988); *Calculation of Road Traffic Noise*

Ref. 12.17 The Highways Agency, Scottish Government, Welsh Assembly Government and the Department for Regional Development Northern Ireland (2011); Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7, HD 213/11 revision 1. *Noise and Vibration*

Ref. 12.18 British Standards Institute BS 7445: *Description and measurement of environmental noise*. Part 1 (2003) *Guide to quantities and procedures*. Part 2 (1991) *Guide to the acquisition of data pertinent to land use*. Part 3 (1991) *Guide to application of noise limits*

Ref. 12.19 British Standards Institute (1997); BS 4142: *Method for Rating industrial noise affecting mixed residential and industrial areas*

Ref. 12.20 British Standards Institute (2014); BS 8233: *Guidance on sound insulation and noise reduction for buildings*

Ref. 12.21 World Health Organisation (2000);. *Guidelines for Community Noise*

Ref. 12.22 UK Government. (2005); *The Control of Noise at Work Regulations*. Statutory Instrument 2005 No.1643

Ref. 12.23 British Standards Institute. (2005); BS 6262: *Glazing for buildings*. Part 2: *Code of practice for energy, light and sound*

Ref. 12.24 HM Government (2010); The Building Regulations Approved Document F. *Ventilation* (2010 edition, incorporating further 2010 amendments)

13 Local Air Quality

13.1 Introduction

13.1.1 This Chapter of the ES presents the likely significant effects on local air quality resulting from air emissions associated with both the construction and operation phases of the Site Wide Development Option and the FDS Development Option. It considers the potential impacts on local air quality concentrations on sensitive receptors both on, and in the vicinity of, the Site.

13.1.2 The Chapter describes the applicable legislation, policy and guidance; the scope of the assessment; the methodology used; the baseline conditions at the Site and surrounding area; the likely significant effects on local air quality; the assessment of the neutrality of emissions associated with the new proposals; the mitigation measures required to prevent, reduce or offset any significant adverse effects; the likely residual effects after these measures have been employed. The cumulative effects with other committed developments are addressed in **Chapter 17**.

13.1.3 This Chapter (and its associated figures and appendices) should be read together with the introductory chapters of this ES, **Chapters 1 – 5,** as well as **Chapter 17 'Cumulative Effects'. Appendix 13.1** sets out a glossary of air quality terminology.

13.2 Legislation, Policy and Guidance

Legislative Framework

13.2.1 The applicable legislative framework is summarised as follows:

- Air Quality Directive 2008/50/EC (Ref. 13.1);
- The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928 (Ref. 13.2);
- The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043 (Ref. 13.3);
- The Air Quality Standards Regulations 2010 - Statutory Instrument 2010 No. 1001 (Ref. 13.4);
- The Environmental Protection Act 1990 (Ref. 13.5); and
- The Environment Act 1995 (Ref. 13.6).

13.2.2 Each of the above are summarised in **Appendix 13.2**.

Planning Policy

13.2.3 The applicable planning policy is summarised as follows:

- National Planning Policy Framework (NPPF) (Ref. 13.7);
- Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS) (Ref. 13.8);
- The London Plan: Spatial Development Strategy for Greater London (July 2011) (Revised October 2013) (Ref. 13.9);
- The Mayor's Air Quality Strategy of London (Ref. 13.10);

- London Borough of Southwark Core Strategy (Adopted Version, April 2011) (Ref. 13.11);
- London Borough of Southwark Air Quality Strategy and Action Plan (Ref.13.12);and
- The Aylesbury Area Action Plan (AAAP) (January 2010) (Ref. 13.13).

13.2.4 Details of the planning policy above are summarised in **Appendix 13.2**.

Guidance

13.2.5 The applicable guidance to the current assessment is as follows:

- National Planning Practice Guidance (NPPG) (Ref. 13.14);
- Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(09) (Ref. 13.15);
- Local Air Quality Management Review and Assessment Policy Guidance LAQM.PG(09) (Ref. 13.16);
- Development Control: Planning for Air Quality (2010 Update) Environmental Protection UK, April 2010 (Ref. 13.17);
- Greater London Authority: The Control of Dust and Emissions from Construction and Demolition – SPG (July 2014) (Ref. 13.18);Institute of Air Quality Management: Guidance on the Assessment of Dust from Demolition and Construction (February 2014) (Ref. 13.19);
- London Councils Guidance for Air Quality Assessments (2007) (Ref. 13.20);
- Environment Agency: H1 Annex F - Air Emissions (Ref. 13.21);
- Air Quality Neutral Planning Support: GLA 80371 May 2013 (Ref. 13.22); and
- Sustainable Design and Construction Supplementary Planning Guidance - London Plan 2011 - Implementation Framework April 2014 (Ref. 13.23).

13.2.6 Details of the guidance above are summarised in **Appendix 13.2**.

13.3 Scope

Scope of the Assessment

13.3.1 An EIA Scoping Report was submitted to LBS (see **Appendix 2.1**) and their formal Scoping Opinion was received on 13th March 2014 (see **Appendix 2.2**). In relation to air quality, a separate technical note was prepared in response to the Scoping Opinion and was issued on 19th June 2014 (see **Appendix 2.3**). The technical note was prepared to address the concerns raised by LBS in relation to their requirement for air quality monitoring. The scope of the air quality assessment has been determined through:

- Consultation with the Health Environment Officer (EHO) of LBS to discuss the availability of local monitoring data, the assessment methodology to be applied, and obtain a copy of the latest review and assessment report;
- Review of air quality data for the area surrounding the Sites, including data from LBS, Defra (Ref 13.24) and the Environment Agency's websites (Ref 13.25);
- Desk study to confirm the location of nearby receptors that may be sensitive to changes in local air quality; and
- Review of traffic data provided by the traffic consultants (WSP UK Ltd.), which have been used as an input to the air quality assessment.

13.3.2 The scope of the current assessment includes the assessment of the impacts resulting from:

- Dust generated by on-site activities on surrounding sensitive receptors during the construction phase;
- Particulate matter (PM_{10} and $PM_{2.5}$) generated by on-site activities on local air quality during the construction phase;
- Increases in pollutant concentrations (NO_2, PM_{10} and $PM_{2.5}$) as a result of exhaust emissions arising from construction traffic and plant on local air quality;
- Increases in pollutant concentrations (NO_2, PM_{10} and $PM_{2.5}$) as a result of exhaust emissions from road traffic generated by the operation of the proposed developments on local air quality and public exposure;
- Increases in pollutant concentrations (NO_2) as a result of onsite energy centre emissions generated by the operation of the proposed developments on local air quality and public exposure;
- Introducing new exposure to prevailing ambient air quality concentrations (NO_2, PM_{10} and $PM_{2.5}$) in the opening year, due to the residential nature of the proposed developments; and
- The required secondary supplies for fire-fighting and life safety in terms of nuisance.

13.3.3 Details of each of the elements above can be found in Appendix **13.3**.

Consultation

13.3.4 The scope and methods adopted in the current air quality assessment were agreed via a series of emails with the EHO in 2014. **Appendix 13.4** provides a summary of the consultation activities undertaken and the associated correspondence. The requests of the Air Quality Officer of LBS have been included and addressed in the assessment.

13.4 Assessment Methodology and Significance Criteria

Desktop Baseline Data Collation

13.4.1 A desktop study was undertaken to collect baseline data which incorporated the following:

- Review of local monitoring data and the latest LAQM Review and Assessment Report (Ref. 13.26) available from LBS;
- Review of additional air quality data for the area surrounding the Sites, including Defra's online LAQM support pages (Ref. 13.27); and
- A study of local mapping data available for the study area and plans for the proposed developments to identify local receptors (both existing and proposed) that may be sensitive to a change in local air quality concentrations.

Potentially Significant Effects

Construction Phase

13.4.2It is considered that the proposed developments will have a temporary effect on local air quality during construction, with demolition and earth-moving works and the storage of aggregates at the Sites posing the

greatest risk with respect to the occurrence of 'nuisance dust' and contributions to local air particulate matter (PM_{10} and $PM_{2.5}$) levels.

13.4.3 Construction activities are likely to increase the risk of dust entrainment and possible nuisance occurrence from increased deposition to surrounding surfaces, and may significantly contribute to any PM_{10} or $PM_{2.5}$ local exceedences.

13.4.4 The assessment of construction phase impacts will focus on likely impacts of airborne and deposited PM_{10} and $PM_{2.5}$ within 350m of the works area from onsite construction activities and the movement of construction vehicles. Control measures will be evaluated and recommended to mitigate any estimated risks associated with the construction of the proposed developments.

Operational Phase

13.4.5 Once the proposed developments are completed, the additional road traffic travelling along the local road network may have an impact on local pollutant concentrations. The quantity of each pollutant emitted from the vehicle exhaust depends on the type of fuel used, engine size, speed of the vehicle, age, driving conditions and the type of emissions abatement equipment fitted, if any.

13.4.6 Therefore changes in local traffic characteristics resulting from the operation of the proposed developments are likely to have an impact on local air quality. The main pollutants of concern for road traffic are typically considered to be nitrogen dioxide (NO_2), PM_{10} and $PM_{2.5}$, which are the pollutants that are most likely to result in exceedences of the statutory air quality limit values and objectives (see Table 13.2 A1 in **Appendix 13.2**).

13.4.7 The operational phase will also consider the potential impact of the onsite energy centres associated with both the FDS Application and Masterplan Application sites. The main pollutant of concern for the energy centres proposed is NO_2. Both applications consider two energy centres each, as below:

- The FDS Application includes a single new energy centre located within Block 5a, and the standing energy centre associated with the existing Estate; and
- The Site Wide Development Option applications include two new energy centres located in sub-plot 4 and Block 5.

13.4.8 The potential air quality effects (primarily focusing on nuisance) associated with secondary power supplies for fire-fighting and life safety will also be considered.

Extent of the Study Area

13.4.9 For the purpose of assessing the impact of dust and particulate matter arising from the on-site preparation, earthworks and construction activities on local air quality, an area of up to 350m from the boundary of the on-site works and up to 500m from the site works entrances along the construction access has been considered in accordance with guidance published by the Institute of Air Quality Management (IAQM).

13.4.10 For the assessment of the impact of traffic related emissions associated with the operation of the proposed developments, traffic data have been provided for the surrounding road network (details of which are provided in **Appendix 13.5**). These include those roads likely to experience a change in traffic volume as a result of the proposals.

13.4.11 For the assessment of the impact of energy centre related emissions associated with the operation of the proposed developments, energy centre data have been provided by manufacturers and adjusted to reflect London Plan's provisions (Ref. 13.20) to reduce emissions, and associated concentrations predicted at relevant receptors at the various building storey heights. Details of these are presented in **Appendices 13.6 and 13.7**.

Construction Phase

Increase in Dust and PM_{10} Generated by On-Site Activities

13.4.12 A qualitative assessment of the likely significant impacts of the generation and dispersion of dust and PM_{10} during the construction phase has been undertaken using guidance produced by the IAQM (Ref. 13.19). Details of the assessment procedure given in this guidance are summarised in **Appendix 13.8** and includes consideration of potential dust and PM_{10} impacts from demolition, earthworks, general construction activities and trackout.

13.4.13 The construction period for the FDS Development is anticipated to be from 2015 to 2020; and the construction period for the Comprehensive Development is anticipated to be from 2015 to 2034. It is likely that a phased approach will be followed during the construction phase of both applications, and Chapter 5: Demolition and Construction, provides details of the proposed phasing plans, the likely building materials to be used and the anticipated timescales allocated to each portion of the development where construction activities will be undertaken. However, the air quality assessment assumes a worst case approach and assumes that all construction activities across the development site will occur simultaneously.

13.4.14 Two separate qualitative assessments of the construction works were undertaken; the first assessment considers the FDS Development and the second assessment considers the Comprehensive Development. As detailed above and Chapter 5, a phased approach to the construction activities is expected, however, to ensure a robust approach each qualitative assessment has assumed that all construction phase activities will occur simultaneously. This is considered to be a conservative approach, as in reality the construction activities associated with each planning application are likely to be staggered, and therefore the magnitude of impacts are likely to be lower than those identified in this report.

13.4.15 The potential for dust emissions during the construction phase was assessed for each activity that is likely to take place. This, together with the sensitivity of the area, defined the risk of dust effects associated with the planning applications.

13.4.16 The following potential effects of increased dust and PM_{10} generated during the construction phase have been considered and are detailed below:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to significant increases in exposure to $PM_{10.}$

13.4.17 The following impacts associated with the construction phases of the proposed developments have been considered:

- The size of the Site and the area of which construction activities are likely to take place;
- The construction activities associated with the proposed developments that could generate dust and their likely duration;
- The proximity and type of sensitive receptors (e.g. schools, residential properties, etc.) to the Site;
- The prevailing wind direction in the area in which the Site are located and local precipitation patterns;
- The presence of vegetation surrounding the Site, which might act as a buffer; and
- The potential distance which construction traffic will travel across unpaved roads on the construction site, prior to accessing the local road network (referred to as 'trackout').

13.4.18 Further detail of the assessment approach is detailed in **Appendix 13.8**.

Increase in Pollutant Concentrations as a Result of Construction Traffic on Local Air Quality

13.4.19 Exhaust emissions from construction vehicles may have an impact on local air quality both onsite and

adjacent to the routes used by these vehicles to access the Site. The WSP UK transport team has provided information on the number of construction vehicles associated with the FDS Application.

13.4.20 A quantitative assessment has been undertaken for the FDS Application to evaluate the overall effect on local air quality from construction traffic. As the FDS Development is the densest part of the proposals, in terms of habitable rooms per hectare, it has been assumed that the peak of this phase represents a reasonable worst case in terms of construction traffic for use in this assessment. Therefore, it has been assumed that the FDS Development construction vehicle assessment be representative of each phase of the Comprehensive Development construction phase. The quantitative construction traffic assessments have considered:

- The number of construction vehicles generated by the construction phase of the application sites;
- The number and distance of sensitive receptors in the vicinity of the application sites and along the likely routes to be used by construction vehicles; and
- The likely duration of the proposed developments' construction phases and the nature of the construction activities undertaken in each case.

13.4.21 For the construction traffic assessment, the following scenarios were modelled:

- 2014 'Baseline Year'; and
- 2014 'Construction Traffic' – Including baseline road traffic and construction traffic.

Operational Phase

Increase in Pollutant Concentrations as a Result of Road Traffic Generated by the Operation of the SWD

13.4.22 The traffic generated by the operation of the proposed developments may have an impact on local air quality concentrations both within and in the vicinity of the Sites. As indicated above, only emissions of NO_2, PM_{10} and $PM_{2.5}$ were assessed.

13.4.23 For the prediction of effects due to emissions arising from road traffic during the operational phases, the advanced dispersion model ADMS-Roads has been used. This model uses detailed information regarding traffic flows on the local road network, surface roughness, and local meteorological conditions to predict pollutant concentrations at selected relevant locations.

13.4.24 Meteorological data such as wind speed and direction are used by the model to determine pollutant transportation and levels of dilution by the wind. The same meteorological data were used in the models for both planning applications and were obtained from the Met Office observing station at London City Airport. This station is considered to provide data representative of the conditions at the Site. The meteorological data used for both assessments were from 2013.

13.4.25 For the FDS Application, the following scenarios were modelled:

- 2013 'Verification Year';
- 2014 'Baseline Year' – Including road traffic and the existing energy centre;
- 2020 'Without Development' / 'Do-Minimum' (DM) – Including road traffic and the existing energy centre; and
- 2020 'With Development' / 'Do-Something' (DS) – Including development generated road traffic plus one new and the existing energy centres.

13.4.26 For the Comprehensive Development, the following scenarios were modelled:

- 2013 'Verification Year';
- 2014 'Baseline Year' – Including road traffic and the existing energy centre;
- 2034 'Without Development' / 'Do-Minimum' (DM) – Including road traffic and the existing energy centre;

and

- 2034 'With Development' / 'Do-Something' (DS) – Including development generate road traffic plus two new energy centres.

13.4.27 Further detail relating to background concentrations used in the assessment, the model verification procedure and the processing of results is detailed in **Appendix 13.9**.

Increase in Pollutant Concentrations as a Result of Proposed Energy Centres by the Operation of the FDS and SWD

13.4.28 The air pollutant dispersion model ADMS 5 has been used to predict the effect of emissions arising from the proposed energy plants on the surrounding environment. ADMS 5 is an advanced dispersion model for calculating concentrations of pollutants emitted continuously from point, line, volume and area sources; or discretely from point sources, and is approved by the Environment Agency and Defra as an acceptable dispersion model in regulatory and planning applications.

13.4.29 This model uses detailed information regarding plant emissions and local meteorological conditions to predict pollution concentrations at specific locations selected by the user.

13.4.30 Meteorological data, such as wind speed and direction, are used by the model to determine pollutant transportation and levels of dilution by the wind. The same meteorological data as used in the modelling of traffic effects in the ADMS Roads model were used in this instance.

13.4.31 The FDS Development is to include one new natural gas fired Combined Heat and Power (CHP) unit (approximately 500kW power output), and three new gas fired boiler units (approximately 1 MW power output per unit) located in sub plot 5. The CHP unit will supply the majority of heating and hot water to the proposed development, with the gas fired boilers supporting the remainder of the demand. It is noted that there are four existing operational boiler units associated within the existing Estate located along Thurlow Street, which will remain in operation in this instance.

13.4.32 The Comprehensive Development is to include one new natural gas fired CHP unit (approximately 1.5 MW power output), and seven natural gas fired boiler units (approximately 1.3 MW power output per unit) located in sub plot 4, plus one new natural gas fired CHP unit (approximately 500kW power output), and three new gas fired boiler units (approximately 1 MW power output per unit) located in sub plot 5. It is noted that the four existing operational boiler units associated within the existing Estate located along Thurlow Street, which will stop operating in this instance.

13.4.33 The CHP units will supply the majority of heating and hot water to the proposed development, with the gas fired boilers supporting the remainder of the demand.

13.4.34 Further modelling details are contained within **Appendix 13.6 and 13.7** in relation to the buildings and topography, modelling assumptions, stack parameters and averaging periods for specific pollutants. However, it must be noted the building numbers highlighted in **Figures 13.3a**, **b** and **c**, and specific building heights relating to the quality assessment only, are presented in **Appendix 13.7**.

Identification of Sensitive Receptors

Identification of Receptors

13.4.35 Sensitive receptors are those properties which are residential dwellings, schools, hospitals or care homes. For each of these properties, concentrations have been predicted at various heights to reflect the different floors within the buildings. This method is required when assessing the combined influence of both traffic and energy facility emissions, as traffic will produce the greatest influence at ground level with plant emissions having a greater effect at height. Further detail can be found in **Appendix 13.10**.

13.4.36 **Figure 13.2a, b** and **c** and **Table 13.1** provide a summary of sensitive receptors within the study area for both planning applications. It shows the number of sensitive properties identified for each sensitivity category for long term public exposure in the vicinity and within the Site, at worst case locations.

Table 13.1: Types of Receptors Modelled for Public Exposure

Type	Number of Properties			
	FDS		SWD	
	Existing	New	Existing	New
Residential	344	399	82	834
Schools	13	0	13	0
Early Care Facilities	2	15	2	12
Care Homes	0	0	0	0
Medical Centre	17	0	0	1
Total Modelled Sensitive Receptors	790		944	

13.4.37 No statutory designated ecological sites are located in the vicinity of the proposed developments and therefore no consideration was given to these types of receptors.

Significance Criteria

13.4.38 The significance of impacts associated with the construction and operational phases of both planning applications has been determined both qualitatively and quantitatively (road traffic and energy centre emissions) and is detailed in **Appendices 13.8 and 13.11** respectively.

Limitations and Assumptions

13.4.39 The limitations and assumptions associated with the FDS Development Option for the construction and operational phases are as follows:

- Construction Phase - General assumptions have been made regarding material volume and type within each phase of construction based on professional judgment (i.e. demolition, earthworks and construction activities);
- Operational Phase – The operational phase assessment assumes that future baseline traffic flows will be as 2014 traffic flows with the addition of locally committed developments and the FDS Development traffic contribution. In addition it assumes that there are no reductions in background concentrations and emission factors beyond 2015. A detailed list of energy centre assumptions can be found in sections 13.3.66 – 13.3.68.

13.4.40 The limitations and assumptions associated with the Site Wide Development Option for the construction and operational phases are as follows:

- Construction Phase - General assumptions have been made regarding material volume and type within each phase of construction based on professional judgment (i.e. demolition, earthworks and construction activities). As no construction traffic data were provided for the Masterplan? Development construction phase, it has been adopted as a reasonable assumption that the assessment undertaken for the FDS Development construction traffic is applicable.

- Operational Phase - The operational phase assessment assumes that future baseline traffic flows will be as 2014 traffic flows with the addition of locally committed developments and the Site Wide Development Option traffic contribution. In addition it assumes that there are no reduction in background concentrations and emission factors beyond 2019. A detailed list of energy centre assumptions can be found in sections 13.3.66 – 13.3.68.

13.5 Baseline Conditions

LBS Air Quality Management

13.5.1 As part of their statutory requirement to review and assess local air quality within their administrative area, LBS has designated an AQMA across the whole Borough due to predicted exceedence of annual mean NO_2 and PM_{10} concentrations. Therefore the two proposed planning applications fall within an AQMA.

Local Emission Sources

13.5.2 The Sites are located in an area where the main influence on local air quality is considered to be exhaust emissions from road traffic and energy production. The two main traffic sources are the B214 Albany Road running immediately adjacent to the southern side of the FDS and Masterplan Application Sites and Thurlow Street which dissects the site between Albany Road and East Street.

13.5.3 The A22 and A215 located east and west of the FDS and Masterplan Application Sites, respectively, are two significant sources of emissions in the local area. However, these are sufficiently far away from the site boundary as to have a less significant impact on new exposure receptors.

13.5.4 Currently there is one existing energy centre comprising a series of gas fired boilers which provides energy to the existing Estate and other local buildings. This is situated adjacent to Thurlow Street and has to potential to contribute to local NO_2 concentrations.

13.5.5 There are no industrial pollution sources in the immediate vicinity of the Sites that are likely to significantly influence the local air quality.

Local Monitoring Data

13.5.6 LBS undertake air quality monitoring across its administrative area using a combination of automatic stations and passive diffusion tubes.

13.5.7 The nearest automatic monitoring site is located 1.5km to the south east of the Sites, along the A2 Old Kent Road. Recent results from this monitoring station are provided in Table 13.2.

Table 13.2: Summary of LBS Nearby Automatic Monitoring Station

Location	Classification	Pollutant	Pollutant Concentration (µg/m^3)*		
			2011	2012	2013
A2 Old Kent Road	Roadside	Annual Mean NO_2	46.9	53.7	58.4
		Annual Mean PM_{10}	26.8	24.4	27.1

*Annual mean data calculated using daily mean concentrations averaged for each year, available from Defra Data Archive

13.5.8 The results for the A2 Old Kent Road monitoring station show that annual mean concentrations of NO_2 between 2011 and 2013 exceeded the objective of 40µg/m^3. There were no exceedences of the annual mean PM_{10} objective of 40µg/m^3 recorded at this monitor between 2011 and 2013. The A2 Old Kent Road continuous monitor does not measure $PM_{2.5}$ concentrations.

13.5.9 Table 13.3 presents a summary of the annual mean results for the NO_2 diffusion tubes, within the jurisdiction of LBS in 2013.

Table 13.3: Summary of LBS NO_2 Diffusion Tube Results

Location	Classification	Approximate Distance to Site	Annual Mean NO_2 Concentration (µg/m^3)
			2013
SWK 1 – Old Kent Road	Roadside	1.5 km	60.4
SWK 2 – Old Kent Road	Roadside	1.5 km	60.7
SWK 3 – Old Kent Road	Roadside	1.5 km	60.0

13.5.10 The results show that in 2013 the annual mean NO_2 concentrations exceeded the objective of 40µg/m^3 at all roadside monitoring locations.

Background Air Quality Data

13.5.11 Table 13.4 summarises the background pollutant concentrations used within the assessment.

Table 13.4: Background Concentrations Used in the Assessment

O.S. Grid Square (Centred on)	NO_2 (µg/m^3)				PM_{10} (µg/m^3)				$PM_{2.5}$ (µg/m^3)			
	2013	2014	2015	2019	2013	2014	2015	2019	2013	2014	2015	2019
532500, 177500	34.8	33.9	33.1	28.1	23.5	23.2	22.8	22.0	16.1	15.8	15.4	14.7
532500, 178500	38.4	37.4	36.4	30.6	24.5	24.1	23.7	22.9	16.7	16.3	16.0	15.2
533500, 177500	32.0	31.3	30.5	25.9	22.2	21.9	21.5	20.8	15.3	15.0	14.7	14.0
533500, 178500	37.3	36.4	35.6	30.0	24.3	23.9	23.5	22.7	16.6	16.2	15.8	15.1

13.5.12 The table above indicates that background concentrations in the vicinity of the FDS and Masterplan Application Sites are below the objective limits of 40µg/m^3 for both NO_2 and PM_{10} concentrations and below the objective level for $PM_{2.5}$ of 25µg/m^3.

13.6 Assessment of Pollutant Emissions Associated with the Proposals

Approach

13.6.1 Air quality is frequently a material planning consideration for major developments in Greater London, and the planning process presents useful opportunities to reduce the impacts of development and to work towards achieving the UK air quality objectives and the EU limit values.

13.6.2 To address the Mayor's Air Quality Neutral policy (Ref. 13.22), and in line with the 2013 Sustainable Design and Construction Supplementary Planning Guidance (Ref 13. 23), NO_x and PM_{10} emissions from the buildings and transport elements of the proposed developments were calculated and compared to the benchmarks set out in Tables 13.5 and 13.6 below, where appropriate.

13.6.3 Where the benchmark is exceeded mitigation is required, either locally or by way of off-setting emissions.

Benchmarks

Emissions from buildings

6.1 Two Building Emission Benchmarks (BEBs) have been used as per current guidance (Ref. 13.20 and Ref. 13.21); one for NO_x and one for PM_{10}, for a series of land-use classes. The benchmarks specifically used in the assessment are provided in Table 13.5.

Table 13.5: Building Emissions Benchmarks (BEBs)

Land Use Class	NOx (g/m^2)	PM10 (g/m^2)
Class A1	14.4	1.57
Class B1	19.6	2.15
Class C1	45.2	4.93
Class C31	57.3	4.38
D1 (a)	27.4	2.99

1 - These benchmarks have been calibrated for London

Transport emissions

13.6.4 In addition, two Transport Emissions Benchmarks (TEBs) have been used as per current guidance (Ref. 13.20 and Ref. 13. 210), one for NO_x and one for PM_{10}, for a series of land-use classes. For those land use types where a TEB has not been derived, one of the TEBs derived for the nearest comparable category

was selected based on professional judgement.

13.6.5 The benchmarks for residential dwelling are expressed in terms of g/dwelling/annum; those for all other developments expressed in terms of g/m^2/annum. The Gross Floor Area (GFA) was used to define the area, consistent with the definition used for the BEB. The benchmarks used in the assessment are provided in Table 13.6.

13.6.6 Where the application of these benchmarks was not possible, WSP UK Air Quality used professional judgement to evaluate the emission balance by pollutant, as required.

Table 13.6: Transport Emissions Benchmarks (TEBs)

Land use	Inner London
NO_x (g/m_2/annum)	
Retail (A1)	194
Office (B1)	10.1
NO_x (g/dwelling/annum)	
Residential (C3)	496
PM_{10} (g/m_2/annum)	
Retail (A1)	35.1
Office (B1)	1.83
PM_{10} (g/dwelling/annum)	
Residential (C3,C4)	89.6

13.7 Assessments of Effects, Mitigation and Residual Effects

Construction Phase

13.7.1 During the construction phase, there will be a number of activities which are likely to generate and / or re-suspend dust and PM_{10}. These activities have been identified for the construction phase of the proposed developments and their likely effects evaluated using the risk assessment approach published by the IAQM. The following sections present these sources and the risk assessment results.

13.7.2 The main sources of dust and PM_{10} during the construction phase will include:

- Site clearance and preparation including demolition activities;
- Preparation of temporary access / egress to the sites and haulage routes;
- Earthworks;
- Materials handling, storage, stockpiling, spillage and disposal;

- Movement of vehicles and construction traffic within the sites (including excavators and dumper trucks);
- Use of crushing and screening equipment / plant;
- Exhaust emissions from site plant, especially when used at the extremes of their capacity and during mechanical breakdown;
- Construction of buildings, roads and areas of hardstanding alongside fabrication processes;
- Internal and external finishing and refurbishment; and
- Site preparation and restoration after completion.

13.7.3 The majority of the releases are likely to occur during the 'working week'. However, for some potential release sources (e.g. exposed soil produced from significant earthwork activities) in the absence of dust control mitigation measures, dust generation has the potential to occur 24 hours per day over the period during which such activities are to take place.

13.7.4 The IAQM assessment methodology considers the sources of dust and PM_{10} generation in four categories: demolition; earthworks; construction and trackout. The generation of dust during these phases of works is classed as large, medium or small. Criteria to determine the dust emission magnitude the Site fall into are detailed in **Appendix 13.8** and results of the assessment are summarised below.

Risk of the FDS Construction Site in Terms of *Dust and PM_{10} Emissions*

Demolition

13.7.5 All of the existing buildings on the FDS Application Site are to be demolished. The existing structures at the Site will be demolished in order to facilitate the development. The scale and type of demolition activities is expected to be in excess of 20,000m^3 with buildings elevated greater than 10m above ground level as detailed in Chapter 5: Demolition and Construction. Therefore, the magnitude of dust and PM_{10} emissions is considered 'large' for demolition activities as defined in IAQM guidance.

Earthworks

13.7.6 The area of the FDS Application Site means that it is within the IAQM threshold for large sites (>10,000m^2), the soil type is assumed to be 'potentially dusty' and the total material moved is likely to be in excess of 100,000 tonnes. Therefore the magnitude of dust and PM_{10} emissions is considered 'large' for earthworks activities as defined in IAQM guidance.

Construction

13.7.7 The total volume of buildings to be constructed on the FDS Application Site will is expected to exceed 100,000m^3 with construction materials with medium to high potential for dust release being used. Therefore the magnitude of dust and PM_{10} emissions is considered 'large' for construction activities as defined in IAQM guidance.

Trackout

13.7.8 It has been estimated by WSP (and is detailed in Chapter 11: Transportation and Access) that there will be up to 115 HGV (>3.5t) two-way movements in any one day travelling on moderately dusty surface materials with potential for dust release during the overall construction period. Due to the size of the Site, it is also assumed that the length of unpaved road within the site will be between 50-100m in length. Therefore, it is considered that the magnitude of dust and PM_{10} emissions is 'large' for trackout as defined in IAQM guidance.

13.7.9 The existing road network is such that all construction vehicles will likely be routed along main roads (e.g. B214 Albany Road and A215 Walworth Road). Moving away from the FDS Application Site, there are sensitive receptors (residential dwellings) located at a distance of approximately 20m from the roadside which could be impacted upon by emissions associated with vehicle trackout.

13.7.10 Table 13.7 provides the dust and PM_{10} emission magnitude for each activity considered during the construction of the FDS.

Table 13.7: Dust and PM_{10} Emission Magnitude for Each Activity

Activity	Summary of Each Activity	Dust Emission Magnitude
Demolition	Total volume of buildings to be demolished est. >20,000m^3 and at >10m above ground level	*Large*
Earthworks	Total site area >10,000m^2	*Large*
Construction Activities	Total building volume >100,000m^3	*Large*
Trackout	Estimated that there will be up to 115 HGV vehicle movements per day and between 50-100m of unpaved surface	Large

Sensitivity of the Area

13.7.11 There are a number of residential, commercial and school properties surrounding the Site, the nearest of these will be particularly sensitive to an increase in dust deposition. Local background PM_{10} concentrations are, however, fairly low and therefore PM_{10} generated by the construction phase is unlikely to cause an exceedence of the objectives for this pollutant at the nearby existing properties. The wind rose for the meteorological station at London City Airport presented in **Appendix 13.12** illustrates that the prevailing winds are from the southwest. Therefore, it is considered that any dust and particulate matter generated by construction activities will be blown towards the immediately neighbouring residential properties, commercial buildings and schools to the north east of the FDS Application Site.

13.7.12 There are more than 500 sensitive receptors within 350m of the Site. As mentioned above, these comprise primarily a mixture of residential and commercial receptors and two schools. There are no other properties (aside from the existing building which is to be demolished) within the Site boundary. It is estimated that there are approximately 25 residential dwellings within 20m of the construction area of the FDS Application Site.

13.7.13 Two schools were identified within 350m of the proposed site; one to the north and one to the north east. These are situated such that there is potential for both schools to be directly downwind of the FDS Application Site. However, should the mitigation measures described in this section below be implemented, it is expected that the impact at the two schools will be insignificant.

13.7.14 Taking the above information and guidance produced by the IAQM into account, the area surrounding the FDS Application Site is considered to be of 'high' sensitivity overall to changes in dust and PM_{10} for human receptors as a result of construction activities (Table 13.8).

Table 13.8: Sensitivity of the Study Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Low	Low	Low	Low

Ecological	N/A	N/A	N/A	N/A

13.7.15 According to the IAQM assessment procedure summarised in **Appendix 13.8**, and based on the available information on the construction phase, the risk arising from the development of each of the activities considered is summarised in Table 13.9. The risk category identified for each activity will define the list of site specific mitigation measures for each relevant construction component.

Table 13.9: Summary Dust and PM_{10} Risk Table to Define Site-Specific Mitigation

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High Risk	High Risk	High Risk	High Risk
Human Health	High Risk	Low Risk	Low Risk	Low Risk
Ecological	N/A	N/A	N/A	N/A

13.7.16 Taking into account all of the above, the overall sensitivity of the surrounding area in terms of human receptors is **high**, and the overall magnitude of change prior to mitigation is considered to be **low** to **high**. Therefore overall, there is likely to be a direct, temporary, medium term impact on nearby residential properties of **moderate** to **minor negative** significance prior to the implementation of mitigation measures.

Construction Traffic

The results of the impact of emissions on local air quality arising from the construction of the FDS Development at existing sensitive receptors are summarised below.

Annual NO_2 Concentrations

13.7.17 The objective for annual mean NO_2 concentrations is 40µg/m^3 to be achieved by the end of 2005 and thereafter. The results of the assessment indicate that in the 2014 Baseline scenario (Do Minimum without construction traffic) concentrations already exceed the objective at 90 of the 376 assessment receptor locations. The background concentration levels of the study area are also close to the objective level.

13.7.18 The highest predicted concentration is 75.9µg/m^3 observed at the ground floor of Receptor 77 (existing property at A2 Old Kent Road), in both the 2014 Do Minimum and Do Something scenarios respectively.

13.7.19 Table 13.10 shows the number of relevant receptors per annual mean concentration ranges for the construction phase scenarios, at existing exposure locations.

Table 13.10 - Predicted Annual Mean NO_2 Concentration at Existing Receptors in the Construction DM and DS Scenarios

Annual Mean NO_2 Concentration (µg/m^3)	Number of Receptors Construction DM	Number of Receptors Construction DS
< 30	0	0
30 – 36	6	6
36 – 40	283	282
>40	**87**	**88**
Total	**376**	**376**

13.7.20 Table 13.11 summarises the construction phase significance of impacts for NO_2 as per EPUK.

Table 13.11 - Predicted NO_2 Significance Impact at Existing Receptors in relation to the Construction phase as per EPUK criteria

Significance	Number of Receptors	%
Substantial Adverse	0	0
Moderate Adverse	0	0
Slight Adverse	1	0.3%
Negligible	375	99.7%
Slight Beneficial	0	0

13.7.21 The construction of the FDS Development in 2014 will result in small to imperceptible changes in annual mean NO_2 concentrations at all of the assessed receptors. The greatest increase of 0.5µg/m^3 was observed at a Receptor 1.

13.7.22 According to the EPUK significance criteria, the impact of the construction of the FDS on annual mean NO_2 concentrations prior to mitigation is **slight adverse to negligible**.

Hourly Mean NO_2 Concentrations

13.7.23 The objective for hourly mean NO_2 concentrations is a concentration of 200µg/m^3 as the 99.8th percentile of hourly mean concentrations to be achieved by the end of 2005 and every year thereafter. The results of the assessment show that in both modelled scenarios (Construction DM and DS) annual concentrations exceed the annual mean objective at many of the assessment receptor locations. The highest modelled annual mean concentration is 75.9µg/m^3 at the existing property at A2 Old Kent Road.

13.7.24 As the annual mean NO_2 concentrations predicted by the model at certain receptors are above 60µg/m^3, exceedences of the hourly mean NO_2 concentration objective are likely to occur at these locations. However, none of these exceedences are a result of the construction phase of the FDS Development.

Annual Mean PM_{10} Concentrations

13.7.25 The objective for annual mean PM_{10} concentrations is 40µg/m^3 to be achieved by the end of 2004 and thereafter. The results of the assessment show that in both of the 2014 Construction Do Minimum and Do Something scenarios, concentrations meet the objective at all of the assessment receptor locations. The highest predicted concentration is 28.8µg/m^3 at an existing ground floor property at A2 Old Kent Road (Receptor 77).

13.7.26 Table 13.12 shows the number of relevant receptors per annual mean concentration ranges for the construction scenarios, at existing exposure locations.

Table 13.12 - Predicted Annual Mean PM_{10} Concentration at Existing Receptors in the Construction DM and DS Scenarios

Annual Mean PM_{10} Concentration (µg/m^3)	Number of Receptors Construction DM	Number of Receptors Construction DS
< 30	376	376

Annual Mean PM_{10} Concentration ($\mu g/m^3$)	Number of Receptors Construction DM	Number of Receptors Construction DS
30 – 36	0	0
36 – 40	0	0
>40	**0**	**0**
Total	**376**	**376**

13.7.27 Table 13.13 summarises the construction phase significance of impacts for PM_{10} as per EPUK.

Table 13.13 - Predicted PM_{10} Significance Impact at Existing Receptors in relation to the Construction phase as per EPUK criteria

Significance	Number of Receptors	%
Substantial Adverse	0	0
Moderate Adverse	0	0
Slight Adverse	0	0
Negligible	376	100
Slight Beneficial	0	0

13.7.28 The construction of the FDS Development in 2014 will result in imperceptible changes in annual mean PM_{10} concentrations at all of the assessment receptors. Increases were considered to be imperceptible on the basis that the greatest increase was $0.1\mu g/m^3$, observed at Receptor 1.

13.7.29 It is observed there will be no exceedence of the annual mean objective, with the highest predicted concentrations identified at Receptor 77, being $28.8\mu g/m^3$ for both the Construction Do Minimum and Do Something scenarios.

13.7.30 According to the EPUK significance criteria, the construction impact of the proposed FDS Development on annual mean PM_{10} concentrations is **negligible**.

Daily Mean PM_{10} Concentrations

13.7.31 The objective for 24 hourly mean PM_{10} concentrations is $50\mu g/m^3$ to be exceeded no more than 35 times a year by the end of 2004 and thereafter. The results of the dispersion modelling indicate that in both the 2014 Construction Do Minimum and Do Something scenarios, there are no existing receptors exposed to concentrations levels above the short term objective of this pollutant.

13.7.32 According to the EPUK significance criteria, the effect of traffic generated by the construction of the FDS Development on daily mean PM_{10} concentrations is **negligible i.e. no significant effect**.

Annual Mean $PM_{2.5}$ Concentrations

13.7.33 The objective for annual mean $PM_{2.5}$ concentrations is $25\mu g/m^3$ to be achieved by the end of 2015 and thereafter. The results of the assessment show that in both of the 2014 Construction Do Minimum and Do Something scenarios, concentrations meet the objective at all of the assessment receptor locations. The highest predicted concentration is $19.4\mu g/m^3$ at an existing ground floor property at A2 Old Kent Road (Receptor 77).

13.7.34 Table 13.14 shows the number of relevant receptors per annual mean concentration ranges for the construction scenarios, at existing exposure locations.

Table 13.14 - Predicted Annual Mean $PM_{2.5}$ Concentration at Existing Receptors in the Construction DM and DS Scenarios

Annual Mean $PM_{2.5}$ Concentration (µg/m^3)	Number of Receptors Construction DM	Number of Receptors Construction DS
< 10	0	0
10 – 18	372	372
18 – 25	4	4
>25	**0**	**0**
Total	**376**	**376**

13.7.35 There is currently no specific guidance for the assessment of magnitude of change in $PM_{2.5}$; therefore, the existing EPUK guidance has been applied. The construction of the FDS Development in 2014 will result in imperceptible changes at all assessment receptors, with the greatest increase of 0.03µg/m^3, observed at Receptor 1.

13.7.36 Based on the results presented, the construction impact of the FDS Development on annual mean $PM_{2.5}$ concentrations is considered to be **negligible**.

Risk of the Site Wide Development Construction Site in Terms of Dust and PM_{10} Emissions

Demolition

13.7.37 There are a large number of existing buildings on the Site which are to be demolished. The existing structures at the site will be demolished in order to facilitate the construction of the proposed development. The scale and type of demolition activities is expected to be in excess of 20,000m^3 with buildings elevated greater than 10m above ground level. Therefore, the magnitude of dust and PM_{10} emissions is considered 'large' for demolition activities as defined in IAQM guidance.

Earthworks

13.7.38 The area of the Site means that it is within the IAQM threshold for large sites (>10,000m^2), the soil type is assumed to be 'potentially dusty' and the total material moved is likely to be in excess of 100,000 tonnes. Therefore the magnitude of dust and PM_{10} emissions is considered 'large' for earthworks activities as defined in IAQM guidance.

Construction

13.7.39 The total volume of buildings to be constructed on the Site will is expected to exceed 100,000m^3 with construction materials with medium to high potential for dust release being used. Therefore the magnitude of dust and PM_{10} emissions is considered 'large' for construction activities as defined in IAQM guidance.

Trackout

13.7.40 It has been estimated based on the transport consultant data that there will be approximately 115 HGV (>3.5t) two-way movements in any one day travelling on moderately dusty surface materials with potential for dust release during the overall construction period. Due to the size of the Site, is also assumed that the length of unpaved road within the site will be in excess of 100m in length. Therefore, it is considered that the

magnitude of dust and PM_{10} emissions is 'large' for trackout as defined in IAQM guidance.

13.7.41 The existing road network is such that all construction vehicles will likely be routed along main roads (e.g. B214 Albany Road, A215 Walworth Road and A2 Old Kent Road). Moving away from the Application Site, there are sensitive receptors (residential dwellings) located at a distance of approximately 20m from the roadside which could be impacted upon by emissions associated with vehicle trackout.

13.7.42 Table 13.15 provides the dust and PM_{10} emission magnitude for each activity considered during the construction of the Site Wide Development Option.

Table 13.15: Dust and PM_{10} Emission Magnitude for Each Activity

Activity	Summary of Each Activity	Dust Emission Magnitude
Demolition	Total volume of buildings to be demolished est. >20,000m^3 and at >10m above ground level	*Large*
Earthworks	Total site area >10,000m^2	*Large*
Construction Activities	Total building volume >100,000m^3	*Large*
Trackout	*Estimated that there will be 80 HGV vehicle movements per day and between 50-100m of unpaved surface*	*Large*

Sensitivity of the Area

13.7.43 There are a number of residential, commercial and school properties surrounding the Site, the nearest of these will be particularly sensitive to an increase in dust deposition. Local background PM_{10} concentrations are, however, fairly low and therefore PM_{10} generated by the construction phase is unlikely to cause an exceedence of the objectives for this pollutant at the nearby existing properties. The wind rose for the meteorological station at London City Airport presented in **Appendix 13.12** illustrates that the prevailing winds are from the southwest. Therefore, it is considered that any dust and particulate matter generated by construction activities will be blown towards the immediately neighbouring residential properties, commercial buildings and school to the north east of the site.

13.7.44 There are more than 500 sensitive receptors within 350m of the Site. As mentioned above, these comprise primarily a mixture of residential and commercial receptors, six schools and a health centre. There are no other properties (aside from the existing buildings which are to be demolished) within the site boundary. It is estimated that there are approximately over one hundred residential dwellings within 20m of the construction area of the proposed development.

13.7.45 Six schools were identified within 350m of the proposed site; two to the north, two to the east and two to the west. These are situated such that there is potential for all six schools to be downwind of the proposed development at certain times during the construction period. However, should the mitigation measures described in this section below be implemented, it is expected that the impact at the six schools will be insignificant.

13.7.46 Taking the above information and guidance produced by the IAQM into account, the area surrounding the SWD is considered to be of 'high' sensitivity overall to changes in dust and PM_{10} for human receptor as a result of construction activities (Table 13.16).

Table 13.16: Sensitivity of the Study Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Medium	Medium	Medium	Medium
Ecological	N/A	N/A	N/A	N/A

13.7.47 According to the IAQM assessment procedure summarised in Appendix 13.8, and based on the available information on the construction phase, the risk of the Site Wide Development Option for each of the activities considered is summarised in Table 13.17. The risk category identified for each activity will define the list of site specific mitigation measures for each relevant construction component.

Table 13.17: Summary Dust and PM_{10} Risk Table to Define Site-Specific Mitigation

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High Risk	High Risk	High Risk	*High Risk*
Human Health	High Risk	Low Risk	Low Risk	*Low Risk*
Ecological	N/A	N/A	N/A	N/A

13.7.48 Taking into account all of the above, the overall sensitivity of the surrounding area in terms of human receptors is **high**, and the overall magnitude of change prior to mitigation is considered to be **low** to **high**. Therefore overall, there is likely to be a direct, temporary, medium to long term impact on nearby residential properties of **moderate** to **minor negative** significance prior to the implementation of mitigation measures

Construction Traffic

13.7.49 The likely significant effects on air quality from traffic associated with the construction activities will be in the areas immediately adjacent to the principal means of site access for construction / site traffic. Based on the current local air quality and the construction traffic assessment results the construction phase of the Site Wide Development Option are considered to be temporary, long-term, local in effect and of **minor negative significance**, prior to mitigation.

Construction Mitigation for both FDS and Site Wide Development Options

13.7.50 It is expected that the measures to mitigate the effects on local air quality associated with the construction phase activities of both development options (the FDS and Site Wide Development Options) will be contained within the respective Construction Environmental Management Plans (CEMP). Details of the

relevant mitigation measures to be considered are presented in Tables 13.8J to 13.8O in **Appendix 13.8**.

Construction Residual Impact

13.7.51 The overall significance of the effects arising from the construction phase activities associated with the FDS and Site Wide Development Options, following the implementation of the mitigation measures described above and good site practice, is anticipated to be **negligible**.

Operational Phase

FDS Development Option

Combined Effects of Emissions from Road Traffic and Energy Centre Emissions

13.7.52 Annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations have been predicted at **376** relevant existing receptors and **414** new exposure locations at multiple heights, located within 200m of the modelled road network for the 'without' and 'with' development scenarios in the opening year (2020) for the FDS Development.

13.7.53 Summaries of estimated results are presented and discussed in the following sub-sections. Results are evaluated in light of current air quality objectives and limit values for the relevant pollutants, and the significance of impacts presented.

Annual Mean NO_2 Concentrations

13.7.54 The objective for annual mean NO_2 concentrations is 40µg/m^3 to be achieved by the end of 2005 and thereafter. Table 13.18 shows the number of relevant receptors per annual mean concentration ranges for both the 'without' and 'with' development scenarios for this pollutant at existing locations.

Table 13.18: Predicted Annual Mean NO_2 Concentration at Existing Sensitive Receptors in DM and DS

Annual Mean NO_2 Concentration (µg/m^3)	Number of Receptors Without FDS	Number of Receptors With FDS
< 30	0	0
30 – 36	15	14
36 – 40	298	291
>40	63	63
Total	**376**	**368***

*Eight existing receptors in the DM scenario were within the site boundary and are not present in the DS scenario

13.7.55 The operation of the FDS Development in the deemed opening year of 2020 will result in an increase in annual mean NO_2 concentrations at all of the assessment receptors. These increases are considered to be imperceptible, with the greatest increase of 0.1µg/m^3 observed at the ground floor level of Receptor 34 (Albany Road).

13.7.56 In 2020, the highest concentrations are predicted at Receptor 77 (adjacent to the A2 Old Kent Road) where the predicted annual mean NO_2 concentration of 73.0µg/m^3 was observed for both the 'without' and 'with' FDS scenarios.

13.7.57 According to the EPUK significance criteria, the overall impact of the FDS Development on annual mean NO_2 concentrations is **negligible**.

13.7.58 According to the London Councils' APEC, in the opening year the all the proposed receptors fall within APEC Level A for annual mean NO_2 concentrations, indicating that there are no grounds for refusal in respect

to air quality.

Hourly Mean NO_2 Concentrations

13.7.59 The objective for hourly mean NO_2 concentrations is a concentration of 200µg/m^3 as the 99.8th percentile of hourly mean concentrations to be achieved by the end of 2005 and every year thereafter.

13.7.60 The annual mean NO_2 concentrations predicted by the model were above 60µg/m^3 and therefore exceedences of the hourly mean NO_2 concentration objective are likely to occur. However, these exceedences are not due to the FDS Development but result from existing high levels of pollution within the study area.

Annual Mean PM_{10} Concentrations

13.7.61 The objective for annual mean PM_{10} concentrations is 40µg/m^3 to be achieved by the end of 2004 and thereafter. Table 13.19 shows the number of relevant receptors per annual mean concentration ranges for both the 'without' and 'with' development scenarios for this pollutant at existing locations.

Table 13.19: Predicted Annual Mean PM_{10} Concentration at Existing Sensitive Receptors in DM and DS

Annual Mean PM_{10} Concentration (µg/m^3)	Number of Receptors Without FDS	Number of Receptors With FDS
< 30	376	368
30 – 36	0	0
36 – 40	0	0
>40	0	0
Total	**376**	**368**

13.7.62 The operation of the FDS Development in the deemed opening year of 2020 will result in an increase in annual mean PM_{10} concentrations at all of the assessment receptors. These increases are considered to be imperceptible, with the greatest increase of 0.01µg/m^3 observed at 17 of the assessment receptors.

13.7.63 In 2020, the highest concentration was predicted at Receptor 77 (adjacent to the A2 Old Kent Road) where the predicted annual mean PM_{10} concentrations are 28.2µg/m^3 in both the 'without' and 'with' development scenarios.

13.7.64 According to the EPUK significance criteria, the overall impact of the FDS Development on annual mean PM_{10} concentrations is **negligible**.

13.7.65 According to the London Councils' APEC, in the opening year all proposed receptors fall within APEC Level A, indicating that there are no grounds for refusal in respect to air quality.

24-Hour Mean PM_{10} Concentrations

13.7.66 The objective for 24-hour mean PM_{10} concentrations is 50µg/m^3 to be exceeded no more than 35 times a year by the end of 2004 and thereafter. The results of the dispersion modelling show that the largest increase is 0.01µg/m^3 for the 'with development' scenario.

13.7.67 According to the EPUK significance criteria, the impact of the FDS on daily mean PM_{10} concentrations is **negligible**.

Annual Mean $PM_{2.5}$ Concentrations

13.7.68 The objective for annual mean $PM_{2.5}$ concentrations is 25µg/m^3 to be achieved by the end of 2010 and thereafter. The results of the assessment show that in both of the 2020 FDS Application site Do Minimum and Do Something scenarios, concentrations meet the objective at all of the assessment receptor locations. The

highest predicted concentration is 18.8µg/m^3 at an existing ground floor property at A2 Old Kent Road (Receptor 77).

13.7.69 Table 13.20 shows the number of relevant receptors per annual mean concentration ranges for the FDS, at existing exposure locations.

Table 13.20: Predicted Annual Mean $PM_{2.5}$ Concentration at Existing Sensitive Receptors in DM and DS

Annual Mean $PM_{2.5}$ Concentration (µg/m^3)	Number of Receptors Without FDS	Number of Receptors With FDS
< 10	0	0
10 – 18	374	95
18 – 25	2	2
>25	0	0
Total	**376**	**97**

*279 existing receptors in the DM scenario were within the site boundary and are not present in the DS scenario

13.7.70 The operation of the FDS Development in the deemed opening year of 2020 will result in imperceptible changes at all assessment receptors, with the greatest increase of 0.01µg/m^3 observed at six existing ground floor level receptors.

13.7.71 According to the EPUK significance criteria, the overall impact of the FDS Development on annual mean $PM_{2.5}$ concentrations is **negligible**.

Nuisance Impacts from Secondary Power Supplies for Fire-Fighting and Life Safety

13.7.72 A review of WSP's 2014 report entitled *"The Aylesbury Estate Regeneration, First Development Site 1B/1C, London, Secondary Power Supplies for Fire-Fighting and Life Safety"* (**Appendix 13.11**) provided detailed information regarding the proposed equipment and the selection process which preceded this. The main aspects and findings of this report are summarised below.

13.7.73 It is a requirement that electrical supplies to life safety and fire-fighting systems are backed up by a secondary supply source, independent to the primary power supply to the building (i.e. to provide power in the event that the primary supply fails). UK Power Networks (the electricity distribution network operator in the study area) has a standard policy to not provide a secondary electrical supply for life safety or fire-fighting purposes. Therefore, other means of providing secondary power supplies to firefighting and life safety equipment was required.

13.7.74 Technical, financial, safety, environmental and logistical aspects were considered and evaluated in respect of whether to provide local (per block) generators, or a single central generator to supply secondary power to all of the blocks within the FDS Development. It was determined that a single generator would be more feasible, a notion supported by the EHO during consultation. This reduces the number of emission sources from four to just one.

13.7.75 The standard for this type of application is understood to be generators running on diesel. Notwithstanding this, a variety of alternative fuel options were also considered for the proposed generator. Both natural gas and LP gas were found to be technically unfeasible (issues included a requirement for much (up to three times) larger engines compared to diesel, and concerns about availability on demand in emergency situations). Hydrogen fuel cell technology was also considered. Although this would offer practically zero emissions at source, significant costs associated with the systems themselves and the implementation of additional safety precautionary measures required for hydrogen storage resulted in this technology being deemed unfeasible for this project. Diesel fuel was therefore determined to be the most feasible option in this instance.

13.7.76 On the basis that only a single generator, of approximately 90kW (110kVA) is proposed (within Building 5D), the generator flue is envisaged to be routed to discharge at a low level, though cognizance will be taken of the relative location and proximity of any nearby receptors to prevent or reduce any potential loss of amenity. The main pollutants emitted by this type of equipment will be similar to the road vehicles described above (NO_x and particulate matter).

13.7.77 The emergency standby generator will only automatically start upon loss of primary supply (failure of the mains electricity) to the life safety or fire-fighting plant, *combined* with a signal from the fire alarm system to state that the building is under fire condition. The generator sets shall not be used for any other purpose other than provision of secondary supplies to fire-fighting and life safety equipment. Monthly maintenance testing, involving running the generator under at least 30% load (to prevent excessive black smoke emissions associated with testing without load) for approximately 30 minutes. In summary, this single source is envisaged to therefore only operate for short and infrequent periods of time.

13.7.78 It is envisaged that the integral fuel tank of the modular-type generator would provide sufficient fuel reserve to satisfy the emergency operating time and testing requirements, and therefore any bulk storage of diesel may be avoided.

Air Quality Neutral Assessment

13.7.79 The air quality neutral assessment found that the FDS Development performance against the relevant BEBs and TEBs, demonstrated comfortable compliance with the policy standards. The findings of the assessment are presented in Table 13.21.

13.7.80 As the benchmarks are not exceeded, no additional mitigation is not required, either locally or by way of off-setting emissions, either than the listed in sections below.

Table 13.21: Summary of Air Quality Neutral Assessment

FDS Application			
Category	**Parameter**	**NO_x (kg/yr/km)**	**PM_{10} (kg/yr/km)**
Building Emissions	Benchmark	2207.0	N/A
	FDS	949.0	N/A
	Category Deficit/Surplus	- 1258.0	N/A
Transport Emissions	FDS (DM)	325690.9	18389.6
	FDS (DS)	325887.0	18405.2
	Category Deficit	- 196.0	- 15.6

Site Wide Development Option

Combined Effects of Emissions from Road Traffic and Energy Centre Emissions

13.7.81 Annual mean NO_2 and PM_{10} concentrations have been predicted at **376** relevant existing receptors and **847** new exposure locations at multiple heights, located within 200m of the modelled road network for the 'without' and 'with' development scenarios in the opening year (2034) of the Comprehensive Development.

13.7.82 Summaries of estimated results are presented and discussed in the following sub-sections. Results are evaluated in light of current air quality objectives and limit values for the relevant pollutants, and the significance of impacts presented.

Annual Mean NO_2 Concentrations

13.7.83 The objective for annual mean NO_2 concentrations is 40µg/m^3 to be achieved by the end of 2005 and thereafter. Table 13.22 shows the number of relevant receptors per annual mean concentration ranges for both the 'without' and 'with' development scenarios for this pollutant at existing locations.

Table 13.22: Predicted Annual Mean NO_2 Concentration at Existing Sensitive Receptors in DM and DS

Annual Mean NO_2 Concentration (µg/m^3)	Number of Receptors Without SWD	Number of Receptors With SWD
< 30	12	8
30 – 36	347	73
36 – 40	12	11
>40	4	5
Total	**376**	**97**

13.7.84 The operation of the SWD in the deemed opening year of 2034 will result in an increase in annual mean NO_2 concentrations at all of the assessment receptors. These increases are considered to be imperceptible, with the greatest increase of 0.1µg/m^3 observed at 22 of the existing receptor locations.

13.7.85 In 2034, the highest concentrations are predicted at Receptor 77 (adjacent to A2 Old Kent Road) where the predicted annual mean NO_2 concentrations are 57.9µg/m^3 for both the 'without' and 'with' SWD scenarios.

13.7.86 According to the EPUK significance criteria, the overall impact of the Comprehensive Development on annual mean NO_2 concentrations is **negligible** at all of the assessment receptors.

13.7.87 According to the London Councils' APEC, in the opening year the all the new proposed receptors fall within APEC Level A for annual mean NO_2 concentrations.

Hourly Mean NO_2 Concentrations

13.7.88 The objective for hourly mean NO_2 concentrations is a concentration of 200µg/m^3 as the 99.8th percentile of hourly mean concentrations to be achieved by the end of 2005 and every year thereafter.

13.7.89 The annual mean NO_2 concentrations predicted by the model were below 60µg/m^3 and therefore exceedences of the hourly mean NO_2 concentration objective are unlikely to occur at the SWD.

Annual Mean PM_{10} Concentrations

13.7.90 The objective for annual mean PM_{10} concentrations is 40µg/m^3 to be achieved by the end of 2004 and thereafter. Table 13.23 shows the number of relevant receptors per annual mean concentration ranges for both the 'without' and 'with' development scenarios for this pollutant at existing locations.

Table 13.23: Predicted Annual Mean PM_{10} Concentration at Existing Sensitive Receptors in DM and DS

Annual Mean PM_{10} Concentration (µg/m^3)	Number of Receptors Without SWD	Number of Receptors With SWD
< 30	376	97
30 – 36	0	0
36 – 40	0	0
>40	0	0
Total	**376**	**97**

13.7.91 The operation of the Comprehensive Development in the deemed opening year of 2034 will result in an

increase in annual mean PM_{10} concentrations at some of the assessment receptors. These increases are considered to be imperceptible, with the greatest increase of 0.03µg/m^3 observed at Receptor 114 (adjacent to Albany Road).

13.7.92 In 2034, the highest concentrations are predicted at Receptor 77 (adjacent to A2 Old Kent Road) where the predicted annual mean PM_{10} concentrations are 26.8µg/m^3 for both the 'without' and 'with' SWD scenarios.

13.7.93 According to the EPUK significance criteria, the overall impact of the Comprehensive Development on annual mean PM_{10} concentrations is **negligible** at all modelled receptors.

13.7.94 According to the London Councils' APEC, in the opening year all the proposed receptors fall within APEC Level A for annual mean PM_{10} concentrations.

24-Hour Mean PM_{10} Concentrations

13.7.95 The objective for 24-hour mean PM_{10} concentrations is 50µg/m^3 to be exceeded no more than 35 times a year by the end of 2004 and thereafter. The results of the dispersion modelling show that the largest increase is 0.03µg/m^3 for the 'with development' scenario.

13.7.96 According to the EPUK significance criteria, the impact of the SWD on daily mean PM_{10} concentrations is **negligible**.

Annual Mean $PM_{2.5}$ Concentrations

13.7.97 The objective for annual mean $PM_{2.5}$ concentrations is 25µg/m^3 to be achieved by the end of 2010 and thereafter. The results of the assessment show that in both of the 2034 Comprehensive Development Do Minimum and Do Something scenarios, concentrations meet the objective at all of the assessment receptor locations. The highest predicted concentration is 17.6µg/m^3 at an existing ground floor property at A2 Old Kent Road (Receptor 77).

13.7.98 Table 13.24 shows the number of relevant receptors per annual mean concentration ranges for the Comprehensive Development, at existing exposure locations.

Table 13.24: Predicted Annual Mean $PM_{2.5}$ Concentration at Existing Sensitive Receptors in DM and DS

Annual Mean $PM_{2.5}$ Concentration (µg/m^3)	Number of Receptors Without SWD	Number of Receptors With SWD
< 10	0	0
10 – 18	376	97
18 – 25	0	0
>25	0	0
Total	**376**	**97**

13.7.99 The operation of the Comprehensive Development in the deemed opening year of 2034 will result in imperceptible changes at all assessment receptors, with the greatest increase of 0.02µg/m^3 observed at an existing ground floor property at A2 Old Kent Road (Receptor 77)

13.7.100 According to the EPUK significance criteria, the overall impact of the SWD on annual mean $PM_{2.5}$ concentrations is **negligible** at all of the assessment receptors.

Nuisance Impacts from Secondary Power Supplies for Fire-Fighting and Life Safety

13.7.101 The detailed design for secondary power supplies for fire-fighting and life safety for the Comprehensive Development had not yet been undertaken at the time of compiling this chapter. Therefore a detailed evaluation of potential air quality (nuisance) effects of the operation of such equipment was not able to

be undertaken. Notwithstanding this, it is likely that the same considerations would apply, as per those described in the corresponding section of the FDS assessment above.

Air Quality Neutral Assessment

13.7.102 The air quality neutral assessment found that the Comprehensive Development's performance against the relevant BEBs and TEBs, demonstrated comfortable compliance with the policy standards. The findings of the assessment are presented in Table 13.25.

13.7.103 As the benchmarks are not exceeded, no additional mitigation is not required, either locally or by way of off-setting emissions, either than the listed in sections below.

Table 13.25: Summary of Air Quality Neutral Assessment

SWD Application			
Category	**Parameter**	**NO_x (kg/yr/km)**	**PM_{10} (kg/yr/km)**
Building Emissions	Benchmark	9899.2	N/A
	SWD	2489.5	N/A
	Category Deficit	- 7409.7	N/A
Transport Emissions	SWD (DM)	220424.5	16431.4
	SWD (DS)	222294.2	16600.6
	Category Deficit/Surplus	-1869.7	-169.2

Mitigation for the FDS Development Option and the Site Wide Development Option

13.7.104 A Travel Plan has been produced by WSP detailing a number of measures to be implemented. The Travel Plan demonstrates a holistic approach incorporating 'hard' engineering measures and 'soft' marketing and management measures necessary to address the transport impacts arising from both applications. Measures include:

- Bus stop improvements;
- Route signage for pedestrians and cyclists;
- Secure cycle parking provision for residents and on-street cycle parking for visitors; and
- Car club parking spaces.

13.7.105 The Energy Strategy for both the FDS and the Site Wide Development Options applications considered on-site energy generation, including a natural gas fired CHP units and condensing boilers with low NO_X emissions using the most recent technology available in the market.

13.7.106 Based on the results presented in this assessment, no further mitigation measures are likely to be required at new exposure receptors once development proposed by the FDS or the Site Wide Development Option is operational.

13.7.107 In terms of the generator to supply secondary power for fire-fighting and life safety, it is recommended that the detailed design of the low-level flue take cognizance of the location and proximity of surrounding receptors (incl. openable windows etc.) and wherever possible minimise potential loss of amenity. Also it is recommended that the periodic generator testing be covered by a procedure requiring that a minimum of 30% load is applied on the generator to minimise the emission of smoke.

Residual Effects of FDS Development Option and Site Wide Development Option

13.7.108 The future residents of the development proposed by the FDS and the Site Wide Development Options will not be exposed to annual mean NO_2, PM_{10} or $PM_{2.5}$ concentrations that exceed the air quality limit values, therefore it is not anticipated that there will be any residual effects in the operational phase.

13.7.109 The frequency and duration of the operation of the generator for the secondary power supply for fire-fighting and life safety, and the anticipated magnitude of the emissions is expected to cause effects of negligible significance.

13.8 Summary

13.8.1 This chapter presents the findings of the assessment which addressed the potential air quality impacts during both the construction and operational phases of the development proposed by the FDS and Site Wide Development Options. For both phases the type, source and significance of potential impacts were identified, and the measures that should be employed to minimise these proposed.

13.8.2 The assessment considered both existing public exposure receptors and new exposure locations associated with the residential nature of the planning applications and followed the Department of Environment, Food and Regional Affairs' (Defra) most recent guidance on local air quality management and the significance of impacts evaluated using IAQM guidance, the Air Pollution Exposure Criteria (APEC) contained in the London Council's guidance, and the Mayor's Local Plan.

13.8.3 LBS have declared the whole borough as an AQMA, due to exceedences of air quality Objectives for annual mean NO_2 and 24-hour mean PM_{10} concentrations and hence the proposals fall in an area highly sensitive to air pollution.

13.8.4 The main air quality pollutants of concern (nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$)) as a result of road traffic emissions associated with changes in the traffic volume, vehicle speed, and fleet composition at the road network in the local area, and from emissions arising from the proposed energy centres (NO_2 only).

13.8.5 Advanced air quality dispersion modelling using ADMS software was undertaken, taking into account the effects of the likely changes in road traffic characteristics associated with the proposed development as well as energy centre emissions. The methodology followed in this study was discussed and agreed with the Environmental Health Officer of LBS, followed current best practice, and used the most up to date tools and data released by Defra for air quality assessment undertakings.

FDS Development Option

13.8.6A qualitative assessment of the likely significant effects on local air quality from construction activities has been carried out for the FDS Application based on the IAQM construction assessment procedure. This showed that during site activities releases of dust and $PM_{10/2.5}$ were likely to occur.

13.8.7This assessment identified that the development proposed by the FDS Application is considered to represent a **high to low** risk overall for demolition earthworks, general construction activities and trackout. However, through good site practice and the implementation of suitable mitigation measures, the impact of dust and $PM_{10/2.5}$ releases will be reduced and excessive releases prevented. The residual impact of the construction phase on air quality are therefore considered to be direct temporary, medium term, local and of **negligible** significance according to IAQM's significance criteria.

13.8.8A quantitative assessment of construction traffic was undertaken and following the implementation of mitigation measures the residual effect was considered to be **negligible**.

13.8.9A quantitative assessment of the likely significant effects during the operation phase was undertaken using advanced dispersion modelling to predict the changes in NO_2, PM_{10} and $PM_{2.5}$ concentrations that would occur due to traffic and energy plant emissions generated by the development proposed by the FDS Application.

13.8.10 Overall, the results show that the development proposed by the FDS Application would cause imperceptible changes in NO_2, PM_{10} and $PM_{2.5}$ concentrations at all assessment receptors considered. Therefore, according to the EPUK significance criteria, the effects of the operation phase are considered to be permanent, direct, long term, **negligible** for NO_2, PM_{10} and $PM_{2.5}$. It is important to note that the air quality assessment assumed that a small improvement (reduction) in vehicle emission factors would occur, therefore 2015 background concentrations were used in the 2020 'Without' and 'With' development scenarios. In addition, the proposed CHP unit and gas-fired boilers have been assumed to be in operation for a representative period of time per day based up on seasonality.

13.8.11 Using the London Council's exposure criteria, the development proposed by the FDS Application at all modelled receptors falls within APEC Level A for annual mean NO_2 and PM_{10} concentrations at residential dwellings. As the receptors fall within APEC level A, there are no grounds for refusal on the basis of air quality.

13.8.12 Air quality emissions (NO_x and PM_{10}) related with the development proposed by the FDS Application from the buildings and transport elements of the proposed planning applications were calculated and compared to the benchmarks set out in current guidance. The calculated emissions are below the benchmarks and therefore no additional mitigation is required.

13.8.13 Overall, with the recommended mitigation measures in place, the development proposed by the FDS Application would comply with European and national air quality legislation, and national, regional and local planning policy.

Site Wide Development Option

13.8.14 A qualitative assessment of the likely significant effects on local air quality from construction activities has been carried out for the Comprehensive Development based on the IAQM construction assessment procedure. This showed that during site activities releases of dust and $PM_{10/2.5}$ were likely to occur.

13.8.15 This assessment identified that the Comprehensive Development is considered to represent a **high to low** risk overall for demolition earthworks, general construction activities and trackout. However, through good site practice and the implementation of suitable mitigation measures, the impact of dust and $PM_{10/2.5}$ releases will be reduced and excessive releases prevented. The residual impact of the construction phase on air quality are therefore considered to be direct temporary, medium to long term, local and of **negligible** significance according to IAQM's significance criteria.

13.8.16 A quantitative assessment of construction traffic was undertaken and following the implementation of mitigation measures the residual effect was considered to be **negligible**.

13.8.17 A quantitative assessment of the likely significant effects during the operation phase was undertaken using advanced dispersion modelling to predict the changes in NO_2, PM_{10} and $PM_{2.5}$ concentrations that would occur due to traffic and energy plant emissions generated by the Comprehensive Development.

13.8.18 Overall, the results show that the Comprehensive Development would cause imperceptible changes in NO_2, PM_{10} and $PM_{2.5}$ concentrations at all assessment receptors considered. Therefore, according to the EPUK significance criteria, the effects of the operation phase are considered to be permanent, direct, long term, **negligible** for NO_2, PM_{10} and $PM_{2.5}$. It is important to note that the air quality assessment assumed that there would be an improvement (reduction) in vehicle emission factors by 2034, therefore 2019 background

concentrations were used in the 2034 'Without' and 'With' development scenarios. In addition, the proposed CHP unit and gas-fired boilers have been assumed to be in operation for a representative period of time per day based up on seasonality.

13.8.19 Using the London Council's exposure criteria, the Comprehensive Development at all modelled receptors falls within APEC Level A for annual mean NO_2 and PM_{10} concentrations at residential dwellings. As the receptors fall within APEC level A, there are no grounds for refusal on the basis of air quality.

13.8.20 Air quality emissions (NO_x and PM_{10}) related with the Comprehensive Development from the buildings and transport elements of the proposed planning applications were calculated and compared to the benchmarks set out in current guidance. The calculated emissions are below the benchmarks and therefore no additional mitigation is required.

13.8.21 Overall, with the recommended mitigation measures in place, the Comprehensive Development would comply with European and national air quality legislation, and national, regional and local planning policy.

FDS Development Option

Table 13.26: Summary of Local Air Quality Effects - FDS Application

Description of Significant Effects	Receptor	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Effects					Relevant Policy	Relevant Legislation
		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		
Construction														
Demolition, Earthworks, Construction & Trackout (Construction Traffic)	Existing Exposure Receptor Locations	Moderate Negative - Negligible	Negative	T	I	MT/LT	■ Implementation of a Construction Environmental Management Plan ■ Employing good site practice, including dampening of exposed road surfaces and stock piles of materials. All vehicles carrying loose aggregates should be sheeted. ■ Ensure all motorised equipment on-site is kept in good working order.	Negligible	N/A	T	D	ST/MT	N/A	■ The Environmental Protection Act 1990 ■ Air Quality Directive 2008/50/EC; ■ The Air Quality (England) Regulations 2000; ■ The Air Quality (England) (Amendment) Regulations; ■ The Air Quality Standards Regulations 2010

							■ Restrict on-site movements where possible. ■ Use of best practice in materials storage and transportations, plant maintenance and site management							■ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland July 2007.
Operation														
Increase in NO_2 concentrations as a result of the combined effects of road traffic and the on-site energy centres.	Existing and New Exposure Receptor Locations	Negligible	Negative	P	D	LT	■ Travel Plan - Promote walking, public transport and cycling.	Negligible	Negative	P	D	LT	■ NPPF	■ The Environmental Protection Act 1990 ■ The Environment Act 1995 ■ Air Quality Directive 2008/50/EC; ■ The Air Quality (England) Regulations 2000; ■ The Air Quality (England) (Amendment) Regulations; ■ The Air Quality Standards Regulations 2010 ■ The Air

														Quality Strategy for England, Scotland, Wales and Northern Ireland July 2007;
Increase in PM_{10} & $PM_{2.5}$ concentrations as a result of the combined effects of road traffic and the on-site energy centres.	Existing and New Exposure Receptor Locations	Negligible	Negative	P	D	LT	■ Travel Plan - Promote walking, public transport and cycling.	Negligible	Negative	P	D	LT	■ NPPF	■ The Environmental Protection Act 1990 ■ The Environment Act 1995 ■ Air Quality Directive 2008/50/EC; ■ The Air Quality (England) Regulations 2000; ■ The Air Quality (England) (Amendment) Regulations; ■ The Air Quality Standards Regulations 2010 ■ The Air Quality Strategy for England, Scotland, Wales and Northern

														Ireland July 2007;

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

Table 13.27: Summary of Local Air Quality Effects

Description of Significant Effects	Receptor	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Effects					Relevant Policy	Relevant Legislation
		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		Major, Moderate, Minor, Negligible	Positive / Negative	P / T	D / I	ST / MT / LT		
Construction														
Demolition, Earthworks, Construction & Trackout (Construction Traffic)	Existing Exposure Receptor Locations	Moderate Negative - Negligible	Negative	T	I	MT/LT	■ Implementation of a Construction Environmental Management Plan ■ Employing good site practice, including dampening of exposed road surfaces and stock piles of materials. All vehicles carrying loose aggregates should be sheeted. ■ Ensure all motorised equipment on-site is kept in good working order. ■ Restrict on-site	Negligible	N/A	T	D	ST/MT	N/A	■ The Environmental Protection Act 1990 ■ Air Quality Directive 2008/50/EC; ■ The Air Quality (England) Regulations 2000; ■ The Air Quality (England) (Amendment) Regulations; ■ The Air Quality Standards Regulations 2010 ■ The Air Quality

							movements where possible. ■ Use of best practice in materials storage and transportations, plant maintenance and site management							Strategy for England, Scotland, Wales and Northern Ireland July 2007.
Operation														
Increase in NO_2 concentrations as a result of the combined effects of road traffic and the on-site energy centres.	Existing and New Exposure Receptor Locations	Negligible	Negative	P	D	LT	■ Travel Plan - Promote walking, public transport and cycling.	Negligible	Negative	P	D	LT	■ NPPF	■ The Environmental Protection Act 1990 ■ The Environment Act 1995 ■ Air Quality Directive 2008/50/EC; ■ The Air Quality (England) Regulations 2000; ■ The Air Quality (England) (Amendment) Regulations; ■ The Air Quality Standards Regulations 2010 ■ The Air Quality

														Strategy for England, Scotland, Wales and Northern Ireland July 2007;
Increase in PM_{10} & $PM_{2.5}$ concentrations as a result of the combined effects of road traffic and the on-site energy centres.	Existing and New Exposure Receptor Locations	Negligible	Negative	P	D	LT	■ Travel Plan - Promote walking, public transport and cycling.	Negligible	Negative	P	D	LT	■ NPPF	■ The Environmental Protection Act 1990 ■ The Environment Act 1995 ■ Air Quality Directive 2008/50/EC; ■ The Air Quality (England) Regulations 2000; ■ The Air Quality (England) (Amendment) Regulations; ■ The Air Quality Standards Regulations 2010 ■ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland July

														2007;

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

13.9 References

13.1 Air Quality Directive 2008/50/EC;

13.2 The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928;

13.3 The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043;

13.4 The Air Quality Standards Regulations 2010 - Statutory Instrument 2010 No. 1001;

13.5 The Environmental Protection Act 1990; and

13.6 The Environment Act 1995;

13.7 National Planning Policy Framework (NPPF);

13.8 Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS);

13.9 The London Plan: Spatial Development Strategy for Greater London (July 2011) (Revised October 2013);

13.10 The Mayor's Air Quality Strategy of London;

13.11 London Borough of Southwark Core Strategy (Adopted Version, April 2011);

13.12 London Borough of Southwark Air Quality Strategy and Action Plan;

13.13 The Aylesbury Area Action Plan (AAAP) (January 2010);

13.14 National Planning Practice Guidance (NPPG);

13.15 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(09);

13.16 Local Air Quality Management Review and Assessment Policy Guidance LAQM.PG(09);

13.17 Development Control: Planning for Air Quality (2010 Update) Environmental Protection UK, April 2010;

13.18 Greater London Authority: The Control of Dust and Emissions from Construction and Demolition – SPG (July 2014);

13.19 Institute of Air Quality Management: Guidance on the Assessment of Dust from Demolition and Construction (February 2014);

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13.21 Environment Agency: H1 Annex F - Air Emissions;

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14 Archaeology

14.1 Introduction

14.1.1 This Chapter reports the assessment of the likely significant environmental effects of the Site Wide Development Option and the FDS Development Option in respect of known and potential buried archaeological remains. In combination the development applied for by the Masterplan Application and the FDS Application is referred to elsewhere as the Comprehensive Development. For the purposes of clarity below where discussing known and potential archaeological remains across the whole Comprehensive Development, the term the Site is used.

14.1.2 In particular this Chapter considers the potential effects of the demolition and construction phase upon known and potential buried archaeological remains. In order to understand these effects it also takes account of the likely impact on known and potential buried archaeological remains arising from existing and previous development within the Site boundary, and the extent to which this may have disturbed, truncated or removed known and potential buried archaeological remains. The latter is assessed in detail and presented in an Archaeological Desk-based Assessment of the Site completed in August 2014 (see **Appendix 14.1**), which in turn provides a revised and updated account of a desk-based assessment of the Site undertaken in 2006 (Ref. 14.17).

14.1.3 The other components of the cultural heritage resource, comprising built heritage assets and townscape assets; designated and non-designated buildings, conservation areas, registered parks and gardens and non-designated London parks are assessed in Volume 3 'Townscape, Visual and Built Heritage Assessment of this ES.

14.1.4 This Chapter should be read together with the Introductory Chapters of this ES (Chapters 1 – 4) as well as **Chapter 17 'Cumulative Effects', Chapter 15 'Ground Conditions, Hydrogeology and Contamination'** and **Chapter 16 'Water Resources, Water Quality, Flood Risk and Drainage'**.

14.1.5 The aim of the assessment is to identify areas of the Site Wide Development Option and FDS Development Option where buried archaeological remains may survive, and if so to present an acceptable strategy that will mitigate all reported significant effects on identified known or potential buried archaeological remains.

14.2 Legislation, Policy and Guidance

Legislation Framework

14.4.1 The applicable legislative framework is summarised as follows:

- Ancient Monuments and Archaeological Areas Act (AMAAA) 1979 (Ref 14.1) largely relates to Scheduled Monuments and Section 61(12) defines sites that warrant protection due to their being of national importance as 'ancient monuments'. These can be either Scheduled Monuments or "*any other monument which in the opinion of the Secretary of State is of public interest by reason of the historic, architectural, traditional, artistic or archaeological interest attaching to it*". A monument is defined by the Act as "*any building, structure or work above or below the surface of the land, any cave or excavation; any site comprising the remains of any such building, structure or work or any cave or excavation; and any site comprising or comprising the remains of any vehicle, vessel or aircraft or other movable structure or part thereof*... (Section 61 (7))". The Act also makes deliberate damage to a monument a criminal offence and any works taking place within one require Scheduled Monument Consent from the Secretary of State;

- Planning (Listed Buildings and Conservation Areas) (P[LBCA]) Act 1990 (Ref 14.2) defines a 'listed building' as a "*building which is for the time being included in a list compiled or approved by the Secretary of State under that section. For the purpose of the Act any object or structure fixed to the building, which, since on or before 1 July 1948, has formed part of the land and is comprised within the curtilage of the building is treated as part of the building*." 'Building' is defined as "*including any structure or erection and any part of a building*". Section 66 and Section 72 place a duty on the relevant planning authority to protect the fabric and setting of Listed Buildings and Conservation Areas;
- Treasure Act 1996 (Ref. 14.3) defines what constitutes Treasure and states that any finds of treasure and objects found in association with treasure must be reported to the local coroner;
- Burial Act 1857 (Ref. 14.4) makes it a criminal offence to remove human remains from any place of burial without an appropriate license issued by the Ministry of Justice (MoJ), although recent legislative changes indicate that some cases are exempt from this requirement; and
- Hedgerow Regulations (1997) (Ref. 14.5) provide the criteria by which hedgerows and field boundaries would be considered to be important including in archaeological and historical terms, which include those which demarcate boundaries that pre-date the main Inclosure Acts, boundaries that follow parish or township boundaries and those that form part of an identified archaeological site or monument.

Planning Policy

14.4.2 Planning policy at the national and local level and its relevance to environmental design and assessment is discussed in Chapter 4 'Planning Policy and Context'. A summary of the Comprehensive Development's compliance with legislation and planning policy has been included in Table 14.6.

National Policy

National Planning Policy Framework (NPPF) (2012)

14.4.3 The National Planning Policy Framework (NPPF) (Ref. 14.6) assesses the historic environment within the definition of sustainable development. Point 7 [P7] of the NPPF states that sustainable development should "contribut[e] to protecting and enhancing our… historic environment". There is also a need for positive inclusion of the historic environment in development design [P9].

14.4.4 The historic environment is stated within the NPPF core principles: development should "conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations". There is no distinction here between designated and non-designated heritage assets. As such, all heritage assets need to be judged by this criteria and significance must be assessed in order to achieve this [P17].

14.4.5 Section 12 of the NPPF details the approach to the historic environment specifically. Four core principles are set out:

- "The desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;
- The wider social, cultural, economic and environmental benefits that conservation of the historic environment can bring;
- The desirability of new development making a positive contribution to local character and distinctiveness; [and]
- Opportunities to draw on the contribution made by the historic environment to the character of a place"

14.4.6 P128 notes that any aspect of the proposal should be assessed in terms of its impact upon heritage assets [P129]. Where deliberate neglect is observed, it is noted that the assessment should consider the significance of the asset as was prior to any neglect [P130].

14.4.7 The test for sustainable development, where change could occur to designated assets, is governed by P132-134. This has particular relevance for a site in or near to the range of established heritage assets of this class - SMs, Listed Buildings, Registered Parks and Gardens, Battlefields for example

14.4.8 The NPPF (Annex 2) also provides the following definitions which are used in this Chapter:

- "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"
- "Setting of heritage asset: The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surrounding evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral";
- "Significance (in relation to heritage): The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting"; and
- "Non-designated heritage asset: identified by the local planning authority as having a degree of significance meriting consideration in planning decisions because of its heritage interest".

Regional and Local Policy

The London Plan: Spatial Development Strategy for Greater London (July 2011) (Revised October 2013)

14.4.9 The London Plan is the overall strategic plan for London and sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031 (Ref. 14.7). It includes an archaeological statement:

- "Policy 7.8 Heritage Assets and Archaeology: Development should incorporate measures that identify, record, interpret, protect and, where appropriate, present the site's archaeology; Development should identify value, conserve, restore, re-use and incorporate heritage assets, where appropriate. Development affecting heritage assets and their settings should conserve their significance, by being sympathetic to their form, scale, materials and architectural detail; and, new development should make provision for the protection of archaeological resources, landscapes and significant memorials. The physical assets should, where possible, be made available to the public on-site. Where the archaeological asset or memorial cannot be preserved or managed on-site, provision must be made for the investigation, understanding, recording, dissemination and archiving of that asset".

The Revised Early Minor Alterations to the London Plan (REMA), published October 2013 and,

Further Alterations to the London Plan (FALP), draft published January 2014

14.4.10 The REMA sets out a series of formal alterations to the London Plan Policy (Ref. 14.8). These are adopted and supersede their counterpart policies within the July 2011 London Plan.

14.4.11 An alteration, which is reiterated in the FALP (Ref. 14.9), strengthens Policy 7.8 of the London Plan and concerning conservation areas specifically states that they:

- "should be protected from inappropriate development that is not sympathetic in terms of scale, materials, details and form. Development that affects the setting of heritage assets should be of the highest quality of architecture and design, and respond positively to local context and character outlined in the policies above".

The Southwark Plan (Unitary Development Plan) (2007) Saved Polices (Updated 2013)

14.4.12 The Southwark Plan provides a range of policies relevant to the Proposed First Development Site and Site Wide Development Option (Ref. 14.10).

- Strategic Policy (SP) 13 Design and Heritage - All developments should be of a high standard of design and where appropriate should preserve or enhance the character or appearance of the historic environment.

The Aylesbury Area Action Plan (AAAP) (January 2010)

14.4.13 The AAAP is one of a number of Local Development Framework documents (Ref. 14.11). It records the vision and objectives of the London Borough of Southwark's Core Strategy. The AAAP provides a blueprint for the regeneration of the Aylesbury Estate over the next 20 years. The AAAP does not contain any specific considerations associated with the known or potential archaeological resource, though does refer to the Southwark Plan, Policy 3.15 Conservation and Historic Environment, for considerations associated with listed buildings, conservation areas and world heritage sites.

Department for Communities and Local Government (2014) Planning Policy Guidance

14.4.14 The Planning Practice Guidance (PPG) (Ref. 14.12) was published on 6th March 2014 and formally revoked over 150 planning guidance documents. The 'Conserving and enhancing the historic environment' section of the PPG states that "protecting and enhancing the historic environment is an important component of the National Planning Policy Framework's drive to achieve sustainable development". The appropriate conservation of heritage assets in a manner appropriate to their significance forms one of the 'Core Planning Principles' that underpin the planning system as "Heritage assets are an irreplaceable resource and effective conservation delivers wider social, cultural, economic and environmental benefits".

14.4.15 The PPG also states "Part of the public value of heritage assets is the contribution that they can make to understanding and interpreting our past. So where the complete or partial loss of a heritage is justified, the aim then is to capture and record the evidence of the asset's significance which is to be lost, interpret its contribution to the understanding of our past, and make that publically available".

Guidance

Institute for Archaeologists Standard and Guidance for Historic Environment Desk-based Assessment (2012)

14.4.16 The Institute for Archaeologists (IfA) Standard and Guidance for Historic Environment Desk-based Assessment (Ref. 14.13) sets out the methods and practices to establish the effects of development proposals on the significance of the historic environment or to identify the need for further evaluation to do so.

Department for Communities and Local Government PPS5 Planning for the Historic Environment: Historic Environment Planning Practice Guide

14.4.17 The Practice Guide to PPS5 (Ref. 14.14) remains in force as guidance to support the NPPF (Ref. 14.6) policies on the Historic Environment. The guide explains how these policies can be implemented and interpreted in the planning process. As a guide to interpreting how policy should be applied, the practice guidance is also material to individual planning and heritage consent decisions.

Highways Agency Design Manual for Roads and Bridges (DMRB) Volume 11 Section 2 Part 3 'Cultural Heritage' HA208/07 (2007)

14.4.18 The DMRB (Ref. 14.15) outlines the process for the assessment of effects on archaeological remains, historic buildings and historic landscapes arising from developments and provides criteria for the assessment of value and magnitude of change.

Greater London Archaeology Advisory Service (GLAAS): Standards for Archaeological Work (2014)

14.4.19 The GLAAS Standards (Ref.14.16) sets out the requirements of archaeological work undertaken in London in a number of guidance papers. This paper sets out the minimum requirements of desk-based assessment, its aims and objectives. It also reinforces the necessity of conforming to the Institute for Archaeology's Standard and Guidance for Historic Environment Desk-based Assessment (Ref. 14.13).

14.3 Assessment Methodology and Significance Criteria

Relevant Elements of the Comprehensive Development (FDS Application and Masterplan Application)

14.3.1 The following components of the application for the Comprehensive Development are also relevant to the assessment of the effects of the development applied for by the FDS Application:

- Planning Application Drawings, specifically the FDS Application Plans and Masterplan (Outline Application-Parameter Plans) / Development Specification;
- Design Code;
- Planning Statement; and
- Statement of Community Involvement.

14.3.2 The following components of the Masterplan Application are relevant to the Outline assessment:

- Existing and Proposed Levels (defined in metres at AOD with allowance for a small limit of deviation to allow for small scale undulation in the landscaping);
- Extent of Basement and Depths; and,
- Maximum and minimum plot extents at ground level.

Scope of the Assessment

14.3.3 An EIA Scoping Report was submitted to LBS in April 2014 which invited LBS and consultees to comment on the scope of this assessment (**Appendix** 2.1). The scope complies with the LBS EIA Scoping Opinion, received in June 2014 (**Appendix** 2.2) in the context of the evidence base for insignificant effects as outlined below.

14.3.4 It is assumed that any potential significant effects to buried/surface archaeological remains will have been mitigated during the demolition, site preparation, earthworks and construction phase. Therefore effects to buried/surface archaeological remains are considered insignificant during the completed and operational phase and are not considered further within this assessment. This is consistent with the approach outlined in the Environmental Scoping Report (**Appendix** 2.1), which confirms:

The completed development will not, under normal operation, result in a continued level of impact upon archaeological assets which would either be considered significant or could be appreciably altered through development design/mitigation.

14.3.5 The mitigation strategy set out in **Chapter 15 'Ground Conditions, Hydrogeology and Contamination'** will ensure that soil and water pollution during construction and operation is minimised to an acceptable level. Similarly, the drainage strategy will ensure there is no net change in the drainage regime across the Site or in the wider area, please refer to **Chapter 16 'Water Resources, Water Quality, Flood Risk and Drainage'**. Therefore, effects on buried archaeological remains beyond the Site boundary are not likely to occur and will not be assessed in the ES.

14.3.6 The potentially significant effects therefore are confined to the Demolition, Site Preparation, Earthworks and Construction Phase and focus on disturbance, truncation or loss of any potential buried/surface archaeological remains.

Extent of the Study Area

14.3.7 A search area of 250m radius around the Site has been used to establish the presence of known and potential buried/surface archaeological remains within and in the vicinity of the Site.

14.3.8 A search of the Greater London Historic Environment Record (GLHER) and English Heritage's National Monuments Record (NMR) was undertaken for this study area. In addition a review of documentary sources at the Southwark Local History Library, the London Metropolitan Archive and the London Archaeological Archive and Resource Centre (LAARC) was undertaken. This is in accordance with the scoping opinion response confirmed for Archaeology, as set out by the Southwark Borough Archaeologist in June 2014 (**Appendix** 2.2).

14.3.9 An Archaeological Desk-Based Assessment prepared by the Museum of London Archaeology Service (MoLAS), August 2006 utilised a 1,250m study area measured from the centre of the Site and drew on data from the Greater London Sites and Monuments Record (GLSMR), now called the Greater London Historic Environment Record (GLHER), The English Heritage National Monuments Record (NMR), and the London Archaeological Archive and Resource Centre (LAARC) for information pertaining to known sites, finds, monuments and previous archaeological investigations (Ref. 14.17).

Consultation

14.3.10 **Table** 14.1 provides a summary of the consultation activities undertaken in support of the preparation of the assessment.

Table 14.1: Summary of Consultation Undertaken to Date

Body / Organisation	Individual(s)at Body / Organisation	Meeting Dates and Other Forms of Consultation	Summary of Outcome of Discussions
Southwark Council	Christopher Constable (Senior Archaeology Officer)	May 2014 August 2014	■ Outlines scope, study area and assets to be considered within the assessment as part of the Scoping Decision ■ Email sent to Southwark Council Archaeologist Christopher Constable. To propose an initial archaeological methodology for areas of the Site where there remains potential for the survival of buried archaeological remains. No response has been received to date.

Method of Baseline Data Collation

Desk Study

14.3.11 A comprehensive desk-based review of existing information has been undertaken, comprising a review of planning policy and guidance, the MoLAS archaeological desk-based assessment of the Site and its surroundings (August 2006) (Ref. 14.17), historic Ordnance Survey mapping and available pre-Ordnance Survey mapping, GLHER and NMR data and other documentary sources.

14.3.12 This review has been prepared as a revised and updated Archaeological Desk-based Assessment completed in August 2014 (**Appendix** 14.1). This document provides an assessment of previous land use and archaeological potential utilising archaeological asset data as defined above. This assessment has been completed in accordance with the Institute for Archaeologists (2012) Standard and Guidance for the preparation of historic environment desk-based assessments (Ref 14.13), the IFA Code of Conduct (Ref. 14.18) and the procedural documents of English Heritage, including Management of Archaeological Projects, second edition (MAP2) (Ref. 14.19) and Management of Research Projects in the Historic Environment, the MORPHE Project Manager's Guide (Ref. 14.20).

Site Visit / Other Assessment

14.3.13 A Site visit was undertaken in August 2014 by an appropriately qualified archaeologist. Observations were made noting the condition and use of each area of the Site, the condition of any known archaeological sites, observations with regard to surface features or above-ground signatures of potential archaeological interest and any potential constraints on further archaeological works. Observation notes were taken and a photographic record made.

Identification of Sensitive Receptors

14.3.14 The sensitive receptors which are the focus of this assessment comprise known and potential buried / surface archaeological remains on which there may be adverse effects arising from the Site Wide Development Option and the FDS Development Option. These archaeological remains may comprise the basal elements of former buildings and associated settlement features such as the deeper cut elements of former pits, ditches or wells within the Site boundary, along with associated and un-associated artefacts. Such remains are more likely to be of recent origin (of Post-medieval and Modern origin) rather than of Prehistoric, Roman, Early Medieval and Medieval origin. These potentially adverse effects are assessed on basis of the evaluation of the Comprehensive Development (as outlined in **Chapter 3 'Comprehensive Development'**) against the predicted value of potential assets.

14.3.15 The criteria used to identify the value (sensitivity) of heritage assets has been informed by the criteria provided in the DMRB (Ref. 14.15) and the distinctions drawn between Grade I and II*/Grade II assets in the NPPF (Ref. 14.6) and PPG (Ref. 14.12). The criteria used to ascertain the value of heritage assets are outlined in **Table 14.2**.

Table 14.2: Criteria Used to Determine Value of all elements of the Historic Environment

Value	Criteria
Very High	World Heritage Sites and their setting Assets of acknowledged international value/assets that can contribute to acknowledged international research objectives
High	Scheduled Monument's and non-designated assets of schedulable quality and value and their setting Grade I and Grade II* Listed Buildings and Registered Historic Parks and Gardens and their setting Conservation Areas containing very important buildings Non-designated assets of schedulable quality and value and Designated and non-designated assets that can contribute to acknowledged national research objectives
Medium	Grade II Listed Buildings and Registered Historic Parks and Gardens and their setting Registered Battlefields and their setting Conservation Areas containing buildings that contribute significantly to its historic character and their setting Designated or non-designated assets that contribute to acknowledged regional research objectives
Low	Locally Listed structures and their setting Designated or non-designated assets of limited value, but with potential to contribute to local research objectives

Value	Criteria
Negligible	Non-designated assets (including sites and features) with no significant historic or archaeological value Buildings of an intrusive character
Unknown	The value of the resource has not been ascertained

Source: adapted from DMRB (Ref. 14.15)

14.3.16 The relevant Regional Archaeological Research Frameworks are 'A Research Framework for London Archaeology' (Ref. 14.21) and the Surrey Archaeological Research Framework (Ref. 14.22).

Table 14.3: Criteria Used to Determine the Magnitude of Change

Magnitude of Change	Criteria
High	Change to most or all of the key elements of the asset so that it is totally altered.
Medium	Changes to many key elements of the asset so that it is clearly modified.
Low	Changes to key elements such that the asset is slightly altered.
Negligible	Very minor/barely noticeable changes to key elements.
No Change	No change to elements.

Source: adapted from DMRB (Ref. 14.15)

Significance Criteria

14.3.17 The assessment of potential effects as a result of the Comprehensive Development has taken into account the demolition and construction phase. The significance level attributed to each effect has been assessed based on the magnitude of change due to the development proposals, and the value (sensitivity) of the affected receptor / receiving environment to change, as well as a number of other factors that are outlined in more detail **in Chapter 2 'Approach to Assessment'** of this ES. Magnitude of change is assessed on a scale of high, medium, low and negligible (as shown also in **Table** 2.2 in **Chapter 2 'Approach to Assessment'**) and the value (sensitivity) of the affected receptor / receiving environment is assessed on an scale of very high, high, medium, low and negligible (**Table** 14.2). Potential or known assets of unknown value are considered to be of very high value as a worse case.

14.3.18 The combined value and magnitude used to determine significance is summarised within **Table** 14.4 below.

Table 14:4: Significance of Effect Matrix (Combined Effect of Value (Significance) and Magnitude of Change)

Magnitude of Change	Value				
	Very high	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible/ neutral
Low	Moderate	Minor	Minor	Negligible/ neutral	Negligible/ neutral
Negligible	Minor	Negligible/ neutral	Negligible/ neutral	Negligible/ neutral	Negligible/ neutral
No Change	Neutral	Neutral	Neutral	Neutral	Neutral

14.3.19 The overall significance of an effect will distinguish between temporary and permanent effects based on the following timescale:

- **Short-Term**: The effects would be of short duration and would not last more than 1 year from the commencement of the works;
- **Medium-Term**: The effects would take 1 to 10 years to be mitigated; and
- **Long-Term**: The effects would be reasonably mitigated over a long period of time (10 years or more) and includes permanent effects.

Effect Significance

The following terms have been used to define the significance of the effects identified:

- **Major effect**: where the Comprehensive Development could be expected to result in a significant effect (either positive or negative) on designated or non-designated heritage assets. Positive effects may result from the recovery of new archaeological evidence or substantial improvements in the general historic environment, which greatly improve the way in which members of the public may experience historic or archaeological assets. This may extend to the removal of modern structures which have impaired the integrity of the historic environment. In terms of negative effects, this could constitute effects upon archaeological sites or elements of international/national value without adequate record or mitigation;
- **Moderate effect**: where the Comprehensive Development could be expected to have a noticeable effect (either positive or negative) on designated or non-designated heritage assets. Positive effects may result from the recovery of new archaeological evidence or moderate improvements in the general historic environment, which moderately improve the way in which members of the public may experience heritage assets. This may extend to the removal of modern structures which have impaired the integrity of the historic environment. In terms of negative effects, this could constitute alterations to a regionally important archaeological site without appropriate mitigation;
- **Minor effect**: where the Comprehensive Development could be expected to result in a small, barely noticeable effect (either positive or negative) on designated or non-designated heritage assets. Positive effects may result from the recovery of new archaeological evidence or minor improvements in the general historic environment, which improve the way in members of the public may experience heritage assets. In terms of negative effects, these could constitute direct alterations to the fabric of locally important assets;
- **Negligible**: where no discernible effect is expected as a result of the Comprehensive Development on the condition or setting of features, or elements of the historic environment; and,
- **Neutral**: where there is no change to the baseline conditions with the introduction of the Comprehensive Development.

Limits and Assumptions

14.3.20 This assessment has relied upon data provided by local and national authorities and within the previous archaeological and historical reports regarding known archaeological sites within or in the locality of the Comprehensive Development. The results of the desk-based works and archaeological fieldwork have provided an archaeological and historic environment baseline, although as is always the case with buried archaeological assets, there is still the potential for hitherto unexpected remains to be discovered within the boundary of the Comprehensive Development. The proposed mitigation measures seek to address the potential for the presence of unknown archaeological remains.

14.4 Baseline Conditions

14.4.1 **Table 14.5** illustrates the timeline that has been used to identify time periods within this Chapter.

Table 0.5: Archaeological and Historical Timeline

Period	Approximate date	
Palaeolithic	*c.*750,000 – 10,000 BC	Prehistoric
Mesolithic	*c.*10,000 – 4,500 BC	
Neolithic	*c.*4,500 – 2,300 BC	
Bronze Age	*c.*2,300 – 700 BC	
Iron Age	*c.*700 BC – 43 AD	
Roman	AD 43 – 410	Historic
Early Medieval (Saxon)	AD 410 – 1066	
Medieval	1066 – 1539	
Post-medieval	1539 – 1900	
Modern	1900 onwards	

Potential Archaeological Assets

Prehistoric period

14.4.2 The Archaeological Desk-based Assessment (**Appendix 14.1**) notes that the Site's location on a well-drained gravel terrace close to predictable resources of the River Thames and its tributaries would have been attractive for early settlement and farming. Despite this, no evidence Prehistoric activity has been found in the study area and little in its surroundings.

14.4.3 The very limited evidence of human activity in the period should be taken into consideration along with existing and previous development within the Site boundary, which is likely to have greatly disturbed, truncated or removed buried archaeological remains dating to the Prehistoric period. Although there has been no previous archaeological investigation within the boundary of the Site to date, on the basis of prevailing evidence and past impacts on the resource, the assessment considered there to be a very low potential for the survival of buried archaeological remains.

Roman period

14.4.4 The Archaeological Desk-based Assessment (**Appendix 14.1**) notes that the Site lies on the periphery of Roman settlement in Southwark, in rural land, as indicated by Roman period activity and sites in the wider surroundings. It is also located close to the route of two Roman roads, along which there would have been continuous activity and some settlement. The recovery of an intact Roman pot from the northern part of the Site, on Flint Street in the 19th century, is an isolated find and may well be unrelated to wider Roman period activity, or alternatively it may be indicative of more extensive activity.

14.4.5 The isolated example of evidence for the period within the Site boundary and the evidence of the surrounding wider area should be taken into consideration along with existing and previous development within the Site boundary, which is likely to have greatly disturbed, truncated or removed buried archaeological remains dating to the Roman period. Although there has been no previous archaeological investigation within the boundary of the Site to date, on the basis of prevailing evidence and past impacts on the resource, the assessment considered there to be a very low potential for the survival of buried archaeological remains.

Early Medieval (Saxon) period

14.4.6 The Archaeological Desk-based Assessment (**Appendix** 14.1) notes that nucleated settlement in the latter half of this period probably grew up on, or in the vicinity of, the later (Medieval) settlement. The main settlements were located some distance from the site, which lay on the periphery of Waltham manor, and in all likelihood was open fields or was wooded throughout this period. The earliest record relevant to the Site and its surroundings refers in fact to Walworth Manor. In 1052, Edward the Confessor confirmed a grant of Chartham and Walworth, together with their manors and many liberties, to Christchurch, Canterbury.

14.4.7 There is no recorded evidence for the survival or recovery of buried archaeological remains of the period from within the Site boundary or wider study area. This should be taken into consideration along with existing and previous development within the Site boundary, which is likely to have greatly disturbed, truncated or removed buried archaeological remains dating to the Early Medieval period. Although there has been no previous archaeological investigation within the boundary of the Site to date, on the basis of prevailing evidence and past impacts on the resource, the assessment considered there to be a very low potential for the survival of buried archaeological remains.

Medieval period

14.4.8 The Archaeological Desk-based Assessment (**Appendix** 14.1) notes that throughout this period, the Site was part of the common land of Walworth manor. The Site fell within the common land of Walworth at the southern end of the manor, c.500m east of the main settlement at Walworth. The villages of Newington and Camberwell lay c.1km south and c.1km north of the Site respectively and as communally owned land on the periphery of the manor it is unlikely to have been settled throughout this period; probably remaining as open fields or woodland.

14.4.9 There is no recorded evidence for the survival or recovery of buried archaeological remains of the period from within the Site boundary or wider study area. It is likely that the majority of land surrounding the Site and study area open field or woodland during the Medieval period and as such any surviving buried archaeological remains would most likely be represented by unstratified artefacts associated with agriculture, such as occasional sherds of pottery or metal items arising from the process of manuring. Within the Site boundary the likelihood of surviving buried archaeological remains dating to the period is very low given the nature and extent of more recent development. Potential buried remains are likely to have been disturbed, truncated or wholly removed by later Post-medieval and Modern development, especially where deep foundations or basements have been located.

Post-medieval period

14.4.10 The Archaeological Desk-based Assessment (**Appendix** 14.1) notes that there is a limited potential in areas of the Site where open spaces exist to locate basal remains of the St Mary Newington Workhouse and St Steven's Church on Beaconsfield Road, and of the two former schools on Westmoreland Road all of which are of 19th century origin. These are of local interest in terms of reconstructing the area's social history during the 19th centuries. There is potential for other buildings, pits, and traces of other activity to survive outside the footprint of the current buildings, and for deep-cut features, such as wells, surviving under the current buildings. Within the Site boundary in areas of open space such as recreational and landscaped areas, the likelihood of surviving buried archaeological remains dating to the Post-medieval period is moderate given the nature, extent and distribution of more recent development. Potential buried remains are likely to have been disturbed at least, or partially or wholly removed by later 19th and 20th century development, especially where deep foundations or basements may have been located.

Modern period

14.4.11 The Archaeological Desk-based Assessment (**Appendix 14.1**) notes that within the Site boundary the likelihood of surviving buried and surface archaeological or modern architectural remains dating to the period is high, albeit that such remains are likely to have been disturbed at least, or partially or wholly removed by subsequent development, especially where deep foundations or basements may have been located. Such buried and surface remains are likely to relate predominantly to post-2nd World War clearances prior to the development of the Aylesbury Estate.

Future Baseline

14.4.12 The Site comprising the extent of the Aylesbury Estate is entirely developed, though incorporates areas of recreational open space, hard-standing, roads and hard and soft landscaping. To the north, east and west the Site is surrounded by and integrated into its wider urban environs. To the south lies Burgess Park, a modern recreational green space which occupies the former space where the Surrey Canal once existed. It is considered that, if the Site is not developed then its quality and function will remain similar to current uses, namely predominantly residential, institutional, commercial and recreational space. Therefore, it is anticipated that future baseline conditions are unlikely to vary significantly from outlined above within the baseline scenario.

14.5 Assessments of Effects, Mitigation and Residual Effects

Demolition and Construction

Design Solutions and Assumptions

14.5.1 It assumes that the Comprehensive Development will be implemented in accordance with the demolition and construction information provided **in Chapter 3 'Comprehensive Development' and Chapter 5 'Demolition and Construction'.**

Site Wide Development Option (Masterplan and FDS Application)

Truncation or loss of potential buried/surface archaeological remains

14.5.2 The ground clearance and excavation activities during the Site preparation, earthworks and construction phase of the Comprehensive Development, as outlined in **Chapter 3 'Comprehensive Development'**, have the potential to disturb, truncate or cause the loss of buried or surface archaeological remains that might be present within the Site boundary. It has been assumed that ground excavations, which will include piling, foundation works and provision of basements and basement carparking and surface water attenuation tanks as outlined in **Chapter 5 'Demolition and Construction',** will occur to depths in excess of the likely upper archaeological horizon (within 500mm of existing surfaces), and that all areas within the Site boundary will be subject to topsoil, existing landscaping and hardstanding stripping and groundworks. It also assumed that these works will occur in multiple phases of the demolition and construction programme.

14.5.3 Based on a review of the baseline evidence there is a very low potential within the Site boundary for currently unknown archaeological remains to exist dating between the Prehistoric and Medieval periods. Where such buried archaeological remains are identified they are likely to provide more information on the nature and extent of settlement and activity within the wider area during these periods, contributing towards regional and local research goals.

14.5.4 The value of any such surviving buried archaeological remains dating between the Prehistoric and Medieval periods is considered to be low to medium due to the contribution that any assets found are likely to make towards local and regional research goals, in accordance with the criteria set out in **Table** 14.2. The magnitude of change, prior to mitigation, is medium in accordance with the criteria in **Table** 14.3 given the potential change to the key elements of any such remains. Therefore, there is likely to be a direct, permanent, long-term effect on potential buried archaeological remains dating between the Prehistoric and Medieval periods of minor to moderate negative significance prior to the implementation of mitigation measures.

14.5.5 Based on a review of the baseline evidence there is a moderate to high potential within the Site boundary for currently unknown archaeological remains to exist dating between the Post-medieval and Modern periods. Such buried remains are likely to be associated with 19th and 20th century residential and institutional development prior the development of the present Aylesbury Estate and may survive in existing recreational and landscaping areas. Where such buried archaeological remains are identified they are likely to provide more information on the domestic, social and economic activity within the local area during these periods, contributing towards local research goals.

14.5.6 The value of any such surviving buried archaeological remains dating between the Post-medieval and Modern periods is considered to be low due to the contribution that any assets found are likely to make towards local research goals, in accordance with the criteria set out in **Table** 14.2. The magnitude of change, prior to mitigation, is medium in accordance with the criteria in **Table** 14.3 given the potential change to the key elements of any such remains. Therefore, there is likely to be a direct, permanent, long-term effect on potential buried archaeological remains dating between the Post-medieval and Modern periods of minor negative significance prior to the implementation of mitigation measures.

Mitigation

14.5.7 A programme of targeted further archaeological works post-demolition and prior to construction has been recommended to LBS to mitigate the effects on the potential buried/surface archaeological remains within the Site. These would comprise, limited and targeted trial trenching beneath existing landscaping and hardstanding areas associated with Michael Faraday House on the north side of the present day Beaconsfield Road and in recreational open space on the south side of Latimer House, in the former location of St Mary Newington Workhouse and St Steven's Church, where basal elements of the former structures may be preserved. Elsewhere within the Site in such areas of recreational open space or hardstanding an intermittent archaeological watching brief of non-archaeological demolition clearance works and development groundworks would be maintained. All archaeological investigations will be completed in accordance with current Institute for Archaeologists guidance for field practice, as well as being formally agreed through a Written Scheme of Investigation (WSI).

Residual Effects

14.5.8 Archaeological recording will ensure that any buried archaeological remains which are identified are preserved 'by record' and will add further to our knowledge of the history and development of the Borough of Southwark and wider area. This will in part reduce the overall magnitude of change. However, as a result of the potential loss of any in situ archaeological remains, the effect for all time periods is considered to be negative.

14.5.9 The value of potential buried archaeological remains dating between the Prehistoric and Medieval periods is low to medium and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a direct, permanent, long-term residual effect on potential buried archaeological remains dating between these periods of minor negative significance following the implementation of mitigation measures.

14.5.10 The value of potential buried archaeological remains from the Post-Medieval and Modern periods is low and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a direct, permanent, long-term residual effect on potential buried archaeological remains from the Post-Medieval and Modern periods of negligible negative significance following the implementation of mitigation measures.

FDS Development Option

Truncation or loss of potential buried/surface archaeological remains

14.5.11 The ground clearance and excavation activities during the site preparation, earthworks and construction phase of the Proposed Development, as outlined in **Chapter 3 'Comprehensive Development',** have the potential to disturb, truncate or cause the loss of buried or surface archaeological remains that might be present within the FDS Application site. It has been assumed that ground excavations, which will include piling, foundation works, provision of basements and basement carparking and surface water attenuation tanks as outlined in **Chapter 5 'Demolition and Construction'**, will occur to depths in excess of the likely upper archaeological horizon (within 500m of existing surfaces), and that all areas within the FDS Application site will be subject to topsoil, existing landscaping and hardstanding stripping and groundworks. It also assumed that these works will occur in multiple phases of the demolition and construction programme.

14.5.12 Based on a review of the baseline evidence there is a very low potential within the FDS Application site for currently unknown archaeological remains to exist dating between the Prehistoric and Medieval periods. Where such buried archaeological remains are identified they are likely to provide more information on the nature and extent of settlement and activity within the wider area during these periods, contributing towards regional and local research goals.

14.5.13 The value of any such surviving buried archaeological remains dating between the Prehistoric and Medieval periods is considered to be low to medium due to the contribution that any assets found are likely to make towards local and regional research goals, in accordance with the criteria set out in **Table** 14.2. The magnitude of change, prior to mitigation, is medium in accordance with the criteria in **Table** 14.3 given the potential change to the key elements of any such remains. Therefore, there is likely to be a direct, permanent, long-term effect on potential buried archaeological remains dating between the Prehistoric and Medieval periods of minor to moderate negative significance prior to the implementation of mitigation measures.

14.5.14 Based on a review of the baseline evidence there is a moderate to high potential within the FDS Application for currently unknown archaeological remains to exist dating between the Post-medieval and Modern periods. Such buried remains are likely to be associated with 19th and 20th century residential and institutional development prior the development of the present Aylesbury Estate and may survive in existing recreational and landscaping areas. Where such buried archaeological remains are identified they are likely to provide more information on the domestic, social and economic activity within the local area during these periods, contributing towards local research goals.

14.5.15 The value of any such surviving buried archaeological remains dating between the Post-medieval and Modern periods is considered to be low due to the contribution that any assets found are likely to make towards local research goals, in accordance with the criteria set out in **Table** 14.2. The magnitude of change, prior to mitigation, is medium in accordance with the criteria in **Table** 14.3 given the potential change to the key elements of any such remains. Therefore, there is likely to be a direct, permanent, long-term effect on potential buried archaeological remains dating between the Post-medieval and Modern periods of minor negative significance prior to the implementation of mitigation measures.

Mitigation

14.5.16 A programme of targeted further archaeological works has been recommended to LBS to mitigate the effects on the potential buried/surface archaeological remains within the FDS Site. These would comprise, within areas of existing recreational open space and landscaping, an intermittent archaeological watching brief of non-archaeological demolition clearance works and development groundworks. All archaeological investigations will be completed in accordance with current Institute for Archaeologists guidance for field practice, as well as being formally agreed through a Written Scheme of Investigation (WSI).

Residual Effects

14.5.17 Archaeological recording will ensure that any buried archaeological remains which are identified are preserved 'by record' and will add further to our knowledge of the history and development of the Borough of Southwark and wider area. This will in part reduce the overall magnitude of change. However, as a result of the potential loss of any in situ archaeological remains, the effect for all time periods is considered to be negative.

14.5.18 The value of potential buried archaeological remains dating between the Prehistoric and Medieval periods is low to medium and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a direct, permanent, long-term residual effect on potential buried archaeological remains dating between these periods of minor negative significance following the implementation of mitigation measures.

14.5.19 The value of potential buried archaeological remains from the Post-Medieval and Modern periods is low and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a direct, permanent, long-term residual effect on potential buried archaeological remains from the Post-Medieval and Modern periods of negligible negative significance following the implementation of mitigation measures.

14.6 Summary

Site Wide Development Option

14.6.1 A comprehensive desk-based review of existing information was undertaken, including a review of planning policy and guidance, GLHER and NMR data, historic ordnance survey mapping and pre-Ordnance Survey mapping. This assessment is supported by an Archaeological Desk-Based Assessment completed by in August 2014 (**Appendix** 14.1). This assessment provides an evaluation of previous land-use and existing archaeological potential utilising archaeological asset data from the GLHER and the NMR, aerial photography, cartographic information and other background material sourced at the Southwark Local History Library, the London Metropolitan Archive and on the London Archaeological Archive and Resource Centre (LAARC) website (including various internet sources such as the Victoria County History).

14.6.2 Based on a review of the baseline evidence there is a very low potential within the Site boundary for currently unknown archaeological remains to exist dating between the Prehistoric and Medieval periods. Where such buried archaeological remains are identified they are likely to provide more information on the nature and extent of settlement and activity within the wider area during these periods, contributing towards regional and local research goals. There is a moderate to high potential within the Site boundary for currently unknown archaeological remains to exist dating between the Post-medieval and Modern periods. Where such buried archaeological remains are identified they are likely to provide more information on the domestic, social and economic activity within the local area during these periods, contributing towards local research goals.

14.6.3 During the demolition and construction phase, the assessment considered that the residual effects on any potential buried/surface archaeological remains are likely to be of minor negative significance where remains date between the Prehistoric and Medieval periods and negligible negative significance where remains date between the Post-medieval and Modern periods, following the implementation of mitigation measures. Such mitigation measures include further archaeological works to be agreed with LBS through the preparation of a WSI.

FDS Development Option

14.6.4 A comprehensive desk-based review of existing information was undertaken, including a review of planning policy and guidance, GLHER and NMR data, historic ordnance survey mapping and pre-Ordnance Survey mapping. This assessment is supported by an Archaeological Desk-Based Assessment completed by in August 2014 (**Appendix 14.1**). This assessment provides an evaluation of previous land-use and existing archaeological potential utilising archaeological asset data from the GLHER and the NMR, aerial photography, cartographic information and other background material sourced at the Southwark Local History Library, the London Metropolitan Archive and on the London Archaeological Archive and Resource Centre (LAARC) website (including various internet sources such as the Victoria County History).

14.6.5 Based on a review of the baseline evidence there is a very low potential within the Site boundary for currently unknown archaeological remains to exist dating between the Prehistoric and Medieval periods. Where such buried archaeological remains are identified they are likely to provide more information on the nature and extent of settlement and activity within the wider area during these periods, contributing towards regional and local research goals. There is a moderate to high potential within the Site boundary for currently unknown archaeological remains to exist dating between the Post-medieval and Modern periods. Where such buried archaeological remains are identified they are likely to provide more information on the domestic, social and economic activity within the local area during these periods, contributing towards local research goals.

14.6.6 During the demolition and construction phase, the assessment considered that the residual effects on any potential buried/surface archaeological remains are likely to be of minor negative significance where remains date between the Prehistoric and Medieval periods and negligible negative significance where remains date between the Post-medieval and Modern periods, following the implementation of mitigation measures. Such mitigation measures include further archaeological works to be agreed with LBS through the preparation of a WSI.

Table 14.6: Summary of [Archaeology] Effects

Site Wide Development Option

Description of Likely Significant Effects	Receptor	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction														
Disturbance, truncation or loss of potential buried/surface archaeological remains	Prehistoric to Medieval remains Post-medieval to Modern remains	Moderate Minor	Negative Negative	P P	D D	MT/ LT MT / LT	Archaeological fieldwork to be agreed with LBS	Minor Negligible	Negative Negative	P P	D D	LT LT	NPPF The London Plan Southwark Plan AAAP	Burial Act 1857, Treasure Act 1996, AMAAA 1979
Operation														
N/A														

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

Table 14.7: Summary of [Archaeology] Effects

FDS Development Option

Description of Likely Significant Effects	Receptor	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction														
Disturbance, truncation or loss of potential buried/surface archaeological remains	Prehistoric to Medieval remains Post-medieval to Modern remains	Moderate Minor	Negative Negative	P P	D D	MT/ LT MT / LT	Archaeological fieldwork to be agreed with LBS	Minor Negligible	Negative Negative	P P	D D	LT LT	NPPF The London Plan Southwark Plan AAAP	Burial Act 1857, Treasure Act 1996, AMAAA 1979
Operation														
N/A														

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

14.7 References

Ref. 14.1 *Ancient Monuments and Archaeological Areas Act 1979*

Ref. 14.2 *Planning (Listed Buildings and Conservation Areas) Act 1990*

Ref. 14.3 *Treasure Act 1996*

Ref. 14.4 *Burial Act 1857*

Ref. 14.5 Department of the Environment, Transport and the Regions (1997), *Hedgerow Regulations*

Ref. 14.6 Department for Communities and Local Government (2012), *National Planning Policy Framework*

Ref. 14.7 Greater London Authority (2013), The London Plan: Spatial Development Strategy for Greater London, published July 2011 (Revised October 2013)

Ref. 14.8 Greater London Authority (2013), The Revised Early Minor Alterations to the London Plan (REMA), published October 2013

Ref. 14.9 Greater London Authority (2014), Further Alterations to the London Plan (FALP), draft published January 2014

Ref. 14.10 Southwark Council (2013), The Southwark Plan (Unitary Development Plan) (2007) Saved Polices (Updated 2013)

Ref. 14.11 Southwark Council (2010), The Aylesbury Area Action Plan (AAAP) (January 2010)

Ref. 14.12 Department for Communities and Local Government (2014), *Planning Policy Guidance*

Ref. 14.13 Institute for Archaeologists (2012), *Standard and Guidance for Undertaking Historic Environment Desk Based Assessments*

Ref. 14.14 Department for Communities and Local Government (2010), *PPS5 Planning for the Historic Environment: Historic Environment Planning Practice Guide*

Ref. 14.15 Highways Agency (2007), Design Manual for Roads and Bridges (DMRB) Volume 11 Section 2 Part 3 '*Cultural Heritage'* HA208/07

Ref. 14.16 Greater London Archaeology Advisory Service (2014): Standards for Archaeological Work

Ref. 14.17 Museum of London Archaeology Service (2006), *Aylesbury Estate, Southwark SE17*. Archaeological Desk-Based Assessment

Ref. 14.18 Institute for Archaeologists (2013), *Code of Conduct*

Ref. 14.19 English Heritage *(1991), Management of Archaeological Projects, second edition (MAP2)*

Ref. 14.20 English Heritage (2006), *Management of Research Projects in the Historic Environment, the MORPHE Project Manager's Guide*

Ref. 14.21 Museum of London (2002), *A Research Framework for London Archaeology*

Ref. 14.22 Bird, D. (2006), *Surrey Archaeological Research Framework 2006*. Surrey County Council.

15 Ground Conditions, Hydrogeology and Contamination

15.1 Introduction

15.1.1 This Chapter reports the findings of the assessment of the likely significant environmental effects of the Site Wide Development Option and FDS Development Option on ground conditions and contamination. In particular it considers the likely significant effects on existing ground conditions on the new site users (residential/commercial use) and controlled waters. The scope of the Chapter was agreed with LBS through the Scoping Opinion received from LBS in June 2014. This Chapter is consistent with the agreed LBS Scoping Opinion.

15.1.2 This Chapter should be read together with the Introductory Chapters of this ES (Chapters 1 – 4) as well as **Chapter 17 'Cumulative Effects'**.

15.1.3 WSP has undertaken a Preliminary Risk Assessment (PRA) that covers both the FDS and Masterplan Application sites, the findings of which are detailed in the report 'Aylesbury Estate, Southwark' dated September 2014 (Ref. 15.1) and provided in **Appendix 15.1**. As well as review of desk study sources of information, the PRA provides a summary of two intrusive investigations undertaken by third parties which are detailed below:

- Soil Limited 13397/GIR February 2013 (Ref 15.2) located within the FDS Application for the purpose of providing information with regard to ground conditions to prepare a foundation scheme for redevelopment; and
- Ground Engineering C11482B January 2014 (Ref 15.3) located adjacent to the west of the FDS Application to identify potential sources of contamination.

15.1.4 WSP has reviewed the above reports during the preparation of the PRA and this ES Chapter.

15.2 Legislation, Policy and Guidance

Legislation

15.2.1 The applicable legislative framework is summarised as follows:

- Environmental Protection Act (1990) (referred to as the EPA 1990) (Ref. 15.4); and
- Town and Country Planning Act (1990).

15.2.2 Legislation on the assessment of contaminated sites is provided under Part 2A of the EPA 1990 as introduced by Section 57 of the Environment Protection Act 1995 (Ref. 15.5). Further guidance on implementation of Part 2A requirement is provided by the DEFRA, Contaminated Land Statutory Guidance (2012) (Ref. 15.6).

15.2.3 The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. Within the context of current UK Legislation, the interpretation of a "significant risk" is termed to be one where:

> *"Significant harm is being caused or there is a significant possibility of such harm being caused, (where harm is defined as harm to health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property); and/or, significant pollution of controlled waters is being caused."*

15.2.4 The contaminated land regime set out in the EPA 1990 and its accompanying regulations deal with the existing condition of land. However, the remediation of contamination from historic land uses is managed through the planning regime. The Local Planning Authority (LPA) may require remediation or mitigation works to be undertaken as part of the development of a site. These works usually encompass site investigation, consultation and remediation works/risk management.

Planning Policy

15.2.5 Planning policy at the national, regional, county and local level is discussed in **Chapter 4 'Planning Policy Context'**. Planning policy of relevance to consideration of ground conditions, hydrogeology and contamination is summarised below.

National Policy

National Planning Policy Framework (NPPF) (2012)

15.2.6 Specifically relating to Ground Conditions and Contamination is Chapter 11 of the National Planning Policy Framework (NPPF, Ref. 15.7), Conserving and Enhancing the Natural Environment, which highlights at paragraph 109 that "*the planning system should contribute to and enhance the natural and local environment by:*

- *Protecting and enhancing valued landscapes, geological conservation interests and soils;*
- *Recognising the wider benefits of ecosystem services;*
- *Minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*
- *Preventing both new and existing developments from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and*
- *Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.*

15.2.7 The aim of development should be to minimise pollution and other adverse effects on the local and natural environment:

- *Planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value; and*
- *To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.*

15.2.8 Planning policies and decisions should also ensure that:

- *The site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;*
- *After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the EPA 1990; and*
- *Adequate site investigation information, prepared by a competent person, is presented."*

Local Planning Policy

Southwark Local Plan (2011) (Ref. 15.8)

Policy 3.1 Environmental Effects

15.2.9 Planning permission for the establishment of uses that would cause material adverse effects on the environment will not be granted, and proposals for activities that will have material adverse impact on the environment and quality of life will be refused.

SP12 Pollution

15.2.10 All developments should where appropriate reduce pollution and improve the environmental performance of buildings especially for energy, water and waste management.

Policy 3.10 Hazardous Substances

15.2.11 Planning permission for development involving hazardous substances, and development in the vicinity of sites where hazardous substances are used, stored or transported, will only be granted if it can be demonstrated that such development will not materially harm or put at risk the health, safety or amenity of users of the site, neighbouring occupiers or the environment.

Guidance

15.2.12 Guidance on the assessment of contaminated sites acknowledges the need for a tiered, risk based approach, underpinned by a Conceptual Site Model (CSM). This is recommended in DEFRA/the Environment Agency's CLR 11 (Ref. 15.9) and in the Construction Industry Research and Information Association (CIRIA) publication 552 'Contaminated Land Risk Assessment – A Guide to Good Practice' (Ref. 15.10) as summarised below:

- Development of the specific Conceptual Site Model (Stage 1);
- Assessment of site investigation results against Soil Guideline Values (SGVs) or Generic Assessment Criteria (GAC) (Stage 2) where available and appropriate as derived by Generic Quantitative Risk Assessment (GQRA);
- Assessment of site investigation results against Site Specific Assessment Criteria (SSAC) (Stage 3) as derived by Detailed Quantitative Risk Assessment (DQRA); and
- Soil Guideline Values (SGVs) are derived and published by an authoritative body. Generic Assessment Criteria (GAC) can be derived by third parties following the technical UK CLEA guidance and methodology. They take into account generic assumptions about the characteristics of contaminants, pathways and receptors and are designed to be protective in a range of defined conditions. Site Specific Assessment Criteria (SSAC) are derived at a further tier of assessment and use site specific ground condition data, pathway and receptor information to reflect the Proposed Development in more detail and in many cases reduce the overall conservatism of the assessment.

15.2.13 Contaminated land assessments are based upon the Contaminated Land Exposure Assessment (CLEA) model released by the Environment Agency/DEFRA (Ref. 15.11). This model assesses risk to human health and has a series of SGVs for individual contaminants. For contaminants where no SGV has been issued by Environment Agency/DEFRA reference is made to the Generic Assessment Criteria (GAC).

15.2.14 Controlled water quality assessments are based on the Water Framework Directive (WFD) (Ref. 15.10); and there are a number of guideline quality indicators in current use. For surface water, concentration limits called Environmental Quality Standards (EQS) have been assigned to dangerous substances to control occurrence and avoid harmful effects. The EQS have been taken from the Environmental Quality Standards Directive, 2008/105/EC (Ref. 15.12). For groundwater, guideline values have been designed as standards for

the supply of drinking water, as part of the UK Water Supply (Water Quality) Regulations 2000 (and amendments) and Private Water Supplies Regulations (2009).

15.3 Assessment Methodology and Significance Criteria

Relevant Elements of the Comprehensive Development

15.3.1 The following components of the Comprehensive Development are relevant to both the FDS Application and the Masterplan Application:

- Land uses within the Comprehensive Development in particular, sensitive uses such as residential properties and communal green spaces.

Scope of the Assessment

15.3.2 The assessment of potential soil and groundwater effects has been undertaken using the 'source-pathway-target contaminant linkage' concept, as introduced by the EPA 1990 (as amended), when assessing the risk posed by contaminated land. This is discussed in the Identification of Sensitive Receptors section below.

15.3.3 The scope of the ground conditions, hydrogeology and contamination assessment was agreed with LBS through submission of an EIA Scoping Report (see **Appendix 2.1**). In their Scoping Opinion (see **Appendix 2.2**) the Council agreed with the scope of work for the assessment of effects on ground conditions, hydrogeology and contamination.

15.3.4 The following have been included in the assessment of effects relating to ground conditions, hydrogeology and contamination presented within this Chapter:

- Assessment of the potential for contaminated soil and/or groundwater (source);
- Assessment of potential migration pathways within the saturated and unsaturated zones; and
- Potential effect of contaminated land on groundwater, end users, and other sensitive receptors.

15.3.5 Mitigation measures are also set out to counter any negative effects of the Comprehensive Development if required

Extent of the Study Area

15.3.6 For the PRA (**Appendix 15.1**) the search radius from the Site for potential contamination sources and sensitive receptors was set to 500m, with the exception of water abstractions and surface water features for which the radius was extended to 1km due to the sensitivity of these receptors.

15.3.7 Previous reports assessed the area of the FDS Application Soil Limited 13397/GIR February 2013 (Ref 15.2) and the area adjacent to the west of Beadenham Road Ground Engineering C11482B January 2014 (15.3).

Consultation

15.3.8 The Contaminated Land Officer (CLO) for LBS and the Environment Agency (EA) were contacted in order to obtain any environmentally pertinent information.

15.3.9 The Building Control Officer (BCO) for LBS was contacted in order to obtain any geotechnical pertinent information.

15.3.10 Both the London Underground Asset Search and Unexploded Ordnance Survey team were contacted to identify any underlying risks below the site that could arise during the development of the application sites.

Method of Baseline Data Collation

Desk Study

15.3.11 Baseline conditions for both the FDS and Masterplan Application sites have been identified through a desk study (**Appendix 15.1**). The desk study included the review of previous reports relating to the FDS Application and adjacent area of land, and historic environmental data comprising a Landmark Envirocheck report (Ref. 15.13) which includes regulatory information and historical mapping, geological mapping published by the British Geological Survey (BGS), BGS boreholes and the Environment Agency's website ('what's in your backyard').

Site Visit / Other Assessment

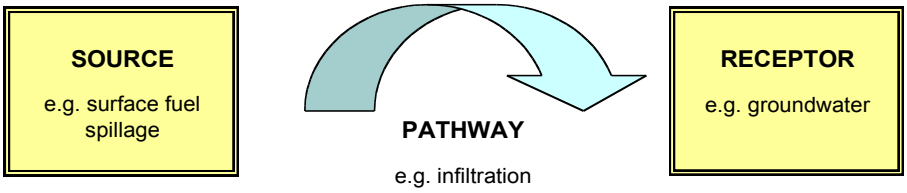
15.3.12 A site visit was undertaken by WSP on 20th June 2014 as part of the PRA which included a detailed summary of key observations, a photographic record and an annotated site plan. The key site observations comprised the general Site use; topography; vegetation; waste materials; on-site drainage and any additional observations such as the potential for asbestos containing materials and other sources of potential contamination.

Identification of Sensitive Receptors

15.3.13 The presence of contaminated materials on-site is generally only of concern if an actual or potentially unacceptable risk exists. The interpretation of a significant risk is presented within the EPA 1990 (Ref. 15.2). The potential for harm to occur requires three conditions to be satisfied:

- **Source**: the presence of potential contaminants / pollutants that may cause harm;
- **Pathway**: the existence of a linkage between the source and the receptor; and
- **Receptor**: the presence of a receptor which may be harmed, (e.g. the water environment or humans, building, fauna and flora).

15.3.14 Current UK guidance advocates the use of a conceptual risk assessment model. The three conditions listed above comprise the basis of this approach in that without each of the three elements (source, pathway and receptor) there can be no plausible contamination risk. Therefore, the presence of measurable concentrations of contaminants within the ground and subsurface environment does not automatically imply that contamination exists, since the contamination must be defined in terms of contaminant linkages and significant risk of harm. The conceptual model is illustrated as follows:



15.3.15 The nature and importance of both pathways and receptors, which are both relevant to a particular site. The pathways and receptors will vary according to the intended use of the Comprehensive Development including its characteristics and surroundings.

15.3.16 The assessment of potential effects as a result of the Comprehensive Development has taken into account the site preparation and earthworks, construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the Comprehensive Development, and the sensitivity of the affected receptor/receiving environment.

Assessment Modelling

15.3.17 There are no known published standard criteria for assessing the significance of effects that may arise from land contamination. Therefore the significance of effects has been qualitatively assessed using professional judgment and reference to relevant published guidance (including the Environment Agency's Contaminated Land Exposure Assessment (CLEA) science programme).

Significance Criteria

15.3.18 The assessment of potential effects as a result of the Comprehensive Development has taken into accounts both the construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the development proposals, and the sensitivity of the affected receptor / receiving environment to change, as well as a number of other factors that are outlined in more detail in **Chapter 2 'Approach to Assessment'** of this ES. Magnitude of change and the sensitivity of the affected receptor / receiving environment are both assessed on a scale of high, medium, low and negligible (as shown in **Table 2.2** in **Chapter 2 'Approach to Assessment'**).

Significance of Effects

15.3.19 The following terms have been used to define the significance of the effects identified:

- **Major effect:** where the Comprehensive Development could be expected to have a very significant effect (either positive or negative) on environmental resource or receptor;
- **Moderate effect:** where the Comprehensive Development could be expected to have a noticeable effect (either positive or negative) on environmental resource or receptor;
- **Minor effect:** where the Comprehensive Development could be expected to result in a small, barely noticeable effect (either positive or negative) on environmental resource or receptor;
- **Negligible:** where no discernible effect is expected as a result of the Comprehensive Development on environmental resource or receptor.

Limitations and Assumptions

15.3.20 Limitations are considered to be present in the extent of current data on which to inform detailed design for the Comprehensive Development and therefore further ground investigation and monitoring will be required. However for the purposes of this ES it is considered that there is sufficient baseline data on which to support the Planning Applications.

15.4 Baseline Conditions

Current Land Uses

15.4.1 The Site is currently developed with varying low to high rise blocks of residential flats of a varied construction. There are also associated areas of communal open green space, car parking, garages and park areas. A health centre and accommodation offices are also noted onsite. Other features on the Site were noted as:

- A cooling tower and potential associated boiler tanks located in the north-east of the Site;
- Potential underground storage tanks/interceptors located in the central eastern portion of the Site; and
- Numerous electricity sub-stations located across the Site.

15.4.2 Additional information was provided by LBS who noted that the pipework for the district heating system within the buildings on the Site was coated in asbestos insulation.

Surrounding Land Uses

15.4.3 The area surrounding the Site is predominantly residential with areas of parkland to the south (Burgess Park) and north-east (Surrey Square Park) and commercial units.

Historical Land Uses

On-Site

15.4.4 The majority of the Site comprises high density development of residential properties. The first historical map dated 1875 shows a development of what is assumed to be residential buildings some with gardens. The map dated 1896 shows a slightly different layout with additional housing developed on the site. The maps dated in 1973 shows the Site layout to change with assumed blocks of flats and communal areas. The Site is developed slightly but generally remains the same until the present day.

15.4.5 In 1948 a portion of the Site in the central area appears to have been cleared and in 1962 appears to have been developed on with blocks of properties. This is thought to have been associated with the WWII bombings that took place within this area.

15.4.6 Other features noted across areas of the Site have been detailed below:

15.4.7 In 1875 ‘Newington Workhouse’ located in the south-east of the Site was renamed in 1916 to ‘Newington Institution’. A mineral water works and church were also noted in the south of the Site. In 1952 the institution was named as a ‘Lodge’, in 1964 the church has been cleared and in 1974 the lodge was cleared to form residential properties;

15.4.8 In the north-east of the Site a floor cloth manufactory was noted in 1875 and was cleared in 1896, a school was noted in 1896 and cleared in 1951;

15.4.9 In the north-west of the Site in 1954 a waste paper works was noted and cleared to residential properties in 1966;

15.4.10 In 1875 a timber yard was located in the far north-western corner of the Site which was cleared in 1896; and

15.4.11 In the south-west of the Site a laundry building is noted in 1916 with a tank and chimney feature and in 1952 a playground. In 1960 the playground is cleared and forms Albany Road Garden, in 1973 the laundrette and garden area are no longer visible. In 1980 a playground and games court are noted.

15.4.12 The previous report undertaken by Ground Engineering C11482B January 2014 (Ref 15.3) comprised a desk study and identified a tributary of the River Thames (Earls Sluice) that flowed eastwards across the centre of the site and beyond which was culverted beneath the site during the mid-1800s. Therefore the tributary could run under both application sites either as an infilled channel or as a culvert.

Off Site

15.4.13 A review of the surrounding land uses located within 100m has been undertaken:

15.4.14 The majority of the surrounding area comprises high density development and redevelopment of residential housing from the first map dated 1875 until the present day

15.4.15 A school located outside the central western part of the Site is noted from 1896 and remains until the present day renamed in 1960 as Michael Faraday Primary School;

15.4.16 In the north north-west of the Site the map dated 1896 shows a builders yard located 30m, a school located 70m and a school located 50m from the Site. In 1916 the builder's yard was cleared and the school in the north extended towards the site. In 1954 the school was named a veterinary school. This is assumed to remain the same until the present day

15.4.17 To the south-west of the Site the map dated 1875 shows two wharf buildings located 20m, a stone yard located 90m, oil works located 40m, and a lime works 110m from the site. In 1896 the map shows the area to the south-west of the site to comprise numerous wharfs, an institute and the limeworks remains. The 1916 map shows a saltworks located where the institute stood and a mineral water works. In 1952 the map shows three wharfs remain, the mineral water works is named wine and mineral water works and the limeworks is cleared to a box factory. In 1960 the box factory is named factory, the wine and mineral water works is named works and the salt works is named Mill. One wharf remains. In 1975 the area comprises a warehouse and a depot and in 1995 two storage tanks are noted. In 1991 the area appears to be cleared and a scrap yard is present in 1993. The map for the present day shows the area to be part of Burgess Park with a raised area of ground located adjacent to the south of the site as part of a playground

15.4.18 To the south-eastern area of the Site a map dated 1875 a book binding works was identified and cleared in 1982 and a ginger beer manufactory was also noted. The map dated 1916 showed a mineral water works, both the water works and ginger beer manufacturers were cleared in 1952. The map dated 1952 shows the area to comprise a depot adjacent to the south of Site until the present day

15.4.19 The area to the north-east of the Site comprises residential properties including a school in 1896 50m east, a play area and a mound feature forming part of Surrey Square Park in 1984 located 30m east

15.4.20 To the north of the Site the map dated 1875 showed a timber ford 150m from the Site; and

15.4.21 To the west of the Site a tramway located 50m from the Site was noted from 1875 to 1960. A railway and station were located 150m from the site until the present day.

Ground Conditions

15.4.22 The British Geological Survey Map (BGS) 'South London' (sheet no. 270), published BGS borehole logs and previous ground investigations indicate the site is directly underlain Topsoil/Made Ground, the Langley Silts in the south-west of the site, and then the Kempton Park Gravels located beneath the entire site. Beneath which is the Lambeth Group, Thanet Sands and White Chalk.

15.4.23 The previous investigation undertaken by Soil Limited 13397/GIR February 2013 (Ref 15.2) located across the FDS Application site encountered the following ground conditions:

- Made Ground typically comprised concrete tarmac of gravelly sandy clay, clayey sand and sandy gravel with brick, rubble, cement, ash, wood, shell, ceramic, glass and roots. Maximum thickness encountered at 3.7metres below ground level (mbgl) and a typical thickness of 1.82m;
- Langley Silt Member slightly gravelly slightly sandy clay with ferruginous dark pockets. The base depths ranged between 1.9m to 4.5m bgl with a typical thickness of 1.34m;
- Kempton Park Gravel Formation gravelly sand and sandy clayey gravel with occasional sandy silty clay layers, with depths ranging from 5.5m and 7.3m bgl with a typical thickness of 4.04m;
- Lambeth Group comprising slightly sandy clay and slightly gravelly clayey sand. Base depths were from 8.0m to 11.0m bgl with typical thickness of 3.76m;
- Thanet Sand Formation comprising dense silty sand to 22.5m to 22.80m bgl and a typical thickness of 12.37m; and
- White Chalk group which comprised a structureless chalk of sandy gravelly clayey silt with flint gravel – weak and low to medium density, thickness not proven (25m to base of borehole).

15.4.24 The second investigation located adjacent to the west of the FDS Application by Ground Engineering C11482B January 2014 (Ref 15.3) encountered:

- Made Ground with evidence of slight contamination comprising ash and clinker; and
- The Langley Silts were encountered to a depth of between 1.6m and 2.8m. The Kempton Park Gravels basal depth was between 5.7m and 7.8mbgl. The Lambeth Beds had a base depth of 14m to 15.9mbgl and the Thanet Sands were encountered at a maximum depth of 24mbgl. The White Chalk was encountered to the base of the holes at 25m.

Contamination - Soil

15.4.25 The previous investigation undertaken by Soil Limited 13397/GIR February 2013 (Ref 15.2) identified the following contaminant concentrations within the Made Ground underlying the site.

15.4.26 The maximum concentrations were identified within WS5 located in south-east and BH4 located in central southern part of the site and comprised arsenic 79mg/kg (WS5), cadmium 22.2mg/kg (WS5), lead 8600mg/kg (WS5), benzo(a)anthracene 19mg/kg (BH4), chrysene 16.8mg/kg (BH4), benzo(a)flouranthene 18.5mg/kg (BH4), benzo(a)pyrene 14.6mg/kg (BH4), indeno(1,2,3-cd)anthracene 8.7mg/kg (BH4) and dibenzo(a,h)anthracene 1.42mg/kg (BH4).

15.4.27 Asbestos was not observed within the investigation however no asbestos analysis was completed and therefore the potential exists for Asbestos to be present within the Made Ground associated with demolition rubble from former buildings. LBS have also noted that the pipework for the district heating system was coated in asbestos insulation

15.4.28 A second investigation undertaken by Ground Engineering C11482B January 2014 (Ref 15.3) located adjacent to the west of the FDS Application concluded that lead posed an unacceptable risk to site users across the site within the Made Ground. However, it is understood that development of this site has taken place and that the entire site is now covered with either buildings or hardstanding.

15.4.29 Other issues noted in the report at the time, included the presence of Japanese Knotweed. However, it is understood that treatment of the Japanese Knotweed was carried out by a specialist contractor.

Hydrology / Hydrogeology

15.4.30 The EA Aquifer Maps divide the underlying strata in England and Wales into Principal and Secondary Aquifers and Unproductive Strata dependent upon their potential for potable water supply.

15.4.31 The map for the Site indicates that the natural strata underlying the Site are classed as follows:

- Langley Silts as an Unproductive Strata;
- Kempton Park Gravels, Lambeth Beds and Thanet Sands as Secondary (A) Aquifers; and
- White Chalk classified as a Principal Aquifer.

15.4.32 The Landmark Envirocheck, May 2014 (Ref. 15.13) identifies five groundwater abstractions within 1km of the site. The nearest abstraction was located 211m north of the site and is used for a variety of uses including commercial, industrial, drinking, cooking and washing. The site is not located within an EA Source Protection Zone (SPZ).

15.4.33 During the Soil Limited 13397/GIR February 2013 (Ref 15.2) groundwater strikes ranged from 4.5m bgl in the south-east to 7.8m bgl in the central southern portion of the site.

15.4.34 Two monitoring visits recorded the following groundwater: BH1; 4.71m – 4.72m bgl; BH4; 5.37m – 5.35m bgl; and BH6; 8.2m – 8.12m bgl.

15.4.35 The EA provided details on the general depth to groundwater. Within the superficial strata the groundwater was recorded at between 5m and 9m bgl in April 2010 and between 4m and 7m bgl in June 2007. This is assumed to be within the Kempton Park Gravels. In the bedrock geology, groundwater within the Thanet Sands was mapped at 12m bgl.

15.4.36 There are no surface water courses located within 1km of the site. Therefore, there were no identified licensed surface water abstractions located within 1km of the site.

15.4.37 However, it should be noted that a lake associated with Burgess Park is located 50m south of the site.

Contamination – Controlled Waters

15.4.38 Previous investigations Soil Limited 13397/GIR February 2013 (Ref 15.2) and Ground Engineering C11482B January 2014 (15.3) across the FDS Application and adjacent to the west of the site identified no significant impact to the underlying groundwater.

Ground Gas

15.4.39 Two visits for ground gas monitoring were undertaken on the FDS Application site , which were completed during the investigation undertaken by Soil Limited 13397/GIR February 2013 (Ref 15.2). The monitoring visits identified elevated levels of carbon dioxide (3.7% and 5.5%) and methane (2.2% and 3.0%).

15.4.40 The previous works carried out adjacent to the FDS Application, Ground Engineering C11482B January 2014 (15.3) classified the ground gas regime to be Characteristic Situation 1 or ‘Green’ classification of the NHBC traffic light system. This classification was determined from three monitoring visits.

15.4.41 It should be noted that supplementary monitoring visits will be required following the grant of planning permission but prior to redevelopment to confirm the ground gas regime at the site in accordance with guidance.

Regulatory Information

Landfills

15.4.42 There are five landfill/waste management facilities located within 500m of the site. The nearest landfill is located 45m south-west of the site and relates to inert waste (last input date December 1975). Two waste management facilities are located 293m licence issued April 2002 and 446m south-east licence surrendered March 1997 both accepted clinical and special wastes. Two waste transfer sites are located 315m south-east licenced operational March 1995 and 446m east licence lapsed 1988 and both accepted industrial wastes.

Contemporary Trade Entries

15.4.43 Of the three entries located on the site two are inactive and relate to a clothing and fabrics manufacturers and hospitals (Health Living Network). The active entry related to a domestic cleaning services located in the east of the site

15.4.44 There are thirteen entries within 100m of the site four of which are active and predominantly relate to commercial / light industrial.

Regulatory Responses / Surveys

15.4.45 Unexploded Ordnance Search (UXO) was completed by BACTEC International Limited dated 10th June 2014 (Ref 15.14) which identified the site to have mixed low to medium / high risk zone areas. The FDS Application comprises low risk areas across the majority of the site with the exception of a small area in the north which has been classed as medium to high. The Masterplan Application is predominantly low risk in the central area with a portion in the east classified as medium to high risk. As part of the low to high assessment it has been recommended by BACTEC that in the low risk zones a safety awareness briefing is conducted to all members working on the site. For medium and medium to high zones an explosive ordnance disposal engineer should be present onsite to support shallow intrusive works as well as an intrusive magnetometer survey of all locations of works to maximum bomb penetration depth.

15.4.46 London Underground asset search has confirmed that there are no London Underground tunnels in the vicinity of the site area.

15.4.47 The Contaminated Land Officer (CLO) at LBS has been contacted with regard to obtaining environmentally pertinent information for the site. The Officer confirmed that there are no plans to undertake any investigation under Part II A. The Officer also stated that there is no record of landfill waste on the site. Historical uses on the site were recorded as a timber yard, light industry, works, a saw mill, public conveniences and that there is also a history of fly tipping. It has been identified that there are no pollution incidents within 500m of the site, no prescribed processes, and no premises registered under the radioactive substances act, hazardous substances or a waste management licence. It was noted that an area adjacent to the south of the site, known as Burgess Park, was formerly used for industrial works including lime works, whitening works and a tannery. The area was reported to have recently been investigated and remediated. No further information was been provided.

15.4.48 The Building Control Officer (BCO) at LBS has been contacted with regard to obtaining geotechnical pertinent information for the site. The Building Control Officer stated that a previous ground investigation was conducted on part of the site by Ground Engineering. The Officer stated that the depth of the Made Ground was approximately to 2.0m below ground level and was underlain by the Kempton Park Gravels to approximately 6.0m bgl and the Lambeth Group. Due to the shallow depths of the Kempton Gravels pad and piled foundations were considered appropriate

15.4.49 The Environment Agency was contacted with regard to obtaining additional environmentally pertinent information. The Environment Agency reported one historic landfill, in relation to 'Old Canal Filling' located 45m south of the site, with a last input dated recorded as December 1975 and was for inert waste. There are no category 1 or 2 pollution incidents within 500m of the site, and no abstraction licences. WSP note that five

groundwater abstractions have been identified within the Envirocheck report within 500m of the site. Groundwater depths were provided and noted that within the superficial deposits groundwater was encountered at 5m and 9m bgl in April 2010 and at 4m and 7m bgl in June 2007. The groundwater is assumed to be within the Kempton Park Gravels. The groundwater within the Thanet Sands was mapped at 12m bgl.

15.4.50 Full copies of the UXO report and regulatory correspondence can be found within the PRA report (**Appendix 15.1**)

Geotechnical Issues

Radon

15.4.51 The ground conditions are considered by the Health Protection Agency to be in an intermediate probability radon area as between 1 and 3% of homes are above the action level. However it has been stated that no radon protective measures are necessary in the construction of new dwellings or extensions.

15.4.52 Geotechnical issues that may be encountered on the Site include:

- The presence of a significant/variable thickness of Made Ground across the site;
- The potential for large obstructions within the Made Ground from the former and current piled foundations, potential basements and service trenches;
- The potential for shallow groundwater is likely to be within the Kempton Park Gravels. Previous investigations encountered groundwater between 4.7m to 8.2m bgl with the FDS Application, however there is the potential for the Masterplan Application to encounter shallow Kempton Park Gravels and therefore shallow groundwater;
- Compressible ground from the presence of any fill/ Made Ground present across the majority of the site and the Langley Silt Formation in the south-west of the site (within the FDS Application); and
- Aggressive ground conditions from the Made Ground. Previous Investigations Soil Limited 13397/GIR February 2013 (Ref 15.2) and Ground Engineering C11482B January 2014 (15.3) identified DS-2 and ACEC AC2.

Foundation Design

15.4.53 It is likely that the majority of the Comprehensive Development will be supported by piled foundations within the Kempton Park Gravels and for heavy loads within the Lambeth Beds and Thanet Sands.

15.4.54 The previous investigations, Soil Limited 13397/GIR February 2013 (Ref 15.2) and Ground Engineering C11482B January 2014 (15.3), have identified a CBR value of 1% - 3% for road pavements.

Contaminant Linkages

15.4.55 Existing and potential sources of contamination include:

FDS Application

- Made Ground from former and current developments;
- Potential for WW II UnexplodedOrdnance ;
- Potentially infilled / culverted tributary;
- Numerous electricity sub-stations;
- Former land uses including tank features, a chimney and laundry building; and
- Asbestos containing materials (ACM) associated with demolition rubble from former buildings and asbestos insulation on the district heating pipework.

Masterplan Application

- Made Ground from former and current development of the site;
- Potential for WWII Unexploded Ordnance;
- Potential for underground storage tanks / interceptors;
- Numerous electricity sub-stations;
- Cooling tower and potential associated boiler tanks;
- Potentially infilled / culverted tributary;
- Former land uses including works buildings relating to mineral water works, waste paper works, a floor cloth manufacturers and a timber yard; and
- ACMs associated with demolition rubble from former buildings and asbestos insulation on the district heating pipework.

15.4.56 Pathways for contamination migration include:

- Inhalation of volatile vapours/ground gases, dust/particulates;
- Dermal contact with soil, surface water and groundwater;
- Ingestion of soil and home grown produce (including attached soil) – although considered to be unlikely as a result of no private gardens;
- Ingress into potable water supply pipes; and
- Migration through the underlying geology and hydrogeology.

15.4.57 Receptors for migrating contamination include:

- Human Health Future site users (predominantly including residential end users), including the construction and maintenance workforce; and
- Controlled Waters, including the Secondary (A) and Principal Aquifers underlying the site.

Sensitivity Analysis

15.4.58 Future site users (predominantly residential, but commercial and construction and maintenance workers), nearby residential properties and the underlying Secondary (A) Aquifers are considered to be the most significant receptors to contamination.

15.4.59 Potential sources of contamination have been identified on-site and relate to the former and current redevelopment of the site, the potential presence for unexploded ordnance, numerous electricity sub-stations and former historical land uses. There is also the potential for a culverted tributary which could have been infilled located across the site however this has not shown on any historical maps. Potential below ground tanks / interceptors and cooling tower with potentially associated boiler tank area also located in the north/north-east of the outline application site.

15.4.60 Previous reports have identified impacted Made Ground within the area of the FDS Application however this is not considered to represent a significant risk due to the proposed redevelopment of the site providing appropriate remediation measures are followed.

15.4.61 The primary off-site sources relate to the former commercial and light industrial use predominantly in the south of the site which include wharfs, a builders yard, a stone yard, lime works, salt works and wine and mineral water works. Other factories, a depot and works buildings were also identified with associated tanks and chimneys. The surrounding area, within 500m is now redeveloped to predominantly residential properties and park land and is therefore not considered to represent a significant risk to future development.

15.4.62 The conclusion of the baseline condition against which the effect of the Comprehensive Development will be assessed is that the Site is considered to be of moderate sensitivity.

Future Baseline

15.4.63 If the Comprehensive Development were not to proceed then it is anticipated that no further contamination would occur within the soils. However, due to presence of the impacted Made Ground underlying the FDS site and potentially underlying the wider site area this could potentially leach into the underlying groundwater.

15.5 Assessments of Effects, Mitigation and Residual Effects

Demolition and Construction

Site Wide Development Option

Effect of Exposure to Contamination and Geotechnical Hazards on Construction Staff

15.5.1 Construction workers may be exposed to contaminants that are present in the Made Ground or perched groundwater during earthworks exercises or general excavations. An intrusive investigation was undertaken by Soil Limited 13397/GIR February 2013 (Ref 15.2) (located within the FDS Application) which identified impacted Made Ground with elevated concentrations of metals and hydrocarbon contaminants. The concentrations could pose a risk to construction workers health through dermal contact, inhalation and ingestion. It is assumed that the Made Ground across the wider Comprehensive Development will comprise similar ground conditions.

15.5.2 There is a risk to construction workers from unexploded ordnance beneath the site. The level of risk at the site has been identified by BACTEC as between low to low / medium.

15.5.3 There is the possibility that asbestos could be within the fabric of the building and within the underlying Made Ground (comprising former building rubble). Is has also been reported by LBS that there is asbestos insulation surrounding the district heating pipework. This could result in a potential inhalation risk to construction staff where the ground or structures are disturbed.

15.5.4 Construction workers may be affected by inhalation of ground gases (resulting in asphyxiation) in particular while working in confined spaces. This is considered to be a low risk however elevated gas readings were noted within the FDS Application (Soil Limited 13397/GIR February 2013 (Ref 15.2)). The gas results were inconclusive due to a limited amount of monitoring visits and therefore may be elevated across the wider Comprehensive Development.

15.5.5 The length of time of direct exposure will be limited to the duration of site works in which construction workers are directly involved. Any health effects from potential contamination could have a medium to long term effect.

15.5.6 There is a risk from ground stability issues during construction particularly in the case of the Made Ground, which could be of variable engineering strength and may result in settlement and/or subsidence either at surface or along its banked slopes under additional loading during the construction works or given the extra weight that may be applied by any plant vehicles.

15.5.7 Should an earthworks exercise be required whereby site won material from development arisings are to be re-used, there is a geotechnical risk in relation to earthworks failure if unsuitable engineering material is used, resulting in damage to property.

15.5.8 It is assumed that the underlying groundwater is not impacted due to previous investigations identifying no contamination risk on the FDS Application located adjacent to the south-west by Soil Limited 13397/GIR February 2013 (Ref 15.2). However there may still be the potential for perched groundwater to be present within the Made Ground which may have been impacted by soil contamination.

15.5.9 The sensitivity of construction and maintenance workers is high and the magnitude of change prior to any required mitigation is high. Therefore, there is likely to be a direct, temporary, short term effect on construction and maintenance workers of **major negative** significance prior to the implementation of mitigation measures.

Mitigation

15.5.10 An intrusive ground investigation should be carried out across the wider site area to determine the underlying ground conditions and identify any contamination.

15.5.11 Effects to the health of construction workers and the general public from potentially contaminated soils and materials will be controlled under the Construction (Design & Management) Regulations 2007 (Ref: 15.15)

15.5.12 The risk from unexploded ordnance during construction and demolition can be mitigated by completing safety awareness briefings to all members working on the site in low risk areas (as per the recommendations made in the BACTEC July 2014 report). For medium and medium to high zones an explosive ordnance disposal engineer should be present onsite to support shallow intrusive works as well as an intrusive magnetometer survey of all locations of works to maximum bomb penetration depth.

15.5.13 Where necessary, construction workers will be required to wear personal protective equipment (PPE) and Respiratory Protective Equipment (RPE), such as gloves and dust and ventilation masks to prevent dermal contact and inhalation or ingestion of contaminants. Appropriate site hygiene and welfare facilities will be provided as per relevant regulations.

15.5.14 The associated hazards of handling potentially contaminated materials will be conveyed to all site workers and all works will be conducted in accordance with the Health and Safety Executive publication entitled ‘Protection of Workers and the General Public during the Development of Contaminated Land’ (1991) (Ref 15.16).

15.5.15 Water/dust suppressant should be sprayed onto material being worked particularly in the Made Ground and during any earthworks exercise to damp down any (potentially contaminated) dust and prevent it from becoming airborne.

15.5.16 Given the health risks from coming into contact with contaminated perched water within the Made Ground and water ingress into excavations that could cause physical risks (e.g. excavation collapse), consideration should be given to implementing temporary surface water drainage or dewatering during construction to ensure water is directed away from excavations.

15.5.17 Care will have to be taken when working around or in excavations, with workers having appropriate training such as confined space training as appropriate. Excavations should be confirmed as being stable and shored up where necessary before anyone is allowed to enter them.

15.5.18 A stability assessment will need to be made of any ground that is to be moved at the detailed design stage, with consideration given to the extra weight that may be applied by any plant vehicles, or under additional loading during the construction works.

15.5.19 The geotechnical risk associated, if an earthworks exercise were to be carried out from site won material, will be mitigated through the further site investigation supplemented with field and laboratory testing to confirm suitability in accordance with an Earthworks Specification.

15.5.20 As part of any proposed earthworks movements it will be ensured that the re-use of site-won material will be of both chemical and engineering suitability for its use. This will be completed in accordance with a Remediation Method Statement and Earthworks Specification respectively to ensure accordance with the design.

15.5.21 If asbestos containing materials are identified then they will be removed as part of the enabling works in accordance with the Control of Asbestos Regulations 2012 (Ref. 15.17) to ensure the potential risks are appropriately managed.

15.5.22 A watching brief would be implemented during the excavation to ensure that any unexpected contamination within the Made Ground or at any other location across the site is rapidly identified, risk assessed and dealt with appropriately.

15.5.23 Should additional contamination hotspots be identified within proposed soft landscaped areas during the site investigation prior to construction, these will either be remediated in line with the agreed Remediation Strategy or a cover layer of material suitable for the proposed end use will be imported or formed from site won materials. All remaining areas will either be covered by buildings or hardstanding. Therefore, there is unlikely to be a health risk via direct contact to future site occupants.

15.5.24 A Materials Management Plan will be prepared prior to commencement on site to document and track the movement of material across the site and material removed off-site. Stockpile management will need to be controlled by the contractor and fugitive dust emissions are to be prevented through the damping down of stockpiles or the use of sheeting. It will also be ensured that disposal of unsuitable material will be undertaken in accordance with Duty of Care procedures.

15.5.25 An approved Construction Environmental Management Plan (CEMP) will be implemented taking into account relevant good site practice with respect to the handling of potentially contaminated material, which will be enforced and monitored throughout the construction phase.

Residual Effects

15.5.26 The sensitivity of construction and maintenance workers is high and the magnitude of change, following any required mitigation, is low. Therefore, there is likely to be a direct, temporary, short term effect on construction and maintenance workers of **negligible to low** significance following the implementation of mitigation measures.

Effect of Contamination on Potable Water Supply

15.5.27 There are public water mains on site associated with the existing residential flats located across the site.

15.5.28 Where present, the potable water supply on site could be affected by direct contact with contaminants, or by contaminants migrating into plastic water supply pipes through service trenches. Some contaminants identified as being present on site have the ability to migrate through plastic pipes, and others are able to degrade plastics.

15.5.29 The sensitivity of potable water supply is high and the magnitude of change, prior to any required mitigation, is medium. Therefore, there is likely to be a direct, permanent, long term effect on potable water supply of **moderate negative** significance prior to the implementation of mitigation measures.

Mitigation

15.5.30 Guidance detailed in the UK Water Industry Research (UKWIR): Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (UKWIR 2010) (Ref. 15.18) will be adhered to during the redevelopment of the Site and it may be necessary to adopt barrier type pipe materials which prevent contaminant ingress and to backfill service corridors with clean imported material. However this will not apply to potable water supply pipes currently installed on Site that may be utilised by construction workers which may or may not be constructed with permeable pipe materials.

15.5.31 Further site investigation works are to be undertaken prior to construction to ensure that all potential contamination risks associated with water supply are adequately mitigated in accordance with the UKWIR guidance.

15.5.32 Potable water supply used by workers during construction will be connected to the existing network. There may be a temporary arrangement of water supply until site infrastructure has been implemented in accordance with UKWIR guidance, however until this time any water supply will avoid known or encountered areas of contamination.

15.5.33 It is anticipated that site-won material will be re-used as fill or to raise levels across the site for the purposes of the development. Any site won material will be confirmed as not containing substances at concentrations which would represent a risk to human health or controlled water receptors.

Residual Effects

15.5.34 The sensitivity of potable water supply is high and the magnitude of change, following any required mitigation, is low. Therefore, there is likely to be a direct, permanent, long term effect on potable water supply of **negligible** significance following the implementation of mitigation measures.

Effect on Third Party Occupants and Properties

15.5.35 Works that disturb or entail removal of Made Ground will potentially release contaminants to the atmosphere (e.g. contaminated dust, asbestos fibres), or will encourage migration of contaminants through groundwater by creating new preferential pathways.

15.5.36 Third party occupants particularly surrounding the site could be affected by contact with contamination, such as direct contact with soil and groundwater, and inhalation of air-borne contamination in the absence of appropriate mitigation measures. Any health effects from the possible contaminants could have a medium to long term effect.

15.5.37 The sensitivity of third party occupants and properties is high and the magnitude of change, prior to any required mitigation, is medium. Therefore, there is likely to be a direct, temporary short term effect on third party occupants and properties of **moderate to major negative** significance prior to the implementation of mitigation measures.

Mitigation

15.5.38 Water/surfactant will be sprayed onto material being worked to damp down any potentially contaminated dust and prevent it from becoming airborne. Temporary surface water drainage and vehicle wheel washes will further reduce the risk of dust generation.

15.5.39 Any asbestos containing materials that are identified on Site should be removed prior to demolition in accordance with the Control of Asbestos Regulations 2012 to ensure the potential risks are appropriately managed.

15.5.40 Precautions should also be taken while transporting excavated materials off-site to ensure that any risk of fugitive dust emissions are prevented, such as the sheeting of wagons.

15.5.41 Construction phase air monitoring may be required to check the effectiveness of damping down of the dust on Site, along with other environmental controls such as temporary surface water drainage and vehicle wheel washes etc. Vehicle movements will be restricted to an agreed travel plan and construction activities will be undertaken during standard working hours.

15.5.42 All site works will be undertaken in accordance with the Environment Agency Pollution Prevention Guidance Note 6 “Working at Construction and Demolition Sites” (Ref. 15.19) and also the CEMP.

Residual

15.5.43 The sensitivity of third party occupants and properties is high and the magnitude of change, following any required mitigation, is negligible. Therefore, there is likely to be a direct temporary short term effect on third party occupants and properties of **negligible** significance following the implementation of mitigation measures.

Effect on groundwater in the Secondary (A) and Principal Aquifers

15.5.44 The site is underlain by the Kempton Park Gravels, Lambeth Group and Thanet Sands which are all classified as Secondary (A) Aquifers underlying which is the White Chalk classified as a Principal Aquifer.

15.5.45 The Made Ground has the potential to be impacted which may leach in to any perched groundwater or into the underlying Secondary (A) Aquifer of the Kempton Park Gravels.

15.5.46 The process of the removal of soil cover/hardstanding on areas of Made Ground during construction and opening up of excavations, introduces the potential for temporary direct water ingress into the Made Ground which could increase contaminant migration from perched groundwater into the Secondary (A) Aquifers.

15.5.47 The Comprehensive Development is likely to require a piled foundation solution. The piling could create a vertical pathway into the underling Secondary (A) Aquifer from the perched groundwater above.

15.5.48 Given the excavation and opening up of ground surface layers on the areas of Made Ground there is the potential for an increased flux of infiltration and lateral movement of perched groundwater flushing through contamination. There may also be ingress of surface water into excavations that will need to be controlled to reduce potential for direct infiltration.

15.5.49 The sensitivity of Secondary (A) and Principal Aquifers is high and the magnitude of change, prior to any required mitigation, is medium. Therefore, there is likely to be a direct, temporary, medium to long term effect of on the Secondary (A) and Principal Aquifers of **moderate to major negative** significance prior to mitigation.

Mitigation

15.5.50 Removal of the surface of the site should be delayed until as late as possible during the enabling/earthworks and, if possible, undertaken during seasonally drier periods of the year.

15.5.51 A system should be put in place to ensure dewatering of excavations and prevention of surface infiltration from ground surface. The dewatering should be discharged to foul sewer under consent with Thames Water or, if generated in small enough quantities, could be temporarily stored on site in holding tanks prior to disposal off site, or re-use as part of on-going operations (e.g. re-use for damping down areas to prevent dust generation if uncontaminated). Pre-treatment may be required to ensure that solids have been filtered out and that organic and inorganic constituents have been removed.

15.5.52 Testing of the perched groundwater within the Made Ground will be undertaken to determine any elevated contaminants that pose a risk to human health or that could migrate into the controlled waters.

15.5.53 A watching brief should be employed to identify the presence of any seepages within the Made Ground during the construction works and a system put in place to control and manage the flow such as a cut-off trench and dewatering.

15.5.54 During any piling through the Made Ground then consideration will be given to the use of clean drilling techniques and the avoidance of creating vertical pathways into natural strata beneath.

15.5.55 Recommendations outlined above should be documented within the CEMP, and should be followed to ensure good working procedures and good housekeeping.

Residual effects

15.5.56 The sensitivity of the Secondary (A) and Principal Aquifers is high and the magnitude of change, following mitigation, is negligible to low. Therefore, there is likely to be a direct, temporary, medium to long term effect on groundwater in the Secondary (A) and Principal Aquifers of **negligible to minor negative** significance following the implementation of mitigation measures.

Effect of construction plant/processes to Controlled Waters

15.5.57 Potential for contaminants associated with construction plant, construction operations, materials (e.g. fuels) run-off from stockpiled material may have the potential to effect on the soil and controlled waters at the Site. Due to the presence of the Secondary (A) Aquifer there is a potential for construction operations to create a contaminant pathway effecting the groundwater. Due to the cohesive cover of the remaining underlying strata further migration to the Principal Aquifer is considered to be limited. The primary mechanism for this is through local spillages and leaks from construction plant. The significance of the effect would be a direct, permanent medium term, effect of **moderate negative** significance.

15.5.58 The sensitivity of construction plant/processes to controlled waters is high and the magnitude of change, prior to any required mitigation, is medium. Therefore, there is likely to be a direct, permanent, medium to long term effect to construction plant/processes to controlled waters of **moderate negative** significance prior to mitigation.

Mitigation

15.5.59 To prevent effects on the underlying soils and controlled waters by construction plant, operations and materials, all fuels, oils and chemicals must be stored in appropriate containers within a bunded compound in accordance with the Environment Agency's Pollution Prevention Guidance Note 6 "Working at Construction and Demolition Sites" (Ref. 15.19). This will mitigate the potential from accidental spills. Recommendations presented in any construction environmental management plan prepared for the Comprehensive Development should be implemented to ensure good working procedures and good housekeeping. In addition during construction works any potentially contaminated water could be discharged under consent to sewer (which may need treatment) or, if generated in small enough quantities, could be temporarily stored on site in holding tanks prior to disposal off-site, or re-use as part of on-going operations (e.g. re-use for damping down areas to prevent dust generation if uncontaminated).

Residual Effects

15.5.60 The sensitivity of construction plant/processes to controlled waters is high and the magnitude of change, following mitigation, is negligible to low. Therefore, there is likely to be a direct, temporary, medium term effect of construction plant/processes to controlled waters of **negligible** significance following the implementation of mitigation measures.

FDS Development Option

Effect of Exposure to Contamination and Geotechnical Hazards on Construction Staff

15.5.61 Construction workers may be exposed to contaminants that are present in the Made Ground or perched groundwater during earthworks exercises or general excavations. Previous investigations undertaken by Soil Limited 13397/GIR February 2013 (Ref 15.2) and Ground Engineering C11482B January 2014 (15.3) have identified impacted Made Ground with elevated contractions of metals and hydrocarbon contaminants that could pose a risk to construction workers health through dermal contact, inhalation and ingestion.

15.5.62 Although asbestos has not been identified within the Soil Limited report 13397/GIR February 2013 (Ref 15.2). There is still the possibility that asbestos could be within the fabric of buildings and within the underlying Made Ground (comprising former building rubble). It has been reported by LBS that there is asbestos insulation surrounding the district heating pipework. This could result in a potential inhalation risk to construction staff where the ground or structures are disturbed.

15.5.63 There is a risk to construction workers from unexploded ordnance beneath the site. The level of risk at the site has been identified by BACTEC as either low or medium

15.5.64 Construction workers may be affected by inhalation of ground gases (resulting in asphyxiation) in particular while working in confined spaces. This is considered to be a low risk however elevated gas readings were noted within the FDS Application (Soil Limited (13397/GIR February 2013). The gas results were inconclusive due a limited amount of monitoring visits and therefore may be elevated in area that pose an unacceptable risk to construction staff.

15.5.65 The length of time of direct exposure will be limited to the duration of site works in which construction workers are directly involved. Any health effects from potential contamination could have a medium to long term effect.

15.5.66 There is a risk from ground stability issues during construction particularly in the case of the Made Ground which could be of variable engineering strength and may result in settlement and/or subsidence either at surface or along its banked slopes under additional loading during the construction works or given the extra weight that may be applied by any plant vehicles.

15.5.67 Should any earthworks be required at the site whereby site-won material from development arisings are to be re-used. There is a geotechnical risk in relation to earthworks failure if unsuitable engineering material is used, resulting in damage to property.

15.5.68 No impact to underlying groundwater was identified during Soil Limited 13397/GIR February 2013 (Ref 15.2) and Ground Engineering C11482B January 2014 (15.3). However, caution should still be made. Perched groundwater could also be present within the Made Ground which may have been impacted by soil contamination.

15.5.69 The sensitivity of construction and maintenance workers is high and the magnitude of change prior to any required mitigation is high. Therefore, there is likely to be a direct, temporary, short term effect on construction and maintenance workers of **major negative** significance prior to the implementation of mitigation measures.

Mitigation

15.5.70 Effects to the health of construction workers and the general public from potentially contaminated soils and materials will be controlled under the Construction (Design & Management) Regulations 2007 (Ref: 15.15)

15.5.71 The risk from unexploded ordnance during construction and demolition can be mitigated by completing safety awareness briefings to all members working on the site in low risk areas (as per the recommendations made in the BACTEC July 2014 report). For medium risk zones an explosive ordnance disposal engineer should be present onsite to support shallow intrusive works as well as an intrusive magnetometer survey of all locations of works to maximum bomb penetration depth.

15.5.72 Where necessary, construction workers will be required to wear PPE and RPE, such as gloves and dust and ventilation masks to prevent dermal contact and inhalation or ingestion of contaminants. Appropriate site hygiene and welfare facilities will be provided as per relevant regulations.

15.5.73 The associated hazards of handling potentially contaminated materials will be conveyed to all site workers and all works will be conducted in accordance with the Health and Safety Executive publication entitled 'Protection of Workers and the General Public during the Development of Contaminated Land' (1991) (Ref 15.16)

15.5.74 Water/dust suppressant should be sprayed onto material being worked particularly in areas of Made Ground and during the earthworks exercise to damp down any (potentially contaminated) dust and prevent it from becoming airborne.

15.5.75 Given the health risks from coming into contact with contaminated perched water within Made Ground and water ingress into excavations that could cause physical risks (e.g. excavation collapse), consideration should be given to implementing temporary surface water drainage or dewatering during construction to ensure water is directed away from excavations.

15.5.76 Care will have to be taken when working around or in excavations, with workers having appropriate training such as confined space training as appropriate. Excavations should be confirmed as being stable and shored up where necessary before anyone is allowed to enter them.

15.5.77 A stability assessment will need to be made of any ground that is to be moved at the detailed design stage, with consideration given to the extra weight that may be applied by any plant vehicles, or under additional loading during the construction works.

15.5.78 The geotechnical risk associated with a cut and fill exercise from site won material, will be mitigated through the further site investigation supplemented with field and laboratory testing to confirm suitability in accordance with an Earthworks Specification.

15.5.79 As part of any proposed earthworks movements it will be ensured that the re-use of site-won material will be of both chemical and engineering suitability for its use. This will be completed in accordance with a Remediation Method Statement and Earthworks Specification respectively to ensure accordance with the design.

15.5.80 If asbestos containing materials are identified then they will be removed as part of the enabling in accordance with the Control of Asbestos Regulations 2012 (Ref. 15.17) to ensure the potential risks are appropriately managed.

15.5.81 A watching brief would be implemented during the excavation to ensure that any unexpected contamination within the Made Ground or at any other location across the site is rapidly identified, risk assessed and dealt with appropriately.

15.5.82 Should additional contamination hotspots be identified within proposed soft landscaped areas during the site investigation prior to construction, these will either be remediated in line with the agreed Remediation Strategy or a cover layer of material suitable for the proposed end use will be imported or formed from site won

materials. All remaining areas will either be covered by buildings or hardstanding. Therefore, there is unlikely to be a health risk via direct contact to future site occupants.

15.5.83 A Materials Management Plan will be prepared prior to commencement on site to document and track the movement of material across the site and material removed off-site. Stockpile management will need to be controlled by the contractor and fugitive dust emissions are to be prevented through the damping down of stockpiles or the use of sheeting. It will also be ensured that disposal of unsuitable material will be undertaken in accordance with Duty of Care procedures.

15.5.84 A CEMP will require implementation taking into account relevant good site practice with respect to the handling of potentially contaminated material, which will be enforced and monitored throughout the construction phase.

Residual Effects

15.5.85 The sensitivity of construction and maintenance workers is high and the magnitude of change, following any required mitigation, is low. Therefore, there is likely to be a direct, temporary, short term effect on construction and maintenance workers of **negligible to low** significance following the implementation of mitigation measures.

Effect of Contamination on Potable Water Supply

15.5.86 There are public water mains on site associated with the residential flats located across the site.

15.5.87 Where present, the potable water supply on site could be affected by direct contact with contaminants, or by contaminants migrating into plastic water supply pipes through service trenches. Some contaminants identified as being present on site have the ability to migrate through plastic pipes, and others are able to degrade plastics.

15.5.88 The sensitivity of potable water supply is high and the magnitude of change, prior to any required mitigation, is medium. Therefore, there is likely to be a direct, permanent, long term effect on the potable water supply of **moderate negative** significance prior to the implementation of mitigation measures.

Mitigation

15.5.89 Guidance detailed in the UK Water Industry Research (UKWIR): Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (UKWIR 2010) (Ref. 15.18) will be adhered to during the redevelopment of the Site and it may be necessary to adopt barrier type pipe materials which prevent contaminant ingress and to backfill service corridors with clean imported material. However this will not apply to potable water supply pipes currently installed on Site that may be utilised by construction workers which may or may not be constructed with permeable pipe materials.

15.5.90 Further site investigation works are to be undertaken prior to construction to ensure that all potential contamination risks associated with water supply are adequately mitigated in accordance with the UKWIR guidance.

15.5.91 Potable water supply used by workers during construction will be connected to the existing network. There may be a temporary arrangement of water supply until site infrastructure has been implemented in accordance with UKWIR guidance, however until this time any water supply will avoid known or encountered areas of contamination.

15.5.92 It is anticipated that site-won material will be re-used as fill or to raise levels across the site for the purposes of the development. Any site-won material will be confirmed as not containing substances at concentrations which would represent a risk to human health or controlled water receptors.

Residual Effects

15.5.93 The sensitivity of potable water supply is high and the magnitude of change, following any required mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long term effect on potable water supply of **negligible** significance following the implementation of mitigation measures.

Effect on Third Party Occupants and Properties

15.5.94 Works that disturb or entail removal of Made Ground will potentially release contaminants to the atmosphere (e.g. contaminated dust, asbestos fibres), or will encourage migration of contaminants through groundwater by creating new preferential pathways.

15.5.95 Third party occupants particularly surrounding the site could be affected by contact with contamination, such as direct contact with soil and groundwater, and inhalation of air-borne contamination in the absence of appropriate mitigation measures. Any health effects from the possible contaminants could have a medium to long term effect.

15.5.96 The sensitivity of third party occupants and properties is high and the magnitude of change, prior to any required mitigation, is medium. Therefore, there is likely to be a direct, temporary short term effect on third party occupants and properties of **moderate to major negative** significance prior to the implementation of mitigation measures.

Mitigation

15.5.97 Water/surfactant will be sprayed onto material being worked to damp down any potentially contaminated dust and prevent it from becoming airborne. Temporary surface water drainage and vehicle wheel washes will further reduce the risk of dust generation.

15.5.98 Any asbestos containing materials that are identified on Site should be removed prior to demolition in accordance with the Control of Asbestos Regulations 2012 to ensure the potential risks are appropriately managed.

15.5.99 Precautions should also be taken while transporting excavated materials off-Site to ensure that any risk of fugitive dust emissions are prevented, such as the sheeting of wagons.

15.5.100 Construction phase air monitoring may be required to check the effectiveness of damping down of the dust on Site, along with other environmental controls such as temporary surface water drainage and vehicle wheel washes etc. Vehicle movements will be restricted to an agreed travel plan and construction activities will be undertaken during standard working hours.

15.5.101 All site works will be undertaken in accordance with the Environment Agency Pollution Prevention Guidance Note 6 “Working at Construction and Demolition Sites” (Ref. 15.19) and also the CEMP.

Residual

15.5.102 The sensitivity of third party occupants and properties is high and the magnitude of change, following any required mitigation, is negligible. Therefore, there is likely to be a direct, temporary, short term effect on third party occupants and properties of **negligible** significance following the implementation of mitigation measures.

Effect on groundwater in the Secondary (A) and Principal Aquifers

15.5.103 The site is underlain by the Langley Silt Formation in the south-west of the site which is classified as an Unproductive Strata which is considered to represent a low risk. However, beneath the Langley Silts are the Kempton Park Gravels, Lambeth Group and Thanet Sands which are all classified as Secondary (A) Aquifers underlying which is the White Chalk classified as a Principal Aquifer.

15.5.104 The Made Ground has been identified to be impacted with contamination however this has not been identified to leach in to the underlying groundwater. There is the potential for the impacted Made Ground to leach in to any perched groundwater or into the underlying Secondary (A) Aquifer of the Kempton Park Gravels.

15.5.105 The process of the removal of soil cover/hardstanding on areas of Made Ground during construction and opening up of excavations, introduces the potential for temporary direct water ingress into the Made Ground which could increase contaminant migration from perched groundwater into the Secondary (A) Aquifers.

15.5.106 The Comprehensive Development is likely to require a piled foundation solution. The piling could create a vertical pathway into the underling Secondary (A) Aquifer from the perched groundwater above.

15.5.107 Given the excavation and opening up of ground surface layers on the areas of Made Ground there is the potential for an increased flux of infiltration and lateral movement of perched groundwater flushing through contamination. There may also be ingress of surface water into excavations that will need to be controlled to reduce potential for direct infiltration.

15.5.108 The sensitivity of Secondary (A) and Principal Aquifers is high and the magnitude of change, prior to any required mitigation, is medium. Therefore, there is likely to be a direct, temporary, medium to long term effect on the Secondary (A) and Principal Aquifers of **moderate to major negative** significance prior to mitigation.

Mitigation

15.5.109 Removal of the surface of the site should be delayed until as late as possible during the enabling/earthworks and, if possible, undertaken during seasonally drier periods of the year.

15.5.110 A system should be put in place to ensure dewatering of excavations and prevention of surface infiltration from ground surface. The dewatering should be discharged to foul sewer under consent with Thames Water or, if generated in small enough quantities, could be temporarily stored on site in holding tanks prior to disposal off site, or re-use as part of on-going operations (e.g. re-use for damping down areas to prevent dust generation if uncontaminated). Pre-treatment may be required to ensure that solids have been filtered out and that organic and inorganic constituents have been removed.

15.5.111 Testing of the perched groundwater within the Made Ground will be undertaken to determine any elevated contaminants that pose a risk to human health or that could migrate into the controlled waters.

15.5.112 A watching brief should be employed to identify the presence of any seepages within the Made Ground during the construction works and a system put in place to control and manage the flow such as a cut-off trench and dewatering.

15.5.113 During any piling through the Made Ground consideration will be given to the use of clean drilling techniques and the avoidance of creating vertical pathways into natural strata beneath.

15.5.114 Recommendations outlined above should be documented within the CEMP, and should be followed to ensure good working procedures and good housekeeping.

Residual effects

15.5.115 The sensitivity of the Secondary (A) and Principal Aquifers is high and the magnitude of change, following mitigation, is negligible to low. Therefore, there is likely to be a direct, temporary, medium to long term effect on Secondary (A) and Principal Aquifers of negligible to **minor negative** effect following the implementation of mitigation measures.

Effect of construction plant/processes to Controlled Waters

15.5.116 Potential for contaminants associated with construction plant, construction operations, materials (e.g. fuels) run-off from stockpiled material may have the potential to effect on the soil and controlled waters at the Application Site. Due to the presence of the Secondary (A) Aquifer there is a potential for construction operations to create a contaminant pathway effecting the groundwater. Due to the cohesive cover of the remaining underlying strata further migration to the Principal Aquifer is considered to be limited. The primary mechanism for this is through local spillages and leaks from construction plant.

15.5.117 The sensitivity of construction plant/processes to controlled waters is high and the magnitude of change, prior to any required mitigation, is medium. Therefore, there is likely to be a direct, permanent, medium to long term effect to construction plant/processes to controlled waters of **moderate negative** significance prior to mitigation.

Mitigation

15.5.118 To prevent effects on the underlying soils and controlled waters by construction plant, operations and materials, all fuels, oils and chemicals must be stored in appropriate containers within a bunded compound in accordance with the Environment Agency's Pollution Prevention Guidance Note 6 "Working at Construction and Demolition Sites" (Ref. 15.19). This will mitigate the potential from accidental spills. Recommendations presented in any construction environmental management plan prepared for the Proposed Development should be implemented to ensure good working procedures and good housekeeping. In addition during construction works any potentially contaminated water could be discharged under consent to sewer (which may need treatment) or, if generated in small enough quantities, could be temporarily stored on site in holding tanks prior to disposal off-site, or re-use as part of on-going operations (e.g. re-use for damping down areas to prevent dust generation if uncontaminated).

Residual Effects

15.5.119 The sensitivity of construction plant/processes to controlled waters is high and the magnitude of change, following mitigation, is negligible to low. Therefore, there is likely to be a direct, temporary, medium term effect of construction plant/processes to controlled waters of **negligible** significance following the implementation of mitigation measures.

Operation

Site Wide Development Option

Effect on Contamination and Geotechnical Hazards on Future Site Occupants and Properties

15.5.120 There is potential for exposure from contamination to residential site users from activities such as playing or eating outdoors. The pathways that could be present comprise indoor and outdoor dermal contact, inhalation of dusts or gases, and ingestion of soils/dusts.

15.5.121 Low levels of ground gas have been detected within the FDS Application and therefore there could be the potential for ingress of gas into enclosed spaces or direct into properties constructed above the material, or through utility corridors that service the properties. Given the likelihood of made ground being present across the entire Site (both the FDS and Masterplan applications), there is the potential for ground gas to be present across the entire site.

15.5.122 The residential properties could potentially be developed on Made Ground and therefore there is the potential for a geotechnical structural risk from settlement or subsidence of the material.

15.5.123 There is also the potential for future site maintenance and utility workers to be exposed to contamination if working in excavations or undertaking groundwork within impacted Made Ground once the development has been constructed. Maintenance/utility workers could be exposed to contamination through dermal contact, inhalation and ingestion.

15.5.124 The sensitivity of future Site occupants is high and the magnitude of change, prior to any required mitigation, is high. Therefore, there is likely to be a direct, permanent, long term effect on future Site occupants of **major negative** significance prior to the implementation of mitigation measures.

Mitigation

15.5.125 A robust and long term durable solution will be developed for areas of impacted Made Ground and proposed areas used for communal open green space. This will comprise engineered mitigation measures through the placement of materials suitable for use in communal areas and will include a clean soil cover layer in line with technical guidance provided in BRE 465 “Cover Systems for Land Regeneration” (Ref 15.20).

15.5.126 If ground gas is encountered during further investigation then gas mitigation measures will be incorporated into building design in accordance with technical guidance as documented in CIRIA C665 and the NHBC “Guidance on Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are present” (Ref. 15.21 and Ref 15.22).

15.5.127 The structural risk from chemical attack will already have been mitigated at the design and construction phases by the use of the appropriate concrete specification as detailed within the BRE Special Digest 1: 2005 Concrete in Aggressive Ground (Ref. 15.23).

15.5.128 Services and utilities will be laid in clean and dedicated service trenches. Water supply pipes will have been installed in accordance with UK WIR (Ref. 15.21) guidance and under consultation with Thames Water.

15.5.129 The risk to future site maintenance/utility workers in excavations will be mitigated by the installation of services within dedicated clean corridors. Such workers will be required to wear PPE and potentially RPE. Appropriate site hygiene and welfare facilities will be provided as per relevant regulations. All works should be undertaken in accordance with health and safety risk assessments for the protection of site workers.

15.5.130 Care will have to be taken when working around or in excavations, with workers having appropriate training such as confined space entry as appropriate. Personal gas monitoring may be undertaken in and around excavation zones within areas of Made Ground.

15.5.131 Potable water supplies will have been protected during the construction phase and all services and utilities will have been placed within clean dedicated trenches and backfilled with clean material.

15.5.132 The mitigation works will be undertaken in accordance with a Remediation Method Statement, where necessary. The works required will be inspected and validated following completion of the work.

15.5.133 To ensure geotechnical suitability of the ground conditions for development on the underlying Made Ground and geology an appropriate solution will be prepared. Due to the height of the proposed buildings, piled foundations founded in the Kempton Park Gravels, Lambeth Beds or Thanet Sands are likely to be required. A targeted site investigation should be carried out prior to pile design. A piling risk assessment associated with the protection of controlled waters may be required prior to commencement on site.

15.5.134 Following the mitigation measures employed at the Site during construction it is considered unlikely that unacceptable risks to human health associated with the future development will remain.

Residual Effects

15.5.135 The sensitivity of future Site occupants is high and the magnitude of change, following any required mitigation, is low to negligible. Therefore, there is likely to be a direct, permanent, medium to long term effect

on future Site occupants and properties of **negligible** to low significance following the implementation of mitigation measures.

Effect on Potable Water Supply

15.5.136 The potable water supply on Site could be affected by the contamination identified in within areas of Made Ground.

15.5.137 The water supply may be affected by future vehicle fuel and oil spills entering the service trenches. However, any spills are likely to be small and very rare.

15.5.138 The sensitivity of potable water supply is high and the magnitude of change, prior to any required mitigation, is medium. Therefore there is likely to be a direct, temporary, medium effect, of **moderate negative** significant prior to the implementation of mitigation measures.

Mitigation

15.5.139 New water supply pipes will be laid in accordance with the UK Water Industry Research (UKWIR): Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (UKWIR 2010) and following consultation and agreement of Thames Water.

15.5.140 Utilities in within Made Ground will be installed within dedicated clean service corridors.

15.5.141 Interceptor drains may be considered in areas of future vehicle usage to further ensure that any spills will not enter service trenches directly or through groundwater migration.

Residual Effects

15.5.142 The sensitivity of potable water supply is high and the magnitude of change, following any required mitigation, is negligible. Therefore, there is likely to be a direct, temporary, medium term effect on potable water supply of **negligible** significance following the implementation of mitigation measures.

Effect on Third Party Occupants and Properties

15.5.143 Following remediation and proposed engineered cover of the identified areas of contamination at the Site during construction, it is considered unlikely that unacceptable risks to third party properties and occupants will remain.

15.5.144 The sensitivity of third party properties and occupants is high and the magnitude of change, prior to any required mitigation, is negligible. Therefore, there is likely to be a direct, temporary, short to medium effect on third party properties and occupants of **negligible** significance prior to the implementation of mitigation measures.

Mitigation

15.5.145 Due to the negligible significance of effects on third party occupants or properties, no mitigation is required.

Residual effects

15.5.146 The sensitivity of third party occupants and properties is high and the magnitude of change, following any required mitigation, is negligible. Therefore, there is likely to be a direct, temporary, short term effect on third party occupants of **negligible** significance following the implementation of mitigation measures.

Effect on Groundwater in the Secondary (A) and Principal Aquifer from existing sources of contamination

15.5.147 The mitigation measures carried out during the construction phase will address identified sources of contamination that may potentially affect the Secondary (A) Aquifers, through control and management of water

infiltration, consideration of clean piling techniques and the use of a clean soil cover layer obtained from site won materials suitable for the proposed end use.

15.5.148 The sensitivity of Secondary (A) and Prinicpal Aquifers is medium and the magnitude of change, prior to any required mitigation, is negligible. Therefore, there is likely to be a direct, temporary, medium-term effect on Secondary (A) and Principal Aquifers of **negligible** significance prior to the implementation of mitigation measures.

Mitigation

15.5.149 Due to the negligible significance of effects on groundwater in the Secondary (A) and Principal Aquifers, no mitigation is required.

Residual Effects

15.5.150 The sensitivity of Secondary (A) and Principal Aquifers is high and the magnitude of change, following any required mitigation, is negligible. Therefore, there is likely to be a direct, temporary, medium-term effect on Secondary (A) and Principal Aquifers of **negligible** significance following the implementation of mitigation measures.

FDS Development Option

Effect on Contamination and Geotechnical Hazards on Future FDS Application Occupants and Properties

15.5.151 There is potential of exposure from contamination to residential site users from activities such as playing or eating outdoors. The pathways that could be present comprise indoor and outdoor dermal contact, inhalation of dusts or gases, and ingestion of soils/dusts.

15.5.152 Low levels of ground gas have been detected within the FDS Application site and therefore there could be the potential for ingress of gas into enclosed spaces or direct into properties constructed above the material, or through utility corridors that service the properties.

15.5.153 The residential properties could potentially be developed on Made Ground and therefore there is the potential for a geotechnical structural risk from settlement or subsidence of the material.

15.5.154 There is also the potential for future site maintenance and utility workers to be exposed to contamination if working in excavations or undertaking groundwork within impacted Made Ground once the development has been constructed. Maintenance/utility workers could be exposed to contamination through dermal contact, inhalation and ingestion.

15.5.155 The sensitivity of future Site occupants is high and the magnitude of change, prior to any required mitigation, is high. Therefore, there is likely to be a direct, permanent, long term effect on future FDS Application occupants of **major negative** significance prior to the implementation of mitigation measures.

Mitigation

15.5.156 A robust and long term durable solution will be developed for areas of impacted Made Ground and proposed areas used for communal open green space. This will comprise engineered mitigation measures through the placement of materials suitable for use in communal open space areas and will include a clean soil cover layer in line with technical guidance provided in BRE 465 “Cover Systems for Land Regeneration” (Ref 15.20).

15.5.157 If ground gas is encountered during further investigation then gas mitigation measures will be incorporated into building design in accordance with technical guidance as documented in CIRIA C665 and the

NHBC “Guidance on Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are present” (Ref. 15.21 and Ref 15. 22).

15.5.158 The structural risk from chemical attack will have been mitigated at the design and construction phases by the use of the appropriate concrete specification as detailed within the BRE Special Digest 1: 2005 Concrete in Aggressive Ground (Ref. 15.23).

15.5.159 Services and utilities will be laid in clean and dedicated service trenches. Water supply pipes will have been installed in accordance with UK WIR (Ref. 15.21) guidance and under consultation with Thames Water.

15.5.160 The risk to future site maintenance/utility workers in excavations will be mitigated by the installation of services within dedicated clean corridors. Such workers will be required to wear PPE and potentially RPE. Appropriate site hygiene and welfare facilities will be provided as per relevant regulations. All works should be undertaken in accordance with health and safety risk assessments for the protection of site workers.

15.5.161 Care will have to be taken when working around or in excavations, with workers having appropriate training such as confined space entry as appropriate. Personal gas monitoring may be undertaken in and around excavation zones within areas of Made Ground.

15.5.162 Potable water supplies will have been protected during the construction phase and all services and utilities will have been placed within clean dedicated trenches and backfilled with clean material.

15.5.163 The mitigation works will be undertaken in accordance with a Remediation Method Statement, where necessary. The works required will be inspected and validated following completion of the work.

15.5.164 To ensure geotechnical suitability of the ground conditions for development on the underlying Made Ground and geology an appropriate solution will be prepared. Due to the height of the proposed buildings, piled foundations founded in the Kempton Park Gravels, Lambeth Beds or Thanet Sands are likely to be required. A targeted site investigation should be carried out prior to pile design. A piling risk assessment associated with the protection of controlled waters may be required prior to commencement on site.

15.5.165 Following the mitigation measures employed at the Site during construction it is considered unlikely that unacceptable risks to human health associated with the future development will remain.

Residual Effects

15.5.166 The sensitivity of future Site occupants is high and the magnitude of change, following any required mitigation, is low to negligible. Therefore, there is likely to be a direct, permanent, medium term effect on the future Site occupants and properties of **negligible to low** significance following the implementation of mitigation measures.

Effect on Potable Water Supply

15.5.167 The potable water supply on Site could be affected by the contamination identified within the Made Ground.

15.5.168 The water supply may be affected by future vehicle fuel and oil spills entering the service trenches. However, any spills are likely to be small and very rare.

15.5.169 The sensitivity of potable water supply is high and the magnitude of change, prior to any required mitigation, is medium. Therefore there is likely to be a direct, temporary, medium effect, on potable water supply of **moderate negative** significance prior to the implementation of mitigation measures.

Mitigation

15.5.170 New water supply pipes will be laid in accordance with the UK Water Industry Research (UKWIR): Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (UKWIR 2010) and following consultation and agreement of Thames Water.

15.5.171 Utilities in within the Made Ground will be installed within dedicated clean service corridors.

15.5.172 Interceptor drains may be considered in areas of future vehicle usage to further ensure that any spills will not enter service trenches directly or through groundwater migration.

Residual Effects

15.5.173 The sensitivity of potable water supply is high and the magnitude of change, following any required mitigation, is negligible. Therefore, there is likely to be a direct, temporary, medium effect on potable water supply of **negligible** significance following the implementation of mitigation measures.

Effect on Third Party Occupants and Properties

15.5.174 Following remediation and the proposed engineered cover of the identified areas of contamination at the Site during construction, it is considered unlikely that unacceptable risks to third party properties and occupants will remain.

15.5.175 The sensitivity of third party properties and occupants is high and the magnitude of change, prior to any required mitigation, is negligible. Therefore, there is likely to be a direct, temporary, short to medium term effect on third party properties and occupants of **negligible** significance prior to the implementation of mitigation measures

Mitigation

15.5.176 Due to the negligible significance of effects on third party occupants or properties, no mitigation is required.

Residual effects

15.5.177 The sensitivity of third party occupants and properties is high and the magnitude of change, following any required mitigation, is negligible. Therefore, there is likely to be a direct, temporary, short term effect on third party occupants of **negligible** significance following the implementation of mitigation measures.

Effect on Groundwater in the Secondary (A) and Principal Aquifer from existing sources of contamination

15.5.178 The mitigation measures carried out during the construction phase will address identified sources of contamination that may potentially affect the Secondary (A) Aquifers, through control and management of water infiltration, consideration of clean piling techniques and the use of a clean soil cover layer obtained from site won materials suitable for the proposed end use.

15.5.179 The sensitivity of Secondary (A) Aquifers is medium and the magnitude of change, prior to any required mitigation, is negligible. Therefore, there is likely to be a direct, temporary, medium-term effect on Secondary (A) and Principal Aquifers of **negligible** significance prior to the implementation of mitigation measures.

Mitigation

15.5.180 Due to the negligible significance of effects on groundwater in the Secondary (A) Aquifers, no mitigation is required

Residual Effects

15.5.181 The sensitivity of Secondary (A) Aquifers is high and the magnitude of change, following any required mitigation, is negligible. Therefore, there is likely to be a direct, temporary, medium-term effect on Secondary (A) and Principal Aquifers of **negligible** significance following the implementation of mitigation measures.

15.6 Summary

Site Wide Development Option

15.6.1 The potential for, and nature of, contamination on the Site Wide Development area was assessed as well as reviewing the existing ground conditions. The results of a Preliminary Risk Assessment and previous investigations undertaken by Soil Limited 13397/GIR February 2013 (Ref 15.2) and Ground Engineering C11482B January 2014 (15.3) has been reviewed and summarised in this ES Chapter.

15.6.2 The Site comprises a a series of three to four storey flats of both brick and concrete construction with communal tarmac areas for car parking and garages beneath the buildings. Along Beaconsfield Road a series of newer brick built flats were noted with ground floor private gardens. Along the eastern portion of the site units of concrete flats approximately three to four storeys high were identified with associated communal green space and park/playground areas. Adjacent to the west of Thurlow Street a cooling tower thought to be part of a boiler/heating system was noted and an area of hard standing and three black vents above the ground were noted in the central eastern portion of the site. The three vents are thought to indicate the potential for three underground storage tanks or a three chambered interceptor. A pharmacy, health centre and Aylesbury Estate housing offices were also noted within the building located in the far north of the site adjacent to the west of Thurlow Street. Residential housing was noted to be situated above the offices.

15.6.3 The Site is considered to be of moderate environmental sensitivity due to the following reasons: the Site is underlain by a Secondary (A) Aquifer (Kempton Park Gravels, Lambeth Group and Thanet Sands), and a Principal Aquifer (White Chalk). There are five groundwater abstractions located within 1km of the site the nearest abstraction to the site is located 211m north of for commercial/industrial and public services including drinking water. The site is not located within an Environment Agency Groundwater Safeguard and Source Protection Zone (SPZ). There are no surface water abstractions located within 1km of the Site. Environmentally sensitive land uses in and around the Site include adjacent residential properties and park land. The nearest surface water feature is a lake associated with Burgess Park located 50m south of the Site.

15.6.4 Asbestos containing materials (ACM) could also be present within the Made Ground associated with demolition of former buildings. LBS have also reported the district heating pipework is insulated in asbestos.

15.6.5 Some existing sources of contamination have been identified onsite relating to the former and current redevelopment of the site, the potential presence for unexploded ordnance, numerous electricity sub-stations and former historical land uses. There is also the potential for a culverted tributary which could have been infilled located across the site however this has not shown on any historical maps. Potential below ground tanks / interceptors and cooling tower with potentially associated boiler tank area also located in the north/north-east of the outline application site.

15.6.6 A previous report undertaken by Soil Limited 13397/GIR February 2013 (Ref 15.2) has identified impacted Made Ground within the area of the FDS Application. Similar conditions are assumed to be present across the site wide area however this is not considered to represent a significant risk providing appropriate remediation measures are followed.

15.6.7 Further assessment will be undertaken and appropriate gas mitigation measures will be incorporated in the building design and construction.

15.6.8 Off-site sources of contamination have also been identified and relate to the former commercial and light industrial use predominantly in the south of the site which include wharfs, a builders yard, a stone yard, lime works, salt works and wine and mineral water works. Other factories a depot and works buildlings were also identified with associated tanks and chimneys.

15.6.9 The main effects identified relate to the impacted Made Ground, generation of elevated ground gas concentrations and potential for impacted perched groundwater which may impact upon controlled waters and

human health receptors. There is also the potential for ACMs located within the Made Ground and as part of the pipework insulation. During construction works including fuel and chemical storage and use of plant, there is the potential for fuels and oils to enter the areas of perched and shallow groundwater.

15.6.10 An intrusive ground investigation will need to be undertaken across the site wide development prior to development to identify ground conditions and underlying contamination.

15.6.11 Following a site investigation mitigation measures to be implemented include use of appropriate PPE and RPE by construction and maintenance workers. A detailed risk assessment will also be undertaken to manage any potential ACMs, localised areas of contamination, ground gas or impacted perched groundwater with regard to activities associated with the development on the site. A monitoring and maintenance plan will be undertaken prior to development to confirm concentrations of ground gas beneath the Site and any contamination within the groundwater (Secondary (A) and Principal Aquifer). Adoption of the recommended mitigation measures will prevent pollution and promote sustainable development through the improvement of contaminated land.

15.6.12 Long-term residual effects on ground conditions could arise from ground gas migration to residential properties from the remaining Made Ground however, providing the appropriate mitigation measures are installed as part of the building design there will be a limited effect to future residents. New potential contaminant pathways may be created resulting in the risk of impacted perched water to migrate into the Secondary (A) Aquifers although, this is considered a limited risk and further site investigation and monitoring will be undertaken to confirm this is not the case. This is considered to be of negligible significance following the implementation of mitigation measures.

FDS Development Option

15.6.13 The potential for, and nature of, contamination on the FDS Application was assessed as well as reviewing the existing ground conditions. The results of a Preliminary Risk Assessment previous investigations undertaken by Soil Limited 13397/GIR February 2013 (Ref 15.2) and Ground Engineering C11482B January 2014 (15.3) has been reviewed and summarised in this ES Chapter.

15.6.14 The FDS Application predominantly comprises residential flats including a twelve storey concrete block of flats; a series three storey concrete flats with associated communal spaces. Beneath some of the flats were garages as well as a courtyard area for car parking and separate garages. A brick built five storey flat with sloped roofing was also located in this area.

15.6.15 The FDS Application is considered to be of moderate environmental sensitivity due to the following reasons: the Site is underlain by a Secondary (A) Aquifer (Kempton Park Gravels, Lambeth Group and Thanet Sands), and a Principal Aquifer (White Chalk) with partial protection in the south-west provided by the Unproductive Strata of Langley Silts. There are five groundwater abstractions located within 1km of the site the nearest abstraction to the FDS site is 500m south for industrial/commercial use. The site is not located within an Environment Agency Groundwater Safeguard and Source Protection Zone (SPZ). There are no surface water abstractions located within 1km of the Site. Environmentally sensitive land uses in and around the Site include adjacent residential properties and park land. The nearest surface water feature is a lake associated with Burgess Park located 50m south of the Site.

15.6.16 Some existing sources of contamination have been identified onsite relating to the former and current redevelopment of the site, the potential presence for unexploded ordnance, numerous electricity sub-stations and former historical land uses. There is also the potential for a culverted tributary which could have been infilled located across the site however this has not shown on any historical maps.

15.6.17 Asbestos containing materials (ACM) could also be present within the Made Ground associated with demolition of former buildings. LBS have also reported the district heating pipework is insulated in asbestos.

15.6.18 The previous reports undertaken by Soil Limited 13397/GIR February 2013 (Ref 15.2) and Ground Engineering C11482B January 2014 (15.3) have identified impacted Made Ground within the area of the FDS and an area adjacent to the west of the FDS Application. However, this is not considered to represent a significant risk providing appropriate remediation measures are followed.

15.6.19 Off-site sources of contamination have also been identified and relate to the former commercial and light industrial use predominantly in the south of the site which include wharfs, a builders yard, a stone yard, lime works, salt works and wine and mineral water works. Other factories a depot and works buidlings were also identified with associated tanks and chimneys.

15.6.20 The main effects identified relate to the impacted Made Ground, generation of elevated ground gas concentrations and potential for impacted perched groundwater which may impact upon controlled waters and human health receptors. There is also the potential for ACM located within the Made Ground and as part of the pipework insulation. During construction works including fuel and chemical storage and use of plant, there is the potential for fuels and oils to enter the areas of perched and shallow groundwater.

15.6.21 Further assessment will be undertaken and appropriate gas mitigation measures will be incorporated in the building design and construction.

15.6.22 Mitigation measures to be implemented include use of appropriate PPE and RPE by construction and maintenance workers. A detailed risk assessment will also be undertaken to manage any potential ACMs, localised areas of contamination, ground gas or impacted perched groundwater with regard to activities associated with the development on the site. A monitoring and maintenance plan will be undertaken prior to redevelopment to confirm levels of ground gas beneath the Site and any contamination within the groundwater (Secondary (A) and Principal Aquifer). Adoption of the recommended mitigation measures will prevent pollution and promote sustainable development through the improvement of contaminated land.

15.6.23 Long-term residual effects on ground conditions could arise from ground gas migration to residential properties from the remaining Made Ground however, providing the appropriate mitigation measures are installed as part of the building design there will be a limited effect to future residents. New potential contaminant pathways may be created resulting in the risk of impacted perched water to migrate into the Secondary (A) Aquifers although, this is considered a limited risk and further site investigation and monitoring will be undertaken to confirm this is not the case. This is considered to be of negligible significance following the implementation of mitigation measures.

Table 15.1: Summary of Ground Conditions, Hydrology and Contamination Effects

Site Wide Development Option

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
Effect of Exposure to Contamination and Geotechnical Hazards on construction Staff	Major	Negative	T	D	ST	CEMP, good working practice and good housekeeping Safety awareness briefings in relation to UXO to all site personnel in low risk zones. Explosive ordnance disposal engineer present onsite during shallow intrusive works and magnetometer survey. PPE and RPE for construction workforce and an appropriate Health and Safety risk assessment Completion site investigation works secured by planning condition. Any additional contamination that is encountered is to be remediated in accordance with a Remediation Method Statement. Implementation of a	Negligible to Minor	Negative	T	D	ST	NPPF	HSE 'Construction (Design and Management) Regulations' (2007) HSE 'Protection of Workers and the General Public during the Development of Contaminated Land' (1991) Control of Asbestos Regulations (2012)

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
						watching brief during excavation to identify any unexpected contamination within the Made Ground and provide for risk assessments and treatment if required.							
Effect of Contamination on Potable Water Supply	Moderate	Negative	P	D	LT	Water supply pipes to be installed in accordance with published guidance	Negligible	N/A	P	D	LT		UK Water Industry Research (UKWIR): Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (UKWIR 2010)
Effect on Third Party Occupants and Properties	Moderate to Major	Negative	T	D	ST	CEMP, good working practice and good housekeeping	Negligible	N/A	T	D	ST	NPPF	Environment Agency, Pollution Prevent Guidance Note 6 "Working at Construction and Demolition Application Sites"
Effect on groundwater in the Secondary (A) and Principal Aquifers	Moderate to Major	Negative	T	D	LT	CEMP, good working practice and good housekeeping	Negligible	N/A	T	D	MT - LT		Environment Agency, Pollution Prevent Guidance Note 6 "Working at Construction and Demolition Application Sites"
Effect of construction plant/processes to Controlled Waters	Moderate	Negative	P	D	MT - LT	CEMP, good working practice and good housekeeping	Negligible	N/A	T	D	MT	Southwark Local Plan: Policy 3.1 Environmental Effects; SP12 Pollution; Policy	Environment Agency, Pollution Prevent Guidance Note 6 "Working at Construction and

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
												3.1 Hazardous Substances	Demolition Application Sites"
Operation													
Effect of Exposure to Contamination and Geotechnical Hazards on construction Staff	Major	Negative	P	D	LT	Appropriate remediation / mitigation strategy including localised source removal, provision of clean engineered cover and installation of gas protection measures	Negligible to Minor	Negative	P	D	MT - LT	NPPF	BRE 465 'Cover systems for land regeneration – thickness of cover systems for contaminated land UK Water Industry Research (UKWIR): Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (UKWIR 2010) BRE Special Digest 1: 2005 Concrete in Aggressive Ground
Effect on Potable Water Supply	Moderate	Negative	T	D	MT	Water supply pipes to be installed in accordance with published guidance	Negligible	N/A	T	D	ST		UK Water Industry Research (UKWIR): Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (UKWIR 2010)
Effect on Third Party Occupants and Properties	Negligible	N/A	T	D	ST - MT	No mitigation required	Negligible	N/A	T	D	ST		
Effect on	Negligible	N/A	T	D	ST	No mitigation	Negligible	N/A	T	D	ST		

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
groundwater in the Secondary (A) and Principal Aquifer from existing sources of contamination.						required							

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

Table 15.2: Summary of Ground Conditions, Hydrology and Contamination Effects

FDS Development Option

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
Effect of Exposure to Contamination and Geotechnical Hazards on construction Staff	Major	Negative	T	D	ST	CEMP, good working practice and good housekeeping Safety awareness briefings in relation to UXO to all site personnel in low risk zones. Explosive ordnance disposal engineer present onsite during shallow intrusive works and magnetometer survey. PPE and RPE for construction workforce and an appropriate Health and Safety risk assessment Completion site investigation works secured by planning condition. Any additional contamination that is encountered is to be remediated in accordance with a Remediation Method Statement. Implementation of a	Negligible to Minor	Negative	T	D	ST		HSE 'Construction (Design and Management) Regulations' (2007) HSE 'Protection of Workers and the General Public during the Development of Contaminated Land' (1991) Control of Asbestos Regulations (2012)

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
						watching brief during excavation to identify any unexpected contamination within the Made Ground and provide for risk assessments and treatment if required.							
Effect of Contamination on Potable Water Supply	Moderate	Negative	P	D	LT	Water supply pipes to be installed in accordance with published guidance	Negligible	N/A	P	D	LT		UK Water Industry Research (UKWIR): Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (UKWIR 2010)
Effect on Third Party Occupants and Properties	Moderate to Major	Negative	T	D	ST	CEMP, good working practice and good housekeeping	Negligible	N/A	T	D	ST		Environment Agency, Pollution Prevent Guidance Note 6 "Working at Construction and Demolition Application Sites"
Effect on groundwater in the Secondary (A) and Principal Aquifers	Moderate to Major	Negative	T	D	MT - LT	CEMP, good working practice and good housekeeping	Negligible to Minor	Negative	T	D	MT – LT		Environment Agency, Pollution Prevent Guidance Note 6 "Working at Construction and Demolition Application Sites"
Effect of construction plant/processes to Controlled Waters	Moderate	Negative	P	D	MT - LT	CEMP, good working practice and good housekeeping	Negligible	N/A	T	D	MT	Southwark Local Plan: Policy 3.1 Environmental Effects; SP12 Pollution; Policy	Environment Agency, Pollution Prevent Guidance Note 6 "Working at Construction and

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
												3.1 Hazardous Substances	Demolition Application Sites"
Operation													
Effect of Exposure to Contamination and Geotechnical Hazards on construction Staff	Major	Negative	P	D	LT	Appropriate remediation / mitigation strategy including localised source removal, provision of clean engineered cover and installation of gas protection measures	Negligible to Minor	Negative	P	D	MT - LT	NPPF	BRE 465 'Cover systems for land regeneration – thickness of cover systems for contaminated land UK Water Industry Research (UKWIR): Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (UKWIR 2010) BRE Special Digest 1: 2005 Concrete in Aggressive Ground
Effect on Potable Water Supply	Moderate	Negative	T	D	MT	Water supply pipes to be installed in accordance with published guidance	Negligible	N/A	T	D	ST		UK Water Industry Research (UKWIR): Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (UKWIR 2010)
Effect on Third Party Occupants and Properties	Negligible	N/A	T	D	ST - MT	No mitigation required	Negligible	N/A	T	D	ST		
Effect on groundwater in the Secondary (A) and	Negligible	N/A	T	D	ST	No mitigation required	Negligible	N/A	T	D	ST		

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Principal Aquifer from existing sources of contamination.													

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

15.7 References

Ref. 15.1 WSP UK Ltd (2014), Geo-Environmental and Geotechnical Preliminary Risk Assessment

Ref. 15.2 Ground Investigation Soil Limited Ground Investigation Report – 1B/1C Aylesbury Estate, Walworth, Southwark, London (Southwark Council) Date February 2013

Ref. 15.3 Ground Engineering – Phase 2 Site investigation report sites B/E and D, Aylesbury Estate, London and Quadrant housing trust date January 2014

Ref. 15.4 The Environmental Protection Act (EPA), (1990). HMSO, London;

Ref. 15.5 The Environment Act, (1995). HMSO, London;

Ref. 15.6 DEFRA (2012) Contaminated Land Statutory Guidance;

Ref. 15.7 National Planning Policy Framework (2012);

Ref. 15.8 Southwark Local Plan (2011);

Ref. 15.9 DEFRA / EA (2004) Model Procedures for the Management of Land Contamination CLR 11;

Ref. 15.10 Construction Industry Research and Information Association (CIRIA) (2001) 'Contaminated Land Risk Assessment – A Guide to Good Practice' (Publication 552);

Ref. 15.11 Environment Agency (January 2009a), Human Health Toxicological Assessment of Contaminants in Soil, Report SC050021/SR2,;

Ref. 15.12 Environmental Quality Standards (2010), The River Basin District Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Directions;

Ref. 15.13 Landmark Envirocheck (May 2014);

Ref. 15.14 BACTEC International Ltd (2014) Explosive Ordnance Threat Assessment in respect of Aylesbury Estate, Southwark

Ref. 15.15 HSE (2007) 'Construction (Design and Management) Regulations' (CDM);

Ref. 15.16 HSE (1991) 'Protection of Workers and the General Public during the Development of Contaminated Land';

Ref. 15.17 Control of Asbestos Regulations (2012);

Ref. 15.18 UK Water Industry Research (UKWIR 2010): Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites;

Ref. 15.19 Environment Agency, Pollution Prevent Guidance Note 6 "Working at Construction and Demolition Application Sites";

Ref. 15.20 BRE 465 'Cover systems for land regeneration – thickness of cover systems for contaminated land;

Ref. 15.21 CIRIA C665 (2007) 'Assessing Risks Posed by Hazardous Gases to Buildings';

Ref. 15.22 NHBC/RSK (2007) 'Guidance on Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are present';

Ref. 15.23 BRE Special Digest 1: 2005 Concrete in Aggressive Ground.

16 Water Resources, Water Quality, Flood Risk and Drainage

16.1 Introduction

16.1.1 This Chapter reports the assessment of the likely significant environmental effects of the Site Wide Development Option and the FDS Development Option in respect of water resources, water quality, flood risk and drainage. In particular it considers the likely significant effects that may arise during construction and operation in terms of surface water drainage and flood risk, surface water quality and surface water / foul water sewerage capacity.

16.1.2 This Chapter should be read together with the Introductory Chapters of this ES (**Chapters 1 – 4**) as well as **Chapter 17 'Cumulative Effects', Chapter 15 'Ground Conditions, Hydrogeology and Contamination', Chapter 6 'Ecology and Nature Conservation'** and the Flood Risk Assessment (FRA) (**Appendix 16.1**) that covers both the FDS Application site and the Masterplan Application site.

16.2 Legislation, Policy and Guidance

Legislation Framework

16.2.1 The applicable legislative framework is summarised as follows:

- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (Ref. 16.1);
- The Environment Act 1995 (Ref. 16.2);
- The Water Act 2003 (Ref. 16.3);
- The Anti-Pollution Works Regulations 1999 (Ref. 16.4);
- The Groundwater (England and Wales) Regulations 2009 (Ref. 16.5);
- The Water Industry Act 1991 (Ref. 16.6);
- The Land Drainage Act 1991(Ref. 16.7); and
- The Flood and Water Management Act 2010 (Ref. 16.8).

Planning Policy

16.2.2 The international and national legislation, policy and guidance that have influenced the assessment are listed below. Local legislation, policy and guidance which provide detailed information of relevance to the Applications have been expanded on. Further details are also provided in the assessment in relation to specific policies and plans.

National Policy

National Planning Policy Framework (NPPF) 2012 (Ref 17.9)

16.2.3 The NPPF was adopted on 27th March 2012 and replaces Planning Policy Statement (PPS) 25 'Development and Flood Risk' and PPS 23 'Planning and Pollution Control'. The NPPF requires local authorities to adopt proactive strategies to mitigate and adapt to climate change, taking account of flood risk and coastal change. The NPPF steers development away from areas which experience flood risk and requires the application of the sequential test when considering new development. The NPPF promotes the use of Sustainable Drainage Systems (SuDS) and states that local authorities should prevent both new and existing developments from contributing to, or being put at unacceptable risk of, water pollution.

NPPF Technical Guidance 2014 (Ref 16.10)

16.2.4 The Technical Guidance to the NPPF provides additional guidance to local planning authorities to ensure the effective implementation of the planning policy set out in the NPPF on development in areas at risk of flooding. The Technical Guidance emphasises the avoidance of inappropriate development in areas at highest risk of flooding. Where development is necessary within areas at risk of flooding, the Technical Guidance provides advice for making development safe without increasing flood risk elsewhere.

Regional

London Plan 2011 (Ref 16.11)

16.2.5 The London plan is updated regularly with information from multiple sources including the Regional Flood Risk Assessment (RFRA). The 2011 London Plan has seen updates in 2013 and 2014, documents such as the RFRA produce recommendations which are borough and London wide specific, and recommendations from such documents are reported annually in the London Plan Annual Monitoring Report.

16.2.6 In July 2011 the Mayor of London published the replacement of the spatial development strategy for London, known as the London Plan (updated most recently in 2014). The London Plan is the overall strategic plan for London and sets out a fully integrated economic, transport, social and environmental framework for the development of the capital to 2031. Chapter 5 of the London Plan identifies London's response to climate change, the following policies are relevant:

- Policy 5.3 Sustainable design principles: 'efficient use of natural resources (including water)' and 'avoiding impacts from natural hazards (including flooding)';
- Policy 5.11 'Major development proposals should be designed to include roof, wall and site planting, especially green roofs and walls where feasible' to help in delivering 'adaption to climate change' and 'sustainable urban drainage';
- Policy 5.12 'Development proposals must comply with the flood risk assessment and management requirements set out in PPS25'; and
- Policy 5.13 'Developments should utilise sustainable urban drainage systems…and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible'.

- Policy 5.15 A strategic effort to conserve water supplies and resources should carried out by:
  - *'minimise use of water mains';*
  - *'reaching cost-effective minimum leakage levels'*
  - *'provision of additional sustainable water resources';*
  - *'minimising…energy consumed in water supply';*
  - *'Promoting the use of water re-use'; and*
  - *'Maintain and upgrade water supply infrastructure'.*
  - *Ensure water supply will not give rise to adverse effects to environment'*
- Policy 5.15 For planning decisions development should minimise the use of mains water by:
  - *'incorporating water saving measures and equipment';*
  - *'Designing residential development so that mains water consumption would meet a target of 105 litres per person per day or less'; and*
  - *'New development for sustainable water supply infrastructure, which has been selected within water companies' Water Resource Management Plans, will be supported'.*
- Policy 5.16 '*Proposals for waste management should be evaluated against...the environmental impact on water resources…'*

London Plan supplementary Planning Guidance 2014 (Ref 16.12)

16.2.7 Titled '*Sustainable Design and Construction'*, the London Plan Supplementary Planning Guidance was published in April 2014. This document was published to support developers, local planning authorities and neighbourhoods in achieving sustainable development. It provides guidance on how to achieve the London Plan policies. Relevant extracts for this chapter are:

- 3.4.2 – It is important to incorporate sustainable drainage in all developments to prevent the increasing volume of surface water runoff;
- 3.4.8 – Attenuation should be provided to a minimum of 50% of the surface water runoff at peak times; and
- 3.4.10 – '*developments on greenfield sites must maintain greenfield runoff rates. On previously developed sites, runoff rates should not be more than three times the calculated greenfield rate'*.

Local

Southwark Plan 2007 (Ref 16.13)

16.2.8 The Southwark Plan was adopted in July 2007. It provides a framework for all land use and development in the London Borough of Southwark (LBS).

The remaining saved relevant policy from the Southwark Plan with regard to hydrology and flood risk is:

- Policy 3.9 Water '*new developments must use preventative measures to ensure that they do not lead to a reduction in water quality'* and *'new developments should not result in an increase in surface water run-off'.*

Southwark Core Strategy 2011 (Ref 16.14)

16.2.9 Southwark Borough Council adopted the Core strategy in April 2011. The strategy sets the outline for the overall direction of development within the borough. The Aylesbury Area Action Plan (Ref 16.15) is referenced within the Core Strategy and takes lead from the direction set out within this document. The Core Strategy identifies that planning decisions will be made with reference to the London plan (Ref 16.11) and the below applicable strategic policies:

- Strategic Policy 1 – Sustainable Development - Development will improve the places we live and work in and enable a better quality of life for Southwark's diverse population. It will help meet the needs of a growing population in a way that respects the limits of the planet's resources and protects the environment; and
- Strategic Policy 13 – High environmental standards - Development will help us live and work in a way that respects the limits of the planet's natural resources, reduces pollution and damage to the environment and helps us adapt to climate change.

Aylesbury Area Action Plan 2010 (Ref 16.15)

16.2.10 The Aylesbury Area Action Plan (AAAP) was adopted by the council in January 2010. The plan provides a blueprint for the redevelopment of the area over the following 20 years.

16.2.11 The plan provides the below direction in terms of hydrology, drainage and flood risk:

- Individual homes to achieve Code for Sustainable Homes (Ref 16.16) level four;
- Provision of green open spaces to aid in water management;
- Sixteen development objectives are identified for the scheme which include: '*encourage sustainable use of water resources', 'maintain and enhance the quality of water',* and '*to reduce vulnerability to flooding';* and
- Promotion of the use of SuDS.

Guidance

London Borough of Southwark Strategic Flood Risk Assessment 2008 (Ref 16.17)

16.2.12 LBS level 1 Strategic Flood Risk Assessment (SFRA) (Ref 16.17) provides an assessment of all types of flood risk to inform and use in planning decisions. The SFRA enables the Local Planning Authority (LPA) to: apply the Sequential Test; allocate appropriate sites for development; identify opportunities for reducing flood risk; and carefully consider the implications of climate change.

Southwark Surface Water Management Plan (2011) (Ref 16.18)

16.2.13 A Surface Water Management Plan (SWMP) is a study to understand the flood risks that arise from local flooding, which is defined by the Flood and Water Management Act 2010 as flooding from surface runoff, groundwater, and ordinary watercourses.

16.2.14 The purpose of the LBS SWMP is to identify what the local flood risk issues are, their effects and what options there may be to manage them. These options are presented in an Action Plan which lists the partners who are responsible for taking the options forward. Although the SWMP provides a full flood history for the study area, which may include coastal and fluvial flood sources, the action plan only proposes measures to manage local flooding. The Action Plan is agreed by partners and reviewed periodically.

Environment Agency Policy

16.2.15 Water policy in England and Wales is set by the Department for Environment, Food and Rural Affairs (Defra) whilst the Environment Agency (EA) is responsible for maintaining or improving the quality of fresh, marine and underground waters (i.e. groundwater). The EA aims to achieve this through the enforcement of legislation, by the regulation of industry and through its powers as a statutory consultee in the planning process.

16.2.16 The management of surface water run-off lies under the jurisdiction of the Local Authority. It is EA policy to promote the use of SuDS, wherever possible, through the adoption of drainage solutions such as infiltration devices, swales and ponds in order to control surface water run-off quantities at the source (i.e. source control). The EA also emphasises the importance of SuDS in relation to reducing flood risk from existing and new developments, minimising diffuse pollution, maintaining or restoring natural flow regimes, improving water resources and enhancing amenity. The EA's primary objective is to establish SuDS as normal drainage practice, where appropriate, for all new developments. This is coupled with a secondary objective of retrofitting SuDS on those existing surface water drainage systems that have a negative effect on the environment. This is further enforced by the NPPF, which sets out stringent restrictions on development within or adjacent to a floodplain. The Local Authority must be satisfied with any proposed drainage scheme as required by the Flood and Water Management Act 2010 (Ref 16.8).

16.2.17 The EA's approach to the management of groundwater is outlined in the 'EA Groundwater Protection: Policy and Practice' documents. This suite of documents sets out a framework for the EA regulation and management of groundwater and describe the aims and objectives for groundwater, technical approach to its management and protection, the tools the EA use to undertake the work and their policies and approach to the application of legislation. The documents are underpinned by published groundwater vulnerability maps and groundwater Source Protection Zones (SPZ).

The Water Framework Directive (Ref 16.1) and River Basin Management Plans

16.2.18 The Water Framework Directive (WFD) (Ref 16.1) introduces a new way of assessing the health of the whole water environment. The WFD considers over 30 measures relating to water features, grouped into ecological status (this includes biology as well as 'elements' like phosphorus and pH) and chemical status ('priority substances'). The WFD relates to estuaries, coastal waters, groundwater and lakes as well as rivers.

16.2.19 The WFD sets a target to achieve at least 'good chemical and biological status' in all water bodies by 2015. Good status for surface waters is a statement of 'overall status', and has an ecological and a chemical component. Good ecological status applies to natural water bodies, and is defined as a slight variation from undisturbed natural conditions. Some water bodies are designated as 'artificial' or 'heavily modified'. This is because they may have been created or modified for a particular use such as water supply, flood protection, navigation or urban infrastructure. By definition, artificial and heavily modified water bodies are not able to achieve natural conditions. Instead the classification and objectives for these water bodies, and the biology they support, are measured against 'ecological potential' rather than status.

16.2.20 Ecological status is based on the following quality elements: biological quality, general chemical and physico-chemical quality, water quality with respect to specific pollutants (synthetic and non-synthetic), and hydromorphological quality and is measured on the scale of high, good, moderate, poor and bad.

16.2.21 The chemical status is assessed by compliance with the environmental standards for chemicals that are listed in the Environmental Quality Standards Directive 2008/105/EC. These include priority substances, priority hazardous substances and eight other pollutants carried over from the Dangerous Substances Directive (76/464/EEC) and it's 'daughter' directives and is measured as a pass or fail.

16.2.22 Ecological status and chemical status together define the overall surface water status. A classification is produced based on a 'one out, all out' principle. This uses the lowest scoring individual element result to set the overall classification.

16.2.23 For an artificial or heavily modified water body to achieve good ecological potential, its chemistry must be good. In addition, any modifications to the structural or physical nature of the water body that harm the biology must be essential for its valid use. All other such modifications must have been altered or managed to reduce or remove their adverse effect, so there is the potential for the biological status to be as close as possible to that of a similar natural water body.

16.2.24 River Basin Management Plans have been produced as part of the WFD, the EA defines them as plans for protecting and improving the water environment that have been developed in consultation with organisations and individuals. The plans describe the main issues for the water environment and the actions that need to be taken, the South East River Basin Management Plan 2009 (Ref 16.19) covers the study area.

16.2.25 River Basin Management is a continuous process of planning (to develop River Basin Management Plans) and delivery. The WFD introduces a formal series of 6 year cycles. The first cycle will end in 2015 when, following further planning and consultation, the River Basin Management Plan will be updated and reissued.

16.2.26 River Basin Management Plans have been approved by the Secretary of State for DEFRA and the Welsh Minister.

Future Water – The Government's Water Strategy for England 2008 (Ref 16.20)

16.2.27 Future Water (DEFRA, 2008) *(Ref 16.20)* outlines how the Government envisages the water sector developing up to the period 2030, with the overall vision for sustainable delivery of water supplies and an improved and protected water environment. The Government's vision for water policy and management is one where (by 2030) England has:

- Improved the quality of the water environment and the ecology which it supports;
- Continued to provide high levels of quality drinking water from taps;
- Sustainably managed risks from flooding and coastal erosion with greater understanding and more effective management of surface water;
- Ensured sustainable use of water resources and implemented fair affordable and cost reflective water charges;
- Cut greenhouse gas emissions; and
- Embedded continuous adaptation to climate change and other pressures across the water industry and water users.

16.2.28 This document provides information relating to existing water usage by sector, water quality, surface water drainage, river and coastal flooding, greenhouse gas emissions and water charging and provides guidance on how the performance against each of these target areas can be improved by 2030.

16.2.29 Other guidance documents considered to be relevant to this assessment include the following:

- *CIRIA 697, 2007: The SuDS Manual (Ref 16.21)*. This document provides current best practice national guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments;
- *Water Research company (WRc) Sewers for Adoption 7th Edition August 2012 (Ref 16.22)*. This guide is for use by developers undertaking new development when planning, designing and constructing conventional foul and surface water sewers, lateral drains, pumping stations and rising mains intended for adoption by the sewerage undertaker;
- *The Code for Sustainable Homes, Technical Guide (11 November 2010) (Ref 16.16)* introduces mandatory elements relating to surface water management. These mandatory elements include criteria against which surface water run-off is to be assessed. These criteria include methodology of assessment and measures to be utilised in developments, such as infiltration and the implementation of SuDS.

16.3 Assessment Methodology and Significance Criteria

Relevant Elements of the Comprehensive Development

16.3.1 The following application documents are relevant to the assessment of the likely environmental effects of the Site Wide Development Option and the FDS Development Option in relation to the assessment of hydrology, drainage and flood risk impacts:

- Flood Risk Assessment;
- FDS drainage strategy;
- Masterplan site drainage strategy;
- Application Plans; and
- Outline Parameter Plans.

16.3.2 For details of the Site's proposed surface water drainage assessment refer to the construction and operation sections of this chapter.

Scope of the Assessment

16.3.3 The scope of the hydrology, drainage and flooding assessment was identified in the EIA Scoping Report (**Appendix 2.1**) and takes into account the comments within the LBS EIA Scoping Opinion (**Appendix 2.2**) and WSP response to EIA Scoping Opinion dated 2nd August 2014. The scope of potentially significant effects included within the assessment is outlined below:

- Impact of the floodplain on the proposals in terms of the location of built development;
- The potential for flood compensation measures if any infrastructure or water related development is constructed;
- A surface and foul water drainage strategy to minimise impacts on the public sewerage infrastructure in the area;
- A water supply strategy to reduce consumption and to minimise impact on current water resources; and
- Potential for contamination of the ground water and public sewerage infrastructure during the course of the construction work.

Extent of the Study Area

16.3.4 The study area for hydrology, drainage and flood risk encompasses the Site and sensitive receptors within the local area of the Site.

Consultation

16.3.5 LBS, the EA and Thames Water Utilities Limited (TWUL) have all been consulted during the design development and planning process. The below is a summary of consultation that has been undertaken, for complete meeting notes please see the appropriate appendices within the FRA (**Appendix 16.1**) for the two separate Applications:

- The Site is located within a defended Flood Zone 3a;
- The EA have confirmed that the results of the site specific breach modelling identifies the Site is not subject to breach waters. Subsequently they have agreed that no further breach modelling will be required;

- The EA have identified that the FRA will still be required to assess flood mitigation measures following assessment of all forms of flooding;
- TWUL are currently undertaking a scoping study and capacity impact assessment for both Applications to confirm allowable foul and surface water discharge rates per plot. Results of the capacity impact assessment are due to be completed post planning submission. TWUL have consequently agreed to condition discharge rates for both Applications for the purposes of planning, refer to the FRA for further details;
- In order to prepare a foul and surface water drainage strategy for the Applications an interim approach to estimating foul and surface water drainage disposal per plot has been undertaken using the Wallingford Procedure (Ref 16.23) methodology in conjunction minimum London Plan requirements. This interim approach to foul and surface water drainage disposal has been agreed in principle with the EA and LBS emerging SAB;
- TWUL agreed in principle that they would be willing to adopt the foul and surface water sewers within the application site's as long as the SuDS, including the surface water attenuation devices are offline to the sewers. The level of adoption will be agreed during the later stages of design;
- It was agreed that the FDS Application site's foul and surface water drainage strategy is acceptable in principle. The level of SuDS commitment associated with the FDS Application site is to be applied for all plots that make up the Masterplan Application site; and
- It was agreed with LBS, SAB and EA that the Masterplan Application site surface water strategy will show areas of strategic attenuation only, together with indicative pipe runs and likely points of connections into the TWUL sewers. Further details, including quanta of additional SuDS (following the principles of the FDS Application site) will be set out as each plot comes forward at a later date, however the commitment to the same level of SuDS provision for the Masterplan Application plots will be addressed within the FRA and this Chapter to enable LBS to condition appropriately.

Method of Baseline Data Collation

Desk Study, Site Visit, Inspection

16.3.6 The baseline information was collected by means of a desk study, intrusive testing, topographical survey including robust drainage connectivity and a site walkover. In addition a further drainage connectivity survey was undertaken by Draincare Ltd in June 2014 to establish the existing drainage arrangements within the Site. Further details can be found within the FRA (**Appendix 16.1**).

Identification of Sensitive Receptors

16.3.7 The following sensitive receptors have been identified as part of the assessment of hydrology, drainage and flood risk:

- Groundwater including minor aquifer;
- Sewerage Infrastructure (surface and foul water capacity);
- Water Supply Infrastructure (potable water supply);
- Site Users (during construction and operation); and
- Existing off site infrastructure/development.

Assessment Modelling

16.3.8 The information contained in the baseline and mitigation techniques sections for the assessment was obtained from the sources referenced above which include the proposed outline surface water drainage strategy. The effect sections were based on professional judgement following review of the information available.

Significance Criteria

16.3.9 The assessments of potential effects as a result of the Comprehensive Development has taken into account both the construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the development proposals, and the sensitivity of the affected receptor / receiving environment to change, as well as a number of other factors that are outlined in more detail in **Chapter 2 'Approach to Assessment'** of this ES. Magnitude of change and the sensitivity of the affected receptor / receiving environment are both assessed on a scale of high, medium, low and negligible (as shown in **Table 2.2** in **Chapter 2 'Approach to Assessment'**.

Significance of Effects

16.3.10 The following terms have been used to define the significance of the effects identified:

- **Major effect:** where the Comprehensive Development could be expected to have a very significant effect (either positive or negative) on hydrology, drainage and flood risk;
- **Moderate effect**: where the Comprehensive Development could be expected to have a noticeable effect (either positive or negative) on hydrology, drainage and flood risk;
- **Minor effect**: where the Comprehensive Development could be expected to result in a small, barely noticeable effect (either positive or negative) on hydrology, drainage and flood risk; and
- **Negligible**: where no discernible effect is expected as a result of the Comprehensive Development on hydrology, drainage and flood risk.

Limitations and Assumptions

16.3.11 No quantitative measurements have been undertaken to inform this assessment, although quantitative measurements such as the River Thames breach modelling have informed the FRA. The assessment is based on the review of available information, professional judgement and consultation with relevant organisations.

16.4 Baseline Conditions

The site and Topography

16.4.1 The Site primarily comprises built development and hardstanding with pockets of amenity grassland and scattered trees. As such the site has previously been developed and would be considered as 'brownfield'.

16.4.2 The Site slopes gently from a maximum of 3.75m AOD in the north to approximately 3m AOD at the southern extreme, over a distance of *c*.600m. Natural deposits have been recorded at various sites in the wider surrounding area and at varying depths. Natural clays at 0.09m AOD to the east at Albany Road; between 1.86m and 1.90m at the north end and south end of Dunton Road; and -0.30m at 360 Old Kent Road. Sandy-clay gravels were exposed at 0.70m AOD at the Old Kent Road junction with Bowles Road too.

Existing Surface and Foul Water Drainage

16.4.3 The Site's surface water currently drains via short lengths of private drainage to external TWUL combined systems located within the public highway network.

16.4.4 The internal surface water drainage systems consist of rain water pipes, gullies and gratings discharging into short lengths of private drainage arrangements. These sewer arrangements are either surface water sewers or combined sewers or a combination of both. These private sewers discharge to the TWUL public combined sewers via gravity. There is no known surface water attenuation associated with the Site.

16.4.5 The foul water associated with each application site drains via on-plot foul or combined sewers to the TWUL public combined sewers via gravity.

16.4.6 The FDS Application site ultimately discharges to the 2,134mm internal diameter TWUL sewer that runs west to east on Albany Road. The Masterplan Application site ultimately discharges into the same Albany road sewer for the majority of the Masterplan Application site, the north of the Masterplan Application site discharges to the 1,372mm by 914mm culvert running from west to east on East Street.

16.4.7 Within the FDS Application site topography survey a 600mm diameter connection to the TWUL sewer in Albany road was identified. TWUL Sewer Records (Ref 16.24) identified this sewer as 'abandoned'. Further on-site inspection by Draincare Ltd identified that this sewer had recently been utilised, and through the means of a knock test identified its connectivity with the 2,134mm internal diameter TWUL sewer in Albany Road.

Existing Water mains

16.4.8 The Site is predominantly served by four water mains; a 355mm diameter and 250mm diameter to the south in Albany Road, and a 90mm diameter and 125mm diameter to the north in East Street.

Existing Watercourses

16.4.9 There are no watercourses currently classified, or proposed to be classified, as a main river in the vicinity of the Site. The closest watercourse is the River Thames, an EA Main River, located approximately 1.8km to the north of the site. The watercourse is tidal in nature in this area and outfalls into the Thames estuary.

Existing Land Drainage

16.4.10 The Site is classed as brownfield and is served by existing traditional drainage sewerage system.

16.4.11 Runoff from the small pockets of open green space throughout the Site is likely to infiltrate into the underlying subsoil and/or convey to formal hardstanding areas that are drained via the existing on site sewerage system.

Flood Data

16.4.12 From review of the SFRA and EA Flood Zone Mapping both applications (FDS and Masterplan) lie wholly within defended Flood Zone 3a. This zone comprises land assessed as having a less than 1 in 200 annual probability of tidal flooding (<0.5%). The indicative Flood Maps provided by the EA and SFRA ignore the presence of the significant flood defences along the River Thames and the operation of the Thames Barrier.

Historical Flood Records

16.4.13 The EA nor the SFRA hold any historical flood records for either application, however the SFRA does identify a number of local historical events within Southwark:

- Fluvial flooding of the southern bank of the River Thames to the north of the Site in January 1928;
- Surface water flooding in April 2004 to the south of the site in Dulwich due to a rainfall event of reported probability less than 0.3% in any year; and
- TWUL have noted that prior to the completion of the Coldharbour Lane project in 2008 a number of properties were at risk of combined sewer overload flooding. The SFRA identifies localised incidents to the north of the site and that the area to the east of the site experienced at least 10 sewer flooding incidents between 1998 and 2008.

Flood Defences

16.4.14 Correspondence from the EA indicate that the defences along the River Thames to the north of the Site are designed to defend up to a 1 in 1000 year flood event, the defences are all raised, man-made and privately owned but regularly inspected by the EA. The defences are at a level of 5.41mAODN on both banks and are rated by the EA as 'Grade 2 - Good'.

16.4.15 The Site is situated west of the Thames Barrier, which offers protection from tidal surge events.

Geology

16.4.16 WSP reviewed the British Geological Society mapping of the area and identified the Site to be located on the Kempton Park Gravel, overlying the soil of Lambeth Group which in turn is underlain by Thanet Sand Formation all of which overlays the White Chalk Group. To the south of the Site the Langley Silt Member is identified as overlaying the Kempton Park Gravel Formation.

FDS Application

16.4.17 WSP completed a Geo-Environmental and Geotechnical Preliminary Risk Assessment (PRA) in August 2014 (**Appendix 15.1**). Five boreholes ranging from 15 to 25m below ground level, window sampling, and monitoring wells were undertaken.

16.4.18 The ground conditions encountered:

- Made Ground, maximum depth encountered at 3.7mbgl;
- Langley Silt Member slightly gravelly slightly sandy clay with ferruginous dark pockets. The depths ranged between 1.9m to 4.5m bgl;
- Kempton Park Gravel Formation gravelly sand and sandy clayey gravel with occasional sandy silty clay layers, with depths ranging from 6.0m and 7.0m bgl;

- Lambeth Ground encountered slightly sandy clay and slightly gravelly clayey sand. Depths were from 8.0m to 11.0m bgl;
- Thanet Sand formation encountered dense silty sand from 22.0m to 22.80m bgl; and
- White Chalk group comprised structurless chalk of sandy gravelly clayey silt with flint gravel – weak and low to medium density.

16.4.19 During the investigations groundwater strikes ranged from 4.5m below ground level in the south-east to 7.8m below ground level in the central southern portion of the site.

16.4.20 Seven trial pit locations were attempted within the FDS Application to ascertain the capacity of infiltration drainage techniques within the site. Of the seven tests only one drained successfully to BRE Digest 365 requirements, this test was located within the proposed West Moreland Park and allowed an infiltration rate of $1*10^{-5}$ l/s between 2.1m and 2.8m below ground level.

Hydrogeology

16.4.21 The EA Groundwater Vulnerability map indicates one geological classification across the Site. The Site is shown as being underlain by a minor aquifer (variable permeable). The minor aquifer comprises the Kempton Park Gravels and Thanet Sand formations. These aquifers are described as being important for local supplies and in supplying baseflow to rivers but do not produce large quantities of water.

16.4.22 The Alluvium / Langley Silt are a low permeability formation.

16.4.23 The EA Groundwater Vulnerability Map classifies the soils underlying the site as soils of high leaching potential.

16.4.24 The EA indicates that the site does not lie within a Groundwater Protection Zone.

16.4.25 There are no recorded groundwater abstraction sites within the Site. There are 8 recorded abstraction sites within 2 km of the Site, the nearest being approximately 210m north of the Site where groundwater is extracted for non-evaporative cooling process amongst other uses.

16.4.26 There are no pollution incident register entries within the Site. There is one entry recorded within 500m, it was a 'significant' incident to the south in Burgess Park which was recorded as having a significant impact to water in August 2007.

16.4.27 The results of groundwater analysis within the Soils Limited Phase 2 Ground Investigation states that the groundwater underneath the FDS Application has not been impacted upon by on-site or off-site sources.

Surface water and ground water quality

16.4.28 As part of the WFD a South East River Basin Management Plan was produced (December 2009) which covers the study area.

16.4.29 The River Basin Management Plans describe the river basin district, and the pressures that the water environment faces. It shows what this means for the current state of the water environment in the river basin district, and what actions will be taken to address the pressures. It sets out what improvements are possible by 2015 and how the actions will make a difference to the local environment - the catchments, estuaries, the coast and groundwater. The results of localised assessment conducted by the EA as part of the Thames River Basin Management Plan are summarised in the **Tables 16.1** and **16.2** below.

Table 16.1 River Basin Management Plan River Quality for Nearby Watercourses

River Name	Distance from the Site / Direction	Current Ecological Quality	Current Chemical Quality	Predicted Ecological Quality in 2015	Predicted Chemical Quality in 2015
River Thames	1.8 km north	Moderate	Fail	Moderate	Fail

Environment Agency's Online Data (Ref. 13.25)

Table 16.2 River Basin Management Plan Onsite Groundwater Quality

Location	Current Quantitive Quality	Current Chemical Quality	Predicted Quantitive Quality in 2015	Predicted Chemical Quality in 2015
The Applications Site	Poor	Poor	Poor	Poor

Environment Agency's Online Data (Ref. 13.25)

Existing Water Resources

16.4.30 From review of the London CAM the water resources within the area are under major stress, the London CAM area receives 200mm less rainfall than the national average per annum, accommodates 8 million residents within 1,200km^2, and most of the catchment is influences by the impermeable London Clay. Confined Chalk underneath London is designated as a principle aquifer; the flow for this aquifer comes from unconfined areas upstream, predominantly out with the London CAM catchment. The major pressure in the London CAM area is the population growth resulting in requirements for new housing and increased demands on water.

16.4.31 The Confined Chalk aquifer under the London CAM catchment is standalone and must be considered in isolation of the surface water system. From the London CAM no abstractions from a groundwater source within the Applications Site boundary will be granted. Licenses for surface water abstraction within the Applications Site boundary will be considered depending on the local and downstream impacts.

16.4.32 TWUL have produced a 25 year Water Resource Management Plan to set out how they will balance supply and demand for water to 2040. The plan will considers population growth, climate change projections, and managing water including reducing leakage (mains replacement), reusing water (wastewater re-use) and regional water transfer.

16.4.33 The London Plan (including supplementary guidance and updates) incorporates polices that include methods which reduce the water deficit across London such as water re-use, and upgrading the water supply system.

Existing Sources of Flooding

Fluvial, Tidal or Coastal:

16.4.34 The Site is located within defended Flood Zone 3a as identified by the EA and SFRA. The River Thames flood defences provide adequate defence against flooding up to a level of 5.41m AOD and according to EA data this protects against tidal and fluvial events up to and including the 1 in 1000 year flood event. As such the direct impact of fluvial flooding can be considered negligible, however the main risk to the Sites is a residual risk resulting from a breach/overtopping of flood defences.

16.4.35 The LBS SFRA shows the Site being subject to breached flood waters and identified that the Site lies within the 6 to 12 hour inundation zone. During consultation with LBS it was recommended that due to the strategic nature of the mapping further investigation into the impact of breached flood waters should be undertaken.

16.4.36 The EA assessed 9 strategic breach/overtopping locations along the reach of the River Thames applicable to the Site. The EA has confirmed that none of the 9 modelled breach/overtopping locations would individually inundate the Site.

16.4.37 The 2008 SFRA model data is strategic in nature and is considered to be superseded for the purposes of assessment in light of the 2011-2012 Halcrow Studies upon which the EA site specific breach analysis assessment is based. It is therefore concluded that the residual risk of flooding, for the Site, from a breach/overtopping of flood defences is negligible.

Sewers*:*

16.4.38 The majority of onsite sewers within the Site are to be replaced during the redevelopment. The strategic outfall locations and sewers within Albany Road, Portland Street, East Street and Thurlow Street will be retained. Due to the location of the site within central London and the local topography the site is susceptible to localised flooding from, or surcharging along the public drainage systems. Were surcharging of sewers was to occur within the Site the flood event would be contained within the public highway and subsequently draw down subsequent of the event.

Water Mains:

16.4.39 The location of the water mains throughout the site could provide localised flood risk if the water mains are not maintained properly.

Groundwater:

16.4.40 Based upon the results from the FDS Application site Phase 2 Ground Investigation works (**Appendix 15.1**) groundwater flooding is not considered an issue. Further works will need to be carried out to confirm the ground water levels remain consistent across the remainder of the Site, please refer also to **Chapter 15 'Ground Conditions, Hydrogeology and Contamination'.**

Pluvial/Sheet Flow:

16.4.41 From review of SWMP mapping there has previously been no recorded incidents of surface water flooding within the Site. The SFRA identifies a number of overland flow routes that generally travel through the Site from the north-west to the lake that is located to the south of the Site in Burgess Park. The SFRA identifies that the EA surface water flood mapping is to be utilised when assessing these overland flow routes.

16.4.42 Since the SFRA was published the EA surface water flood risk mapping has been made available. This mapping is considered to be the most accurate and up to date source of data for assessment purposes. The EA data identifies that surface water flow routes through the Site are along the existing highway network.

16.4.43 There is a small localised area identified as at risk of surface water flooding on the southern boundary of the FDS Application. The area is currently occupied by a slightly sunken concrete basketball court.

16.4.44 The primary highway network within the Site will remain post development and in conjunction with strategic setting of finished floor and ground levels post development the flood risk from pluvial/sheet flooding is considered insignificant.

Future Baseline

16.4.45 Should the development of the Site not proceed, land uses remain as they are currently and current routine maintenance of water utilities services is continued; it is considered likely that the future baseline conditions in relation to hydrology, drainage and flooding would remain relatively unchanged.

16.4.46 In the longer term, the risk of flooding at the Site may increase with the effects of climate change due to increased frequency of extreme rainfall events.

16.5 Assessments of Effects, Mitigation and Residual Effects

16.5.1 In order to comply with current legislation, policy and guidance requirements, the design of the development proposals must consider flood risk, and safeguard surface and groundwater resources from pollution.

16.5.2 Similarly, the management of surface water run-off is an important issue. Increased surface water run-off may lead to increased flood risk or the reduction in groundwater levels through the interception of water. It is the EA's, LBS and London Plan's policy to promote the use of options to control surface water at source and to provide attenuation on-site prior to discharge off-site.

16.5.3 Potential effects on flood risk, water resources, surface water quality, quantity and groundwater during the construction and operational phases have been identified and are discussed below.

16.5.4 It should be noted that under powers of the Anti-Pollution Works Regulations 1999 (Ref 16.4), the EA is able to stop construction activities at any time, should a significant risk be posed to the environment.

Demolition and Construction

Site Wide Development Option

Alteration of the drainage regime

12.1 Demolition/Construction activities, such as topsoil stripping within the existing open space areas will result in soil compaction and ultimately less water being bound up in the unsaturated soil matrix. This may increase the volume and the rate of surface water sheet run-off into off site infrastructure including public the highway and third party development which could pose a localised flood risk.

12.2 Increasing the rate and volume of surface water run-off into the aforementioned off site areas and altering ground levels will affect local drainage patterns and may result in temporary pooling of water in certain parts of the Site during the construction phase.

12.3 The sensitivity of the off-site infrastructure is considered to be high and the magnitude of change, prior to mitigation, is predicted to be high. Therefore, there is likely to be a direct, temporary, short term **major negative** significance prior to the implementation of mitigation measures.

Mitigation

16.5.5 Best practice recommendations for the prevention of localised flooding during construction will be outlined in more detail in the Construction Environment Management Plan (CEMP) which will be prepared by the Principal Contractor.

16.5.6 To prevent localised flooding associated with extreme rainfall events during the demolition and construction phases a temporary localised run-off management system will be employed by the contractor (as part of the CEMP). This will comprise temporary surface water run-off facilities such as storage tanks or ponds and will provide on-site attenuation for surface water flows and thereby reduce temporary flood risk.

Residual Effects

16.5.7 The sensitivity of the receptors are high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a **negligible** effect to offsite infrastructure after the implementation of mitigation measures.

Potential contamination of water resources

16.5.8 The operation of demolition and construction vehicles and general construction activities can potentially give rise to the contamination of surface water runoff by pollutants such as hydrocarbons, dust, suspended solids and construction materials. This may lead to deterioration of public sewerage water quality.

16.5.9 The sensitivity of the above receptor is considered to be high and the magnitude of change, prior to mitigation, is predicted to be high. Therefore, there is likely to be a direct, temporary, short term **major negative** significance prior to the implementation of mitigation measures.

16.5.10 It is anticipated that the Comprehensive Development will necessitate earthworks comprising excavations to construct/excavate building foundations, catchment control surface water storage devices and foul and surface water sewers. These excavations may lead to deterioration of ground water quality as direct pathways to the ground water could occur.

16.5.11 The sensitivity of the ground water onsite is considered to be high and the magnitude of change, prior to mitigation, is predicted to be high. Therefore, there is likely to be a direct, temporary, short term **major negative** significance prior to the implementation of mitigation measures.

Mitigation

16.5.12 The Principal Contractor appointed to manage and control all construction activities, including management of water resources and the storage of fuel and chemicals will put a CEMP for the entire Comprehensive Development in place. The CEMP will detail the procedures and methods that must be followed to minimise the potential environmental effects of construction activities. The CEMP will be developed and agreed with LBS prior to the commencement of the construction activities. Contractors will be required to comply with the CEMP and will be briefed accordingly. The CEMP will be monitored and updated throughout the duration of the project.

16.5.13 The CEMP will make reference to the provisions of the EA's Pollution Prevention Guidance Notes (PPG), and in particular:

- PPG 1 'General Guide to the Prevention of Water Pollution' (Ref 16.26);
- PPG 5 'Works in, near or liable to Affect Watercourses' (Ref 16.27);
- PPG 6 'Working at Construction and Demolition sites' (Ref 16.28); and
- PPG 8 'Safe Storage and Disposal of Used Oils' (Ref 16.29).

16.5.14 The CEMP will also describe the procedure if there is an environmental emergency; such as a fuel or chemical spillage within the Site. All contractors and personnel will be briefed on this procedure before construction work commences.

16.5.15 In addition, to protect the environment from contamination during the demolition/construction phase, a localised surface water run-off management system, lined where appropriate, will be employed by the contractor. This will enable containment of pollutants and sediment and only surface water, which is of a suitable standard, will be allowed to discharge from the Site.

16.5.16 Construction vehicles will be properly maintained to reduce the risk of the escape of potentially polluting substances (such as hydrocarbons) and will only operate when required. Other construction equipment and materials will be managed in such a way as to effectively minimise the risk posed to the water environment, e.g. chemicals and fuel will be stored in bunded areas. These storage areas will be inspected regularly and maintained to the required standard for the duration of the project.

Residual Effects

16.5.17 The sensitivity of the groundwater and public sewerage infrastructure is high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a **negligible** effect on the water resources following the implementation of mitigation measures.

Flood Risk to construction workers and construction plant

16.5.18 The Site is considered to be at low risk of fluvial flooding due to existing defence structures, and the flow volumes of groundwater during any excavations are likely to be negligible due to recorded ground water levels beneath the Site. There are risks that should be managed through appropriate site management during construction. In the absence of appropriate site management the magnitude of change through introducing construction workers to a risk of flooding is potentially small. Therefore, there is likely to be a direct, temporary, short term **minor negative** significance prior to the implementation of mitigation measures.

Mitigation

16.5.19 The Contractor will be required to prepare a flood emergency and contingency plan including arrangements to make safe any static plant, move any mobile plant, and to evacuate site operatives in a flood risk emergency. Construction workers would be made aware of risks associated with excess surface water caused by overland flows and standing water. For example, risks to excavations and damage to plant. If applicable any such groundwater control measures will also require pollution control measures in accordance with EA guidance.

Residual Effects

16.5.20 The sensitivity to site users is high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a **negligible** effect on the watercourses following the implementation of mitigation measures.

Leak or breakage of the temporary sewerage system

16.5.21 Leaks and breakages of sewers from the temporary toilet facilities onsite during construction works may result in crude sewage infiltrating groundwater or being washed into water bodies through surface water flows. Sewage contains high levels of nutrients, organic matter, coliforms and suspended solids. These can result in nutrient enrichment and eutrophication, smothering of bottom dwelling organisms and plants, and significantly reduced oxygen levels. The effect would be temporary as water quality within the affected water body would improve over time as organic matter is dispersed and treated by natural processes. Therefore, there is likely to be a direct, temporary, short term moderate negative significance prior to the implementation of mitigation measures.

Mitigation

16.5.22 The development and implementation of a CEMP will provide control measures for the following: Contractor should provide and maintain a temporary septic tank, and/or sewerage connection for disposal of sewage from the toilet facilities to reduce the likelihood of crude sewage infiltrating groundwater or migrating towards water bodies.

Residual Effects

16.5.23 The sensitivity of people and property is high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a **negligible** effect on the water bodies following the implementation of mitigation measures.

FDS Development Option

Alteration of the drainage regime

16.5.24 Demolition/Construction activities, such as topsoil stripping within the existing open space areas in the FDS Application site, will result in soil compaction and ultimately less water being bound up in the unsaturated soil matrix. This may increase the volume and the rate of surface water sheet run-off into off site infrastructure including public highway and third party development which could pose a localised flood risk.

16.5.25 Increasing the rate and volume of surface water run-off into the aforementioned off site areas and altering ground levels within the FDS Application site will affect local drainage patterns and may result in temporary pooling of water in certain parts of the site during the construction phase.

16.5.26 The sensitivity of the off-site infrastructure is considered to be high and the magnitude of change, prior to mitigation, is predicted to be high. Therefore, there is likely to be a direct, temporary, short term major negative significance prior to the implementation of mitigation measures.

Mitigation

16.5.27 To prevent localised flooding associated with extreme rainfall events during the demolition and construction phases a temporary localised run-off management system will be employed by the contractor. This will comprise temporary surface water run-off facilities such as storage tanks or ponds and will provide on-site attenuation for surface water flows and thereby reduce temporary flood risk.

16.5.28 Best practice recommendations for the prevention of localised flooding during construction will be outlined in more detail in the CEMP which will be prepared by the Principal Contractor.

Residual Effects

16.5.29 The sensitivity of the receptors are high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a **negligible** effect to offsite infrastructure after the implementation of mitigation measures.

Potential contamination of water resources

16.5.30 The operation of demolition and construction vehicles and general construction activities can potentially give rise to the contamination of surface water runoff from the FDS Application site by pollutants such as hydrocarbons, dust, suspended solids and construction materials. This may lead to deterioration of public sewerage water quality.

16.5.31 The sensitivity of the above receptor is considered to be high and the magnitude of change, prior to mitigation, is predicted to be high. Therefore, there is likely to be a direct, temporary, short term **major negative** significance prior to the implementation of mitigation measures.

16.5.32 It is anticipated that the FDS Application site will necessitate earthworks comprising excavations to construct/excavate building foundations, catchment control surface water storage devices and foul and surface water sewers. These excavations may lead to deterioration of ground water quality as direct pathways to the ground water could occur.

16.5.33 The sensitivity of the ground water onsite is considered to be high and the magnitude of change, prior to mitigation, is predicted to be high. Therefore, there is likely to be a direct, temporary, short term **major negative** significance prior to the implementation of mitigation measures.

Mitigation

16.5.34 The Principal Contractor appointed to manage and control all construction activities, including management of water resources and the storage of fuel and chemicals will put a CEMP for the FDS Application

site in place. The CEMP will detail the procedures and methods that must be followed to minimise the potential environmental effects of construction activities at the FDS Application site. The CEMP will be developed and agreed with LBS prior to the commencement of the construction activities. Contractors working will be required to comply with the CEMP and will be briefed accordingly. The CEMP will be monitored and updated throughout the duration of the project.

16.5.35 The CEMP will make reference to the provisions of the EA's Pollution Prevention Guidance Notes (PPG), and in particular:

- PPG 1 'General Guide to the Prevention of Water Pollution' (Ref 16.26);
- PPG 5 'Works in, near or liable to Affect Watercourses' (Ref 16.27);
- PPG 6 'Working at Construction and Demolition sites' (Ref 16.28); and
- PPG 8 'Safe Storage and Disposal of Used Oils' (Ref 16.29).

16.5.36 The CEMP will also describe the procedure if there is an environmental emergency; such as a fuel or chemical spillage on the FDS Application site. All contractors and personnel will be briefed on this procedure before construction work commences.

16.5.37 In addition, to protect the environment from contamination during the demolition/construction phase, a localised surface water run-off management system, lined where appropriate, will be employed by the contractor. This will enable containment of pollutants and sediment and only surface water, which is of a suitable standard, will be allowed to discharge from the FDS Application site.

16.5.38 Construction vehicles will be properly maintained to reduce the risk of the escape of potentially polluting substances (such as hydrocarbons) and will only operate when required. Other construction equipment and materials will be managed in such a way as to effectively minimise the risk posed to the water environment, e.g. chemicals and fuel will be stored in bunded areas. These storage areas will be inspected regularly and maintained to the required standard for the duration of the project.

Residual Effects

16.5.39 The sensitivity of the groundwater and public sewerage infrastructure is high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a **negligible** effect on the water resources following the implementation of mitigation measures.

Flood Risk to construction workers and construction plant

16.5.40 Contractor to prepare a flood emergency and contingency plan including arrangements to make safe any static plant, move any mobile plant, and to evacuate site operatives in a flood risk emergency. Construction workers should be made aware of risks associated with excess surface water caused by overland flows and standing water. For example, risks to excavations and damage to plant. If applicable any such groundwater control measures will also require pollution control measures in accordance with EA guidance.

Residual Effects

16.5.41 The sensitivity to site users is high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a **negligible** effect on the watercourses following the implementation of mitigation measures.

Leak or breakage of the temporary sewerage system

16.5.42 Leaks and breakages of sewers from the temporary toilet facilities onsite during construction works may result in crude sewage infiltrating groundwater or being washed into water bodies through surface water flows. Sewage contains high levels of nutrients, organic matter, coliforms and suspended solids. These can result in nutrient enrichment and eutrophication, smothering of bottom dwelling organisms and plants, and significantly reduced oxygen levels. The effect would be temporary as water quality within the affected water body would improve over time as organic matter is dispersed and treated by natural processes. Therefore, there is likely to be a direct, temporary, short term **moderate negative** significance prior to the implementation of mitigation measures.

Mitigation

16.5.43 Development and implementation of a CEMP that provides control measures for the following: Contractor should provide and maintain temporary septic tank, and/or sewerage connection for disposal of sewage from the toilet facilities to reduce the likelihood of crude sewage infiltrating groundwater or migrating towards water bodies.

Residual Effects

16.5.44 The sensitivity of people and property is high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a negligible effect on the water bodies following the implementation of mitigation measures.

Operation

Site Wide Development Option

Alteration of the existing drainage regime

16.5.45 Runoff generated from the Site is currently conveyed by existing drainage infrastructure to TWUL assets. It is the intention to mimic the existing drainage regime where practicable.

16.5.46 The proposed surface water drainage strategy will be split into two primary catchments; one catchment (the majority of the Site including the FDS Application site and southern section of the Masterplan Application site) draining to the TWUL 2,134mm internal diameter combined sewer in Albany Road, and the remaining catchment compromising the northern section of the Masterplan Application site draining to the 1,372mm by 914mm TWUL culvert in East Street. The Comprehensive Development will marginally increase the volume and rates of runoff directly into TWUL combined sewer.

16.5.47 The sensitivity of the combined sewers is considered to be high and the magnitude of change, prior to mitigation, is predicted to be high. Therefore, there is likely to be a direct, permanent, long term **major negative** significance prior to the implementation of mitigation measures.

Mitigation

16.5.48 The Comprehensive Development will largely mimic the existing drainage catchments however it will increase the volume of runoff. As the underlying soil is cohesive in nature across the Site it is not currently considered possible to mitigate this increase in flows and volumes generated by the catchments by implementing infiltration techniques. It is therefore proposed to mitigate against this and the increase in catchment discharging to the TWUL sewers by incorporating SuDS and limiting off site discharge rates. All flows off-site shall be restricted to the existing brownfield 1 in 2 year rainfall return period with a minimum 50% reduction in peak flow for all events up to and including the critical 1 in 100 year plus 30% allowance for climate change. The principles of measures to be used within the FDS Application site where practicable will be provided throughout the Comprehensive Development. Existing brownfield discharge rates have been calculated via the Wallingford Procedure Modified Rational Method as provisionally agreed with EA and LBS, please refer to the FRA for further details.

16.5.49 It should be noted that TWUL are in the process of carrying out a sewer capacity impact assessment to determine agreeable discharge rates. The allowable discharge rate to TWUL sewers within the planning application will remain conditioned until completion of the capacity impact assessment and agreement of discharge rates is made with TWUL, please refer to the FRA for further details.

16.5.50 Implementation of a new formal drainage arrangement and storage for the Comprehensive Development will also reduce the risk of offsite sheet flows generated by the site from entering third party areas.

Residual Effects

16.5.51 The sensitivity of the public sewer network is high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a direct, permanent, long term minor positive effect on the TWUL combined public sewer network following the implementation of mitigation measures.

16.5.52 The sensitivity of the offsite development areas is high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a direct, permanent, long term minor positive effect on the receptor following the implementation of mitigation measures.

Effect of surface water drainage

16.5.53 The FRA has identified that the development proposals create an increase in gross impermeable area on the site, (see FRA – Appendix 16.1).

16.5.54 An increase in impermeable area will alter the existing drainage characteristics of the Site and could generate greater peak surface water runoff and volume to offsite areas. Furthermore it is proposed to discharge the Comprehensive Development surface water flows to the TWUL combined sewers which if left unmitigated could exacerbate directly flood risk associated with the public combined sewer network.

16.5.55 The sensitivity of the TWUL combined public sewer network considered to be high and the magnitude of change, prior to mitigation, is predicted to be high. Therefore, there is likely to be a direct and indirect, permanent, long term **major negative** significance prior to the implementation of mitigation measures.

Mitigation

16.5.56 The Comprehensive Development will implement SuDS throughout in order to provide source control and attenuation of surface waters whilst also providing water quality and biodiversity enhancement. The Masterplan Application development will look to deliver SuDS in a similar manner as the FDS Application development identified within the FRA. The SuDS proposed include:

- Bio Retention Areas;
- Geo-cellular soil vault assembly units;
- Green Roofs;
- Tanked Storage; and
- Rainwater butts, where appropriate, will also be implemented as part of the proposed terraced housing arrangements. Other SuDS including permeable paving and rainwater harvesting will also be assessed further during the detailed design stages associated with the Masterplan Application.

16.5.57 The greenroofs, bio retention areas and soil vault assembly units will provide an element of source control and passive treatment of surface waters whilst also providing local bio diversity enhancement.

16.5.58 The surface water sewers will be sized to ensure that no surcharging occurs for the 1 in 2 year design storm rainfall event and no flooding for the 1 in 30 year event in accordance with Sewers for Adoption 7th Edition (Ref 16.22).

16.5.59 In an exceedance event such as the 1 in 100 year plus 30% allowance for climate change rainfall event, flows from the development parcels will be directed away from people and properties via overland flow routes towards the proposed bio-retention areas, open spaces and surface water storage areas.

16.5.60 Surface water runoff will be attenuated on-site for events up to and including the critical 1 in 100 year storm rainfall event with a 30% allowance for climate change and will be released off site to the existing TWUL combined sewer network. Discharge to the TWUL combined sewer network will be restricted to rates as set out within the FRA.

16.5.61 It is proposed that all SuDS within the public highway will be offered for adoption to LBS. All SuDS not within the public highway will be adopted by a third party management and maintenance company, who will be formed to maintain the SuDS devices throughout the lifetime of the development proposals.

16.5.62 It is considered that the principles for SuDS and dealing with surface water runoff for the Comprehensive Development can be dealt with in a sustainable manner, in accordance with the AAAP, LBS core strategy, and London Plan.

16.5.63 The SuDS devices will also be supplemented with traditional pollution control measures to prevent detriment in terms of water quality to receiving receptors.

Residual Effects

16.5.64 The sensitivity of the receptors is high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a **negligible** effect to the TWUL combined sewers following the implementation of mitigation measures.

Increased potable water demand

16.5.65 There will be an increased demand on the TWUL Potable Water Supply as a result of the Comprehensive Development.

16.5.66 The sensitivity of the potable water network is high and the magnitude of change, prior to any required mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long -term effect of **negligible** significance and no mitigation measures are required.

16.5.67 TWUL have confirmed via their Aylesbury Estate Regeneration Modelling Report that given the current parameters no upgrade works would be required to supply the Comprehensive Development.

Mitigation

16.5.68 No mitigation is required given the proposed development specifications.

Residual Effects

16.5.69 The sensitivity of the receptor is moderate and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a **negligible** effect to the local potable water supply.

Foul Water Increase

16.5.70 As a result of the Comprehensive Development there will be additional foul water discharge to the existing TWUL combined sewer network subject to the completion of TWUL capacity impact assessment.

16.5.71 The sensitivity of the offsite TWUL combined sewer network is high and the magnitude of change, prior to any required mitigation, is high. Therefore, there is likely to be a direct, permanent, long term of **moderate negative** significance prior to the implementation of mitigation measures.

16.5.72 The sensitivity of the TWUL infrastructure is high and the magnitude of change, prior to any required mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long -term effect of **negligible** significance and no mitigation measures are required due to available capacity.

Mitigation

16.5.73 The Comprehensive Development connection locations to the combined sewer network are proposed as existing connections. Where these connection locations cannot be utilised new connections will be made. Final arrangements will be decided upon during detailed design. Any mitigating upgrade works will be discussed and agreed post agreement of rates and locations of connection with TWUL during detailed design.

Residual Effects

16.5.74 The sensitivity of the offsite TWUL infrastructure is high and the magnitude of change, following required mitigation, where applicable, is negligible. Therefore, there is likely to be a **negligible** effect to the existing TWUL assets.

Increased flood risk to site users

16.5.75 Although there is negligible fluvial flood risk associated with the Comprehensive Development (see FRA), there could be a risk of overland sheet flow from offsite areas entering the site from the north west, furthermore during an extreme rainfall event the performance of the proposed surface water drainage arrangement could be exceeded and therefore cause a flood risk to people and properties within the Site.

16.5.76 The sensitivity of the site users are high and the magnitude of change, prior to any required mitigation, is medium. Therefore, there is likely to be a direct, permanent, long term of **moderate negative** significance prior to the implementation of mitigation measures.

Mitigation

16.5.77 The likelihood of a blockage to the surface water outfall devices or an extreme consecutive storm event occurring is minimal. To mitigate for this a robust maintenance and pre-treatment strategy shall be implemented to reduce the likelihood of blockages occurring.

16.5.78 To mitigate the risk to people or property in the event of the proposed surface water drainage arrangement being exceeded, finished floor levels, threshold levels, external levels and overland flood routes will be designed into the development to take account of overland flood flow routes from exceedance events, and to divert any excess floodwater around and away from proposed buildings. A specific site assessment of levels will be undertaken as developments come forward for detailed design.

16.5.79 In an exceedance event such as the 1 in 100 year plus 30% allowance for climate change rainfall event, flows from the development parcels will be directed away from built development via overland flow routes towards the proposed on site SuDS features and open spaces areas until such a time where capacity becomes available within the proposed and existing sewer network.

16.5.80 The Comprehensive Development will be protected from offsite flows from the north west by the existing and retained strategic highway network, which will intercept overland flows and divert them around and through the Applications Site.

Residual Effects

16.5.81 The sensitivity of the site users is high and the magnitude of change, following required mitigation, is negligible. Therefore, there is likely to be a **negligible** effect to site users.

FDS Only Development Option

Alteration of the existing drainage regime

16.5.82 Runoff generated from the FDS Application site is conveyed by existing drainage infrastructure to TWUL assets It is the intention to mimic the existing drainage regime where practicable.

16.5.83 The proposed surface water drainage strategy will be two internal catchments draining to ultimately the same TWUL sewer, as such it can be considered one catchment draining to the TWUL 2,134mm internal diameter combined sewer in Albany Road. The FDS Application development will marginally increase the volume and rates of runoff directly into TWUL combined sewer.

16.5.84 The sensitivity of the combined sewers, is considered to be high and the magnitude of change, prior to mitigation, is predicted to be high. Therefore, there is likely to be a direct, permanent, long term **major negative** significance prior to the implementation of mitigation measures.

Mitigation

16.5.85 The FDS Application development will largely mimic the existing drainage catchments however it will increase the volume of runoff. Intrusive infiltration testing within the FDS Application site has been carried out. Only one test location complied with BRE Digest 365, results from the intrusive testing can be found in the FRA. This test (located within the proposed West Moreland Park) is not located within an area where infiltration SuDS can be utilised due to planting and landscaping. As such no infiltration SuDS will be considered further within the FDS Application site. It is therefore proposed to mitigate against this and the increase in catchment discharging to the TWUL sewers by incorporating SuDS and limiting off site discharge rates. All flows off-site shall be restricted to the existing brownfield 1 in 2 year rainfall return period with a minimum 65% reduction in peak flow for all events up to and including the critical 1 in 100 year plus 30% allowance for climate change. Existing brownfield discharge rates have been calculated via the Wallingford Procedure Modified Rational Method as provisionally agreed with EA and LBS.

16.5.86 In addition green roof provision will reduce the proposed volumetric run-off by up to 120m^3 , see FRA for calculations and assumptions for proposed green roofs.

16.5.87 It should be noted that TWUL are in the process of carrying out a sewer capacity impact assessment to determine agreeable discharge rates. The allowable discharge rate to TWUL sewers from the proposed development will remain conditioned until completion of the capacity impact assessment and agreement of discharge rates is made with TWUL, please refer to the FRA for further details.

16.5.88 Implementation of a new formal drainage arrangement and circa 850m^3 storage for the FDS Application site will also reduce the risk of offsite sheet flows generated by the site from entering third party areas.

16.5.89 The SuDS devices will also be supplemented with traditional pollution control measures to prevent detriment in terms of water quality to receiving receptors.

Residual Effects

16.5.90 The sensitivity of the public sewer network is high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a direct, permanent, long term **minor positive** effect on the TWUL combined public sewer network following the implementation of mitigation measures.

16.5.91 The sensitivity of the offsite development areas is high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a direct, permanent, long term **minor positive** effect on the receptor following the implementation of mitigation measures.

Effect of surface water drainage

16.5.92 The NPPF FRA has identified that the FDS Application development will cause an increase in gross impermeable area on the site of 0.61 Ha, (see FRA (**Appendix 16.1**)).

16.5.93 An increase in impermeable area will alter the existing drainage characteristics of the site and could generate greater peak surface water runoff and volume to offsite areas, furthermore it is proposed to discharge the FDS Application development surface water flows to the TWUL combined sewers within Albany Road which if left unmitigated could exacerbate directly flood risk associated with the public combined sewer network.

16.5.94 The sensitivity of the TWUL combined public sewer network is considered to be high and the magnitude of change, prior to mitigation, is predicted to be high. Therefore, there is likely to be a direct and indirect, permanent, long term **major negative** significance prior to the implementation of mitigation measures.

Mitigation

16.5.95 The FDS Application development will implement SuDS throughout in order to provide source control and attenuation of surface waters whilst also providing water quality and biodiversity enhancement. The SuDS proposed include:

- Bio Retention Areas;
- Geo-cellular soil vault assembly units;
- Green Roofs (identified to mitigate 0.19 Ha of the increased impermeable area, see FRA); and
- Tanked Storage.

16.5.96 The greenroofs, bio retention areas and soil vault assembly units will provide an element of source control and passive treatment of surface waters whilst also providing local bio diversity enhancement.

16.5.97 The surface water sewers will be sized to ensure that no surcharging occurs for the 1 in 2 year design storm rainfall event and no flooding for the 1 in 30 year event in accordance with Sewers for Adoption 7th Edition (Ref 16.22).

16.5.98 In an exceedance event such as the 1 in 100 year plus 30% allowance for climate change rainfall event, flows from the development parcels will be directed away from people and properties via overland flow routes towards the proposed bio-retention areas, open spaces and surface water storage areas.

16.5.99 Surface water runoff will be attenuated on-site for events up to and including the critical 1 in 100 year storm rainfall event with a 30% allowance for climate change and will be released off site to the existing TWUL combined sewer network. Discharge to the TWUL combined sewer network will be restricted to rates as set out within the FRA.

16.5.100 It is proposed that all SuDS within public highway will be offered for adoption to LBS. All SuDS not within the public highway will be adopted by a third party management and maintenance company, who will be formed to maintain the SuDS devices throughout the lifetime of the FDS.

16.5.101 It is considered that the principles for SuDS and dealing with surface water runoff for the FDS Application site can be dealt with in a sustainable manner, in accordance with the AAAP, LBS core strategy, and London Plan.

Residual Effects

16.5.102 The sensitivity of the receptors is high and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a **negligible** effect to the TWUL combined sewers following the implementation of mitigation measures.

Increased potable water demand

16.5.103 There will be an increased demand on the TWUL Potable Water Supply as a result of the FDS Application development.

16.5.104 The sensitivity of the potable water network is high and the magnitude of change, prior to any required mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long -term effect of **negligible** significance and no mitigation measures are required.

16.5.105 TWUL have confirmed via their Aylesbury Estate Regeneration Modelling Report that given the current parameters no upgrade works would be required to supply the FDS Application development.

Mitigation

16.5.106 No mitigation is required given the proposed development specifications.

Residual Effects

16.5.107 The sensitivity of the receptor is moderate and the magnitude of change, following mitigation, is low. Therefore, there is likely to be a **negligible** effect to the local potable water supply.

Foul Water Increase

16.5.108 As a result of the FDS Application development there will be additional foul water discharge (circa 11m^3) to the existing TWUL combined sewer network subject to the completion of TWUL capacity impact assessment.

16.5.109 The sensitivity of the offsite TWUL combine sewer network is high and the magnitude of change, prior to any required mitigation, is high. Therefore, there is likely to be a direct, permanent, long term effect of **moderate negative** significance prior to the implementation of mitigation measures.

16.5.110 The sensitivity of the TWUL infrastructure is high and the magnitude of change, prior to any required mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long -term effect of **negligible** significance and no mitigation measures are required due to available capacity.

Mitigation

16.5.111 The connection locations for the FDS Application development on Albany Road and Portland Street to the combined sewer network are proposed to be the same as existing connections, where these connection locations cannot be utilised new connections will be made. Final arrangements will be decided upon during detailed design. Any mitigating upgrade works will be discussed and agreed post agreement of rates and locations of connection with TWUL during detailed design.

Residual Effects

16.5.112 The sensitivity of the offsite the TWUL infrastructure is high and the magnitude of change, following required mitigation, where applicable, is negligible. Therefore, there is likely to be a **negligible** effect to the existing TWUL assets.

Increased flood risk to site users

16.5.113 Although there is negligible fluvial flood risk associated with the FDS Application site (see FRA (**Appendix 16.1**)), there could be a risk of overland sheet flow from offsite areas entering the site from the north west, furthermore during an extreme rainfall event the performance of the proposed surface water drainage arrangement could be exceeded and therefore cause a flood risk to people and properties within the site.

16.5.114 The sensitivity of the site users are high and the magnitude of change, prior to any required mitigation, is medium. Therefore, there is likely to be a direct, permanent, long term of **moderate negative** significance prior to the implementation of mitigation measures.

Mitigation

16.5.115 The likelihood of a blockage to the surface water outfall devices or an extreme consecutive storm event occurring is minimal. To mitigate for this a robust maintenance and pre-treatment strategy shall be implemented to reduce the likelihood of blockages occurring.

16.5.116 To mitigate the risk to people or property in the event of the proposed surface water drainage arrangement being exceeded, finished floor levels, threshold levels, external levels and overland flood routes will be designed into the development to take account of overland flood flow routes from exceedance events, and to divert any excess floodwater around and away from proposed buildings.

16.5.117 In an exceedance event such as the 1 in 100 year plus 30% allowance for climate change rainfall event, flows from the development parcels will be directed away from built development via overland flow routes towards the proposed SuDS features and existing overland flow routes. SuDS devices such as green roofs, and bio retention areas will help manage exceedance flows close to source as possible whilst also providing a degree of attenuation prior to discharging into the catchment storage controls.

16.5.118 The FDS Application site will be protected from offsite flows from the north west by the existing and retained strategic highway network, which will intercept overland flows and divert them around and through the FDS Application site.

16.5.119 Overland flow routes from Westmoreland Road will be directed to SuDS devices where feasible or will draw down into the proposed traditional network to be stored and discharged at the controlled site discharge rate totalling 111 l/s.

16.5.120 The area subject to the surface water flooding identified to the south of the site where the existing basketball court is located will be landscaped and reprofiled to direct flows to SuDS and the public highway to ensure flows are not directed to People or property.

Residual Effects

16.5.121 The sensitivity of the site users is high and the magnitude of change, following required mitigation, is negligible. Therefore, there is likely to be a **negligible** effect to site users.

16.6 Summary

Site Wide Development Option

16.6.1 This assessment has been undertaken to determine the potential effects of the Comprehensive Development on hydrology, drainage and Flood Risk. The potential effects can be summarised as:

- Potential increased surface runoff;
- Potential increase of flood risk; and
- Potential contamination of water resources.

16.6.2 A CEMP will be put in place and will control all demolition and construction activities, including surface water management. This will detail the procedures and methods that must be followed to minimise potential environmental effects. This will be developed and agreed with LBS, EA and other regulators/consultees as required.

16.6.3 Currently the majority of the Site surface water runoff off coveys either directly or indirectly into TWUL combined sewers.

16.6.4 Potable water considerations such as low flow devices and on-site storage will be considered during detailed design.

16.6.5 The Comprehensive Development will incorporate SuDS techniques in order to attenuate surface water at source, regulate flows and volumes and provide water quality and biodiversity enhancement the general principles will follow that set out within the FDS Application strategy as a minimum.

16.6.6 The SuDS devices will also be supplemented with traditional pollution control measures to prevent detriment in terms of water quality to receiving receptors.

16.6.7 The proposed surface water sewer networks for will be offered for adoption to TWUL and a suitable SuDS maintenance regime will also be implemented by either LBS or a private management and maintenance company to ensure the performance of the drainage networks and SuDS throughout the lifetime of the Comprehensive Development.

16.6.8 Site specific overland flow routing will be assessed as and when the development comes forward for detailed planning. General principles set out within the FDS Application site will apply during design and overland flow routes will be maintained within the highway. External levels will be set to protect people and property from the risk of flooding.

16.6.9 Following the implementation of the recommended mitigation measures, no significant residual effects in terms of hydrology, drainage or flood risk are anticipated during demolition or construction, under operation with a new sewer network, surface water storage facilities and limited discharge rates it is likely that there will be betterment across the Comprehensive Development.

16.6.10 The Comprehensive Development will meet the requirements of relevant legislation (e.g. in terms of protection of the environment) and guidance (e.g. in terms of the NPPF and LBS Core Strategy and London Plan).

16.6.11 A summary of the effects of the Comprehensive Development on water resources and flood risk is presented below in **Table 16.3.**

FDS Development Option

16.6.12 This assessment has been undertaken to determine the potential effects of the FDS Application development on hydrology, drainage and Flood Risk. The potential effects can be summarised as:

- Potential increased surface runoff;
- Potential increase of flood risk; and
- Potential contamination of water resources.

16.6.13 A CEMP will be put in place and will control all demolition and construction activities, including surface water management. This will detail the procedures and methods that must be followed to minimise potential environmental effects. This will be developed and agreed with LBS, EA and other regulators/consultees as required.

16.6.14 Currently the majority of the FDS Application site surface water runoff off coveys either directly or indirectly into TWUL combined sewers.

16.6.15 The FDS Application development will be designed to emulate the existing drainage arrangement. Betterment will be built into the proposed drainage by limiting the discharge to a minimum of 65% less existing brownfield discharge rates.

16.6.16 The FDS Application development will incorporate SuDS techniques in order to attenuate surface water at source, regulate flows and volumes and provide water quality and biodiversity enhancement (See FRA for further details).

16.6.17 The SuDS devices (green roofs, bio-retention planters, and geocellular soil vault assembly units) will also be supplemented with traditional pollution control measures (catchpit manholes, petrol interceptors and alike)to prevent detriment in terms of water quality to receiving receptors.

16.6.18 The proposed surface water sewer networks for will be offered for adoption to TWUL and a suitable SuDS maintenance regime will also be implemented by either LBS or a private management and maintenance company to ensure the performance of the drainage networks and SuDS throughout the lifetime of the FDS.

16.6.19 Existing surface water flow routes currently routed through the FDS from offsite third parties will be maintained. These routes are identified by the EA surface water mapping as the main highway arrangement. Proposed finished levels within these routes will be at or close to existing levels, finished levels at property thresholds will be such that surface water runoff will be directed away from habitable properties.

16.6.20 Following the implementation of the recommended mitigation measures, no significant residual effects in terms of hydrology, drainage or flood risk are anticipated during demolition, construction or operation.

16.6.21 The FDS will meet the requirements of relevant legislation (e.g. in terms of protection of the environment) and guidance (e.g. in terms of the NPPF and LBS Core Strategy and London Plan).

16.6.22 A summary of the effects of the FDS on water resources and flood risk is presented below in **Table 16.4.**

Table 16.3: Summary of Water Resources, Water Quality, Flood Risk and Drainage Effects

Site Wide Development Option

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
Alteration of the drainage regime	Major	Negative	T	D	MT/LT	A CEMP will be developed and implemented by principle contractor A localised run-off management system will be employed by the principle contractor Temporary above ground storage facilities will be provided	Negligible	N/A	N/A	N/A	N/A	NPPF	N/A
Potential contamination of water resource	Moderate	Negative	T	D	MT/LT	A CEMP will be developed and implemented by principle contractor including surface water management where appropriate	Negligible	N/A	N/A	N/A	N/A	PPG 1 & 5	N/A
Flood Risk to Construction Workers and Plant	Minor	Negative	T	D	MT/LT	Contractor to provide a flood emergency and contingency plan	Negligible	N/A	N/A	N/A	N/A	NPPF	N/A
Leak or Breakage of temporary sewer system	Moderate	Negative	T	D	MT/LT	A CEMP will be developed that will provide measures on temporary foul water control measures	Negligible	N/A	N/A	N/A	N/A	PPG 1 and 5	N/A

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Operation													
Alteration of the drainage regime	Major	Negative	P	D I	LT	Development will discharge to the TWUL combined sewers at a minimum of 50% less existing brownfield rates as agreed with TWUL The perceived flood risk associated with sheet flows to off-site areas will be alleviated.	Negligible (development flows and volumes) Minor (off site sheet flow)	N/A Positive	N/A P	N/A D	N/A LT	NPPF, Code for Sustainable Homes	N/A
Effect of Surface Water Drainage	Major (surface water management)	Negative	P	D	LT	Increase of surface water runoff and volumes will be mitigated by SuDS techniques. All SuDS and drainage to be designed in accordance with relevant standards and best practice procedure s	Negligible	N/A	N/A	N/A	N/A	NPPF, CIRIA C697 and emerging National SuDS Standards	N/A

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Increased Potable Water	Negligible	N/A	P	D	L/T	TWUL have confirmed via their Aylesbury Estate Regeneration Modelling Report that given the current parameters no upgrade works would be required to supply the Comprehensive Development. Water saving measures will be considered within development areas	Negligible	N/A	N/A	N/A	N/A	N/A	Water Act (2003
Increased Combined Effluent Discharge	Moderate	Negative	P	D	L/T	Correspondence with TWUL will confirm available capacity to serve the Applications Site and any off site reinforcement required.	Negligible	N/A	N/A	N/A	N/A	NPPF	Water Act (2003)
Increased Risk to Site Users	Moderate	Negative	P	D	L/T	Overland flow routes will be maintained/ incorporated to direct overland flow routes away from habitable development.	Negligible	N/A	N/A	N/A	N/A	NPPF	N/A

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

Table 16.4: Summary of Water Resources, Water Quality, Flood Risk and Drainage Effects

FDS Development Option

Description of Likely Significant Effects	Significance of Effects					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/MT/LT)		
Construction													
Alteration of the drainage regime	Major	Negative	T	D	ST	A CEMP will be developed and implemented by principle contractor A localised run-off management system will be employed by the principle contractor Temporary above ground storage facilities will be provided	Negligible	N/A	N/A	N/A	N/A	NPPF	N/A
Potential contamination of water resource	Moderate	Negative	T	D	ST	A CEMP will be developed and implemented by principle contractor including surface water management where appropriate	Negligible	N/A	N/A	N/A	N/A	PPG 1 & 5	N/A
Flood Risk to Construction Workers and Plant	Minor	Negative	T	D	ST	Contractor to provide a flood emergency and contingency plan	Negligible	N/A	N/A	N/A	N/A	NPPF	N/A
Leak or Breakage of temporary sewer system	Moderate	Negative	T	D	ST	A CEMP will be developed that will provide measures on temporary foul water control measures	Negligible	N/A	N/A	N/A	N/A	PPG 1 and 5	N/A

Operation													
Alteration of the drainage regime	Major	Negative	P	D I	LT	Development will discharge to the TWUL combined sewers at a minimum of 50% less existing brownfield rates as agreed with TWUL The perceived flood risk associated with sheet flows to off-site areas will be alleviated.	Negligible (development flows and volumes) Minor (off site sheet flow)	N/A Positive	N/A P	N/A D	N/A LT	NPPF, Code for Sustainable Homes	N/A
Effect of Surface Water Drainage	Major (surface water management)	Negative	P	D	LT	Increase of surface water runoff and volumes will be mitigated by SuDS techniques. All SuDS and drainage to be designed in accordance with relevant standards and best practice procedure s	Negligible	N/A	N/A	N/A	N/A	NPPF, CIRIA C697 and emerging National SuDS Standards	N/A
Increased Potable Water	Negligible	N/A	P	D	L/T	TWUL have confirmed via their Aylesbury Estate Regeneration Modelling Report that given the current parameters no upgrade works would be required to supply the Comprehensive Development. Water saving measures will be considered within development areas	Negligible	N/A	N/A	N/A	N/A	N/A	Water Act (2003
Increased Combined Effluent Discharge	Moderate	Negative	P	D	L/T	Correspondence with TWUL will confirm available capacity to serve the FDS and any off site reinforcement required.	Negligible	N/A	N/A	N/A	N/A	NPPF	Water Act (2003)
Increased Risk to Site Users	Moderate	Negative	P	D	L/T	Overland flow routes will be maintained/ incorporated to direct overland flow routes away from habitable development.	Negligible	N/A	N/A	N/A	N/A	NPPF	N/A

Key:

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT = Short Term, Medium Term or Long Term

N/A = Not Applicable

16.7 References

Ref 16.1 2003, The Water Environment (Water Framework Directive) (England and Wales) Regulations

Ref 16.2 1995, The Environment Act

Ref 16.3 2003, The Water Act

Ref 16.4 1999 The Anti-Pollution Works Regulations

Ref 16.5 2009, The Groundwater Regulations

Ref 16.6 1991, The Water Industry Act

Ref 16.7 1991, The Land Drainage Act

Ref 16.8 2010, The Flood and Water Management Act

Ref 16.9 *2012, National Planning Policy Framework*

Ref 16.10 *2012, NPPF Technical Guidance*

Ref 16.11 *2011, London Plan*

Ref 16.12 *2014, London Plan Supplementary Planning Guidance*

Ref 16.13 *2007, Southwark Plan*

Ref 16.14 *2011, Southwark Core Strategy*

Ref 16.15 *2010, Aylesbury Area Action Plan*

Ref 16.16 2012, Code for Sustainable Homes & supporting Technical Guide

Ref 16.17 *2008, London Borough of Southwark Level 1 Strategic Flood Risk Assessment*

Ref 16.18 *Southwark Surface Water Management Plan*

Ref 16.19 2009, South East River Basin Management Plan

Ref 16.20 *2008, Future Water – The Government's Water Strategy for England*

Ref 16.21 2007, CIRIA 697: The SuDS Manual

Ref 16.22 2012, Water Research company (WRc) Sewers for Adoption 7th Edition August

Ref 16.23 *1981, The* Wallingford Procedure, Volume 4 Modified Rational Method

Ref 16.24 Thames Water Utilities Limited Sewer Records

Ref 16.25 Environment Agency's Online Mapping

Ref 16.26 PPG 1 'General Guide to the Prevention of Water Pollution';

Ref 16.27 PPG 5 'Works in, near or liable to Affect Watercourses';

Ref 16.28 PPG 6 'Working at Construction and Demolition sites'; and

Ref 16.29 PPG 8 'Safe Storage and Disposal of Used Oils'.

17 Cumulative Effects

17.1 Introduction

17.1.1 This Chapter reports the likely significant environmental cumulative effects of the Comprehensive Development with other relevant development. Cumulative effects comprise the combined effects of reasonable foreseeable human induced changes within a specific geographical area and over a certain period of time, and can be both direct and indirect.

17.1.2 The Department for Communities and Local Government (DCLG) published a consultation draft of Environmental Impact Assessment: *A Guide to Good Practice Procedures in June 2006* (Ref. 17.1), which identified two types of cumulative effects that require consideration within EIA:

- **In-combination effects:** the interaction and combination of environmental effects of a proposed development with other schemes and activities affecting the same receptor. Examples include residents along a road experiencing changes in local air quality and noise levels due to a cumulative increase in road traffic from new developments in the area; and
- **Effect interactions:** the interaction and combination of environmental effects, and indirect effects of a proposed development affecting the same receptor either within the site or in the local area. General examples include increased recreational access to and light spill into a woodland area, indirect effects on commercial development in the local area due to road construction as part of a proposed development.

17.1.3 The assessment of in-combination effects and effect interactions are discussed in Sections 17.2 and 17.3 respectively.

Assessment Methodology

17.1.4 The approach adopted for the assessment of cumulative effects is based on professional experience, the types of receptors being assessed, the nature of the Comprehensive Development and the identified committed and 'reasonably foreseeable' developments. The assessment methodology comprises:

- A desk based assessment of effect interactions based on predicted changes in baseline conditions at specific sensitive receptors, informed by the results of the assessments presented within the technical chapters of this ES (**Chapters 6 – 15**); and
- Desk based assessment of each technical topic in turn, generally qualitative, using professional expertise to make a judgement as to the likely significance of changes in baseline conditions in the area surrounding the Site arising from the Comprehensive Development together with committed developments which have been identified in consultation with LBS.

17.1.5 Where appropriate, and for the relevant technical disciplines, the consideration of cumulative effects arising from the committed development is discussed in Section 17.2.

17.2 Assessment of In-combination Effects (The Comprehensive Development together with the Committed Developments)

Scope of the Assessment

<u>Identification of Schemes to be Considered</u>

17.2.1 As discussed in **Chapter 2 'Approach to the Assessment'**, in accordance with the Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (Ref. 17.2), only developments that can reasonably be presumed to proceed (those schemes that are approved but not completed or

implemented as identified on LBS planning application register) and for which sufficient information is available have been taken into account in the cumulative effects assessment. These schemes are referred to as 'committed developments'.

17.2.2 In their EIA Scoping Opinion (**Appendix 2.2**) LBS provided details of 10 schemes to be considered in the assessment of cumulative effects. These were reconfirmed through the Scoping Opinion Response (**Appendix 2.3**) and the consented Site 7 outside the north-eastern boundary of the Site was also included.

17.2.3 As indicated in **Chapter 2 'Approach to the Assessment'** following a review of the available information on LBS's online register of planning applications for the schemes listed in the EIA Scoping Opinion and agreed through the Scoping Opinion Response, the approved committed developments that have been taken forward for assessment in relation to potential cumulative effects comprise:

- Site 7 Aylesbury Estate (LPA Ref. 12/AP/2332);
- Eileen House (LPA Ref. 09/AP/0343);
- Elmington (LPA Ref. 11/AP/4309);
- Heygate (LPA Ref. 12/AP/1092);
- Leisure Centre (LPA Ref. 12/AP/2570);
- Former London Park Hotel (LPA Ref. 07/AP/0760);
- Newington Causeway (LPA Ref. 09/AP/1940);
- One the Elephant (LPA Ref. 12/AP/2239);
- Elephant One (LPA Ref. 08/AP/2403);
- Trafalgar Place (LPA Ref. 12/AP/1455);
- Walworth Road 1 (LPA Ref. 14/AP/0833); and
- Walworth Road 2 (LPA Ref. 14/AP/0830).

17.2.4 The location of the above developments in relation to the Comprehensive Development is shown on **Figure 17.1**.

17.2.5 A review of these committed developments was undertaken and those relevant effects of the respective schemes which have the potential to result in likely significant cumulative effects together with the Comprehensive Development have been taken forward for further consideration in the assessment for each technical topic. This was determined based on consideration of the following:

- The nature and scale of the committed development;
- The distance of the committed development from the Comprehensive Development; and
- The potential for significant residual environmental effects to arise from the committed development (assuming that mitigation measures have been implemented in accordance with good practice and legal requirements).

17.2.6 The Transport Assessment (TA) (Ref. 17.3) submitted as an Application Report has considered the traffic effect of the Comprehensive Development on the local road network, taking account of the above committed developments as well as a forecast housing growth. The baseline and "with development" traffic data used in the assessments of the likely significant environmental effects presented in **Chapter 11 'Transportation and Access'**, **Chapter 12 'Noise'** and **Chapter 13 'Local Air Quality'** therefore include an assessment of cumulative traffic effects on the local highway network.

Summary of In-Combination Interactions Associated with Committed Developments

17.2.7 **Table 17.1** and **Table 17.2** summarises the potential for cumulative effects from each committed development together with the Site Wide Development Option (Comprehensive Development) and the FDS Development Option in relation to each technical environmental topic considered within **Chapters 6 – 16**.

17.2.8 For certain technical topics, it is appropriate to exclude (or scope out) the potential for cumulative effects based on distance from the Comprehensive Development or where significant effects are unlikely (for example due to the limited size of the committed development or the nature of effects being limited to within the Site boundary).

Table 17.1: Scope of Cumulative Effects Assessment on the Site Wide Development Option (including both Construction and Operation) Associated with the Committed Developments

Environmental Topic	Committed Development											
	Eileen House	Elmington	Heygate	Leisure Centre	Former London Park Hotel	Newington Causeway	One the Elephant	Site 7 Aylesbury Estate	Elephant One	Trafalgar Place	Walworth Road 1	Walworth Road 2
Ecology & Nature Conservation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Socio-Economics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Telecommunications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wind	×	×	×	×	×	×	×	×	×	×	×	×
Daylight, Sunlight and Overshadowing	×	×	×	×	×	×	×	×	×	×	×	×
Transport & Access	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Noise and Vibration	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Local Air Quality	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Archaeology	×	×	×	×	×	×	×	✓	×	×	×	×
Ground Conditions, Hydrogeology and Contamination	×	×	×	×	×	×	×	✓	×	×	×	×
Water Resources, Water Quality, Flood Risk and Drainage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Townscape, Visual and Built Heritage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ Scoped in
× Scoped out

Table 17.2: Scope of Cumulative Effects Assessment on the FDS Development Option (including both Construction and Operation) Associated with the Committed Developments

Environmental Topic	Committed Development											
	Eileen House	Elmington	Heygate	Leisure Centre	Former London Park Hotel	Newington Causeway	One the Elephant	Site 7 Aylesbury Estate	Elephant One	Trafalgar Place	Walworth Road 1	Walworth Road 2
Ecology & Nature Conservation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Socio-Economics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Telecommunications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wind	x	x	x	x	x	x	x	x	x	x	x	x
Daylight, Sunlight and Overshadowing	x	x	x	x	x	x	x	x	x	x	x	x
Transport & Access	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Noise and Vibration	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Local Air Quality	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Archaeology	x	x	x	x	x	x	x	✓	x	x	x	x
Ground Conditions, Hydrogeology and Contamination	x	x	x	x	x	x	x	✓	x	x	x	x
Water Resources, Water Quality, Flood Risk and Drainage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Townscape, Visual and Built Heritage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ Scoped in
✖ Scoped out

Assumptions

17.2.9 The following assumptions have been made in the assessment of cumulative effects:

- It is expected as for the Comprehensive Development, that other committed developments will have been approved in the context of national, strategic and local plan policy and will need to comply with appropriate planning conditions that will require appropriate mitigation measures to be implemented during their respective construction phases (such as through a Construction Environmental Management Plan (CEMP)), to prevent / minimise adverse effects during construction and avoid potential cumulative effects should construction periods overlap with that of the Comprehensive Development;
- The assessment has been completed based on information relating to the committed developments which is available within the public domain;
- The committed developments will be at least partly completed and operational by the time the Comprehensive Development is fully operational in 2035. This would be particularly the case with Site 7 of the Aylesbury Estate;
- The traffic data used in the assessment of air quality and noise effects associated with the Comprehensive Development as presented in **Chapter 12 'Noise and Vibration'** and **Chapter 13 'Local Air Quality'**, includes consideration of the Comprehensive Development together with the committed developments as set out in **Chapter 11 'Transportation and Access'**;
- Mitigation measures required to minimise or avoid likely significant negative environmental effects arising from the committed developments will be adopted as part of the implementation of those schemes; and
- As confirmed in **Chapter 1 'Introduction'**, planning permission has already been granted for Site 1a (Ref No. 07/AP/0046) and Site 7 (Ref No. 12/AP/2332) (both part of the Estate). As development of Site 1a is already complete, this has been treated as existing baseline in the technical Chapters (**Chapters 6 - 16**). Site 7 is currently under construction and has therefore been treated as a cumulative scheme (see section 2.5 and **Table 2.3** of **Chapter 2 'Approach to the Assessment'**), with the exception of **Chapter 10 'Daylight, Sunlight and Overshadowing'** and **Chapter 11 'Wind'** which has assessed Site 7 as part of the existing baseline.

Assessment of In-Combination Effects

17.2.10 The likely significant effects of the Comprehensive Development in conjunction with the committed developments listed and described above are discussed below in relation to each of the technical topics covered in this ES.

17.2.11 As per the technical chapters (**Chapter 6 – 16**), the cumulative assessment has been carried out for both the Site Wide Development Option and the FDS Development Option.

Ecology and Nature Conservation

Site Wide Development Option

Demolition and Construction Phase

17.2.12 Through implementation of appropriate mitigation, involving seasonal timing of works and use of appropriate working methods, it is considered that effects upon adjacent non-designated sites, breeding birds and bats resulting from the Site Wide Development Option and the committed developments will be negligible.

17.2.13 With respect to breeding birds, and bats, a temporary reduction in habitat availability during the demolition and construction phase has potential to contribute towards cumulative effects of greater significance (for example if a number of schemes, each requiring a temporary reduction in habitat, proceeded in parallel). Given the duration of the construction programme and nature of other development schemes in the vicinity however, it is considered unlikely that this will occur.

17.2.14 Due to the phased nature of the redevelopment, and relatively long construction period, landscaping of plots completed early in the construction period will have become established prior to removal of habitat from latter phases. Overall, this will lead to a net gain in habitat available to nesting birds and bats possible, and negative effects will be limited to a short-term period at the very beginning of the demolition and construction phase. It is improbable that this short time period will overlap with a high proportion of other schemes proposed, which generally involve existing urbanised sites, with limited potential to add to the short term reduction in semi-natural habitat availability.

Completed/Operational Phase

17.2.15 During the latter phases of the demolition and construction phase, and continuing into the operational phase positive effects of the landscaping incorporated into the Site Wide Development Option will be realised. It is reasonably assumed, that all committed development in the local area will be progressed in line with relevant national and local planning policy which requires proper consideration of ecological effects, and supports the inclusion of ecological enhancement measures in development proposals. It is considered highly unlikely therefore that cumulatively, redevelopment will reverse this positive effect, instead the number of development schemes pursued in the vicinity of the Site have potential together to increase the scale at which ecological enhancement may be significant.

FDS Development Option

Demolition and Construction Phase

17.2.16 Through implementation of appropriate mitigation, involving seasonal timing of works and use of appropriate working methods, it is considered that effects upon adjacent non-designated sites, breeding birds and bats resulting from the FDS Development Option will be negligible.

17.2.17 As for the Site Wide Development Option, the FDS Development Option has potential to contribute towards significant effects upon breeding birds, and bats, through the temporary reduction in habitat availability during the demolition and construction phase. Given the relatively small scale of the FDS Development Option and the nature of other development schemes in the vicinity however, it is considered unlikely that this will occur. This is because it is highly unlikely that all schemes will be progressed simultaneously, and the majority of schemes involve existing urbanised sites, with limited potential to add to the short term reduction in semi-natural habitat availability.

Completed / Operational Phase

17.2.18 During the operationally phase positive effects of the landscaping incorporated into the FDS Development Option will be realised. It is reasonably assumed, that all development in the local area will be progressed in line with relevant national and local planning policy which requires proper consideration of ecological effects, and supports the inclusion of ecological enhancement measures in development proposals. It is considered highly unlikely therefore that cumulatively, redevelopment will reverse this positive effect, instead the number of development schemes pursued in the vicinity of the FDS Application site have potential together to increase the scale at which ecological enhancement may be significant.

Socio-Economics

Site Wide Development Option

Construction

17.2.19 The Site Wide Development Option and committed developments are likely to have a direct, temporary, long-term moderate positive cumulative effect on employment in the area during the construction phase, including as a result of increased spend in the local area.

Completed / Operation

17.2.20 There is likely to be a direct, permanent, long-term minor positive cumulative effect as a result of the Site Wide Development Option in conjunction with the committed developments identified due to the provision of new housing, community facilities and educational facilities that these schemes will provide. The committed developments are also likely to have a direct, permanent, long-term moderate positive cumulative effect on employment in the area and the local economy once operational.

FDS Development Option

Construction

17.2.21 The FDS Development Option and committed developments are likely to have a direct, temporary, long-term moderate positive cumulative effect on employment in the area during the construction phase, including as a result of increased spend in the local area.

Completed/ Operation

17.2.22 There is likely to be a direct, permanent, long-term minor positive cumulative effect as a result of the FDS Development Option in conjunction with the committed developments identified due to the provision of new housing, community facilities and educational facilities that these schemes will provide. The committed developments are also likely to have a direct, permanent, long-term moderate positive cumulative effect on employment in the area and the local economy once operational.

Telecommunications

Site Wide Development Option

17.2.23 It is considered that, with appropriate mitigation (both committed schemes and Site Wide Development Option) (in accordance with current best practice standards) the other committed schemes together with the Site Wide Development Option would not give rise to any significant cumulative effects on existing or future sensitive receptors.

FDS Development Option

17.2.24 It is considered that, with appropriate mitigation (both committed schemes and FDS Development Option) (in accordance with current best practice standards) the other committed schemes together with the FDS Application site would not give rise to any significant cumulative effects on existing or future sensitive receptors.

Wind

Site Wide Development Option

17.2.25 Due to the distance separating the Site Wide Development Option and the majority of the committed developments, there are no cumulative developments in the surrounding area that may significantly impact on wind. Site 7 located in the north-east of the Site is currently under construction. The wind model used treats this area as constructed and is therefore considered as part of the existing baseline.

FDS Development Option

17.2.26 Due to the distance separating the FDS Development Option and the majority of the committed developments, there are no cumulative developments in the surrounding area that may significantly impact on the wind microclimate at the FDS Application site.

Daylight, Sunlight and Overshadowing

Site Wide Development Option

17.2.27 Due to the distance separating the Site Wide Development and the majority of the committed developments, there are no cumulative developments in the surrounding area that may significantly impact on daylight and sunlight. Site 7 located in the north-east of the Site is currently under construction. The daylight, sunlight and overshadowing model used treats this area as constructed and is therefore considered as part of the existing baseline condition.

FDS Development Option

17.2.28 Due to the distance separating the FDS Development Option and the majority of the committed developments, there are no cumulative developments in the surrounding area that may significantly impact on daylight and sunlight.

Transportation and Access

17.2.1 The assessment of transport effects includes additional traffic from committed development as part of the assessment process. The traffic flows have been established by reviewing application documents for the sites identified by LBS. The committed development traffic flows are assumed to have commenced at the time of the assessment of the effect of development traffic.

17.2.2 Consequently, the assessment of future traffic flows includes the anticipated developments in the area and allows for the cumulative effects of development.

Noise

Site Wide Development Option

Demolition and Construction

17.2.3 An indicative assessment of construction phase effects associated with the Site Wide Development Option has been undertaken. However, given the uncertainty of programme (which construction activities on different construction sites in the vicinity, if any, might coincide to cause a negative effect of greater significance at any particular receptor) a qualitative assessment of cumulative effects is considered appropriate.

17.2.4 Noise and vibration associated with construction activities will usually only cause significant negative effects at receptors in the immediate vicinity of a site. Consequently, unless there is another construction site a similar distance from, or closer to, a particular receptor, it will (all else remaining the same) be those activities on the nearest site which will cause the greatest effect.

17.2.5 **Figure 17.1** identifies the cumulative schemes to be considered in this assessment. The only committed development in close proximity to the Site is Site 7 (identified as No.8 on **Figure 17.1**) which was itself part of the Estate; all other cumulative sites are in excess of 200 metres away. The buildings on Site 7 have been demolished although, at the time of writing, the re-building has yet to get underway. Site 7 lies adjacent to Phase 2c (to the south-east) and Phase 3 (to the south-west on the other side of Thurlow Street) within the Masterplan Application site. The demolition of these phases is due to commence in June 2018 and May 2021 respectively, so it seems very likely that the building work on Site 7 would be complete before either of the adjoining sites are re-developed and no over-lap would occur.

17.2.6 If, however, demolition and construction activities were to overlap, then the works on both Sites would need to be carefully managed through adherence to their respective CEMPs. But ultimately there would be potential for cumulative effects of moderate to major negative significance to arise.

17.2.7 Elsewhere, as none of the other committed developments considered within this cumulative assessment lie in such close proximity to the Site, it is considered unlikely that the cumulative construction phase effects would be significantly greater than those presented in the construction phase assessment see **Chapter 12 'Noise'**) and as summarised below:

- Noise – effects of mostly minor negative significance are anticipated following the implementation of mitigation measures, although occasional effects of moderate to major negative significance are likely to occur during some activities when works are at their closest to nearby sensitive receptors.
- Traffic – residual effects of negligible significance are anticipated.
- Vibration – residual effects of minor negative significance are anticipated when works are at their closest to nearby vibration sensitive receptors.

Development Related Road Traffic

17.2.8 Unlike temporary site based demolition and construction phase activities, which generate essentially localised effects, development related road traffic obviously has the potential to affect a much wider area.

17.2.9 In **Chapter 12 'Noise'** consideration was given to the effect of traffic associated with the Site Wide Development Option comparing this scenario with the baseline situation. In each case traffic related to committed developments was included.

17.2.10 To determine the effect of traffic related to committed development on top of that related to the Site Wide Development Option, two traffic scenarios have been considered. The numbering of these scenarios follows on from that used in **Chapter 12 'Noise'**.

[1] 2014 baseline; and

[4] 2014 baseline plus committed developments plus Site Wide Development Option.

17.2.11 **Table 17.3** presents the difference in the BNL between scenario [4] and [1] from which the significance of the change attributable to the Site Wide Development Option and other committed developments can be derived. As no traffic growth is expected in the area in the future, no assessment has been undertaken of any future years.

Table 17.3: Predicted Difference in the Road Traffic Basic Noise Level (BNL), dB $L_{A10,18h}$

ID	Road	Between		Difference in BNL scenario [4] – [1]
1	A201 New Kent Road	Rodney Place	-	+0.1
2	A201 New Kent Road	Rodney Place	A2 Old Kent Road	+0.1
3	Rodney Place	A201 New Kent Road	Heygate Street	+1.1
4	A215 Walworth Road	Heygate Street	-	+0.1
5	Heygate Street	Rodney Place	A215 Walworth Road	+0.3
6	Rodney Road	Rodney Place	East Street	0.0
7	A2 Old Kent Road	East Street	A201 New Kent Road	0.0
8	East Street	Thurlow Street	A2 Old Kent Road	+0.1
9	East Street	Thurlow Street	-	+0.2
11	A215 Walworth Road	Heygate Street	East Street	0.0
12	A215 Walworth Road	Fielding Street	Merrow Street	0.0
13	Fielding Street	A215 Walworth Road	-	0.0
14	Portland Street	Merrow Street	-	+0.2

ID	Road	Between		Difference in BNL scenario [4] – [1]
15	Thurlow Street	East Street	Area 3/4 Access	+0.1
16	A2 Old Kent Road	East Street	B203 Dunton Road	0.0
17	Merrow Street	A215 Walworth Road	Portland Street	+0.1
19	A215 Walworth Road	Merrow Street	John Ruskin Street	0.0
20	John Ruskin Street	A215 Walworth Road	-	0.0
21	A215 Walworth Road	John Ruskin Street	B214 Albany Road	0.0
22	Portland Street	Merrow Street	B214 Albany Road	+0.3
24	A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	0.0
25	A215 Camberwell Road	A214 Albany Road	-	0.0
26	B214 Albany Road	A215 Walworth Road	Area 1 Access	+0.2
27	B214 Albany Road	Portland Street	Wells Way	+0.2
28	Wells Way	B214 Albany Road	-	0.0
29	B214 Albany Road	Wells Way	Thurlow Street	+0.1
30	B214 Albany Road	A2 Old Kent Road	Area 2 Access	+0.1
31	B204 Humphrey Road	A2 Old Kent Road	-	0.0
32	A2 Old Kent Road	B214 Albany Road	-	0.0
33	Thurlow Street	Area 3/4 Access	B214 Albany Road	+0.2
34	B214 Albany Road	Area 2 Access	Thurlow Street	+0.1
35	B214 Albany Road	Area 1 Access	Portland Street	+0.2
38	Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	+0.1
39	B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	+0.1

17.2.12 It can be seen that for all links the change in road traffic noise, comparing the baseline situation (scenario 1) with the situation including traffic associated with committed developments and the Site Wide Development Option (scenario 4), is no greater than +0.3 dB in the short, with a single exception – Rodney Place – where a short-term change of 1.1 dB is predicted.

17.2.13 Comparison of results with the adopted significance criteria reveals that, at worst, the increase in operational traffic noise associated with the Site Wide Development Option and committed developments would result in an effect of negligible significance along all roads, with the exception of Rodney Place where the change would be described as being of minor negative significance.

Fixed Building Services Plant

17.2.14 LBS requires that the fixed plant noise level is at least 10 dB below the existing background noise level $L_{A90,T}$, with plant which is likely to attract attention being penalised by a further 5 dB. In this situation, however, a different approach to determining noise emission criteria has been proposed as low background (L_{A90}) noise levels in the area would otherwise result in plant noise levels very substantially below existing ambient noise climate.

17.2.15 Where noise from a specific source is 10 dB or more below the existing ambient noise level, no significant uplift in the overall noise level (i.e. less than 0.5 dB) would be expected when the new source is

introduced. Consequently, the noise emission criteria proposed should prevent any significant uplift in ambient noise in the area.

17.2.16 Noise from fixed plant will usually only cause significant negative effects at receptors in the immediate vicinity, or put another way, noise emissions from fixed plant are usually controlled by the proximity of the nearest receptors. It follows, therefore, that any noise from any fixed plant associated with committed developments in the area is very unlikely to give rise to any significant cumulative effects.

17.2.17 It has already been established that the only cumulative scheme to lie in close proximity to the Site is Site 7. But even here, provided that all plant (i.e. that associated with the FDS and Masterplan Application sites and Site 7) adheres to agreed noise emission criteria, in line with LBS requirements, then it is unlikely that the cumulative fixed plant noise effects would be significantly greater than those presented in the fixed building services plant noise assessment (see **Chapter 12 'Noise'**), i.e. at worst, residual effects of negligible significance.

FDS Development Option

Demolition and Construction Phase Activities

17.2.18 The cumulative effects described in the equivalent section for the Site Wide Development Option apply equally to the FDS Development Option, with the exception of the comments relating to Site 7, which are not relevant as this cumulative scheme lies some distance (in excess of 500 m) to the north-east of the FDS Application site.

Development Related Road Traffic

17.2.19 Unlike temporary site based demolition and construction phase activities, which generate essentially localised effects, development related road traffic obviously has the potential to affect a much wider area.

17.2.20 In **Chapter 12 'Noise'** consideration was given to the effect of traffic associated with the FDS Development Option comparing this scenario with the baseline situation. In each case traffic related to committed developments was included.

17.2.21 To determine the effect of traffic related to committed development on top of that related to the FDS Development Option, two traffic scenarios have been considered. The numbering of these scenarios follows on from that used in **Chapter 12 'Noise'**.

[1] 2014 baseline; and

[5] 2014 baseline plus committed developments plus FDS Development Option.

17.2.22 **Table 17.4** presents the difference in the BNL between scenario [5] and [1] from which the significance of the change attributable to the FDS Development Option and other committed developments can be derived. As no traffic growth is expected in the area in the future, no assessment has been undertaken of any future years.

Table17.4: Predicted Difference in the Road Traffic Basic Noise Level (BNL), dB $L_{A10,18h}$

ID	Road	Between		Difference in BNL scenario [5] – [1]
1	A201 New Kent Road	Rodney Place	-	+0.1
2	A201 New Kent Road	Rodney Place	A2 Old Kent Road	+0.1
3	Rodney Place	A201 New Kent Road	Heygate Street	+1.0
4	A215 Walworth Road	Heygate Street	-	+0.1
5	Heygate Street	Rodney Place	A215 Walworth Road	+0.2

ID	Road	Between		Difference in BNL scenario [5] – [1]
6	Rodney Road	Rodney Place	East Street	0.0
7	A2 Old Kent Road	East Street	A201 New Kent Road	0.0
8	East Street	Thurlow Street	A2 Old Kent Road	0.0
9	East Street	Thurlow Street	-	+0.2
11	A215 Walworth Road	Heygate Street	East Street	0.0
12	A215 Walworth Road	Fielding Street	Merrow Street	0.0
13	Fielding Street	A215 Walworth Road	-	0.0
14	Portland Street	Merrow Street	-	+0.1
15	Thurlow Street	East Street	Area 3/4 Access	0.0
16	A2 Old Kent Road	East Street	B203 Dunton Road	0.0
17	Merrow Street	A215 Walworth Road	Portland Street	0.0
19	A215 Walworth Road	Merrow Street	John Ruskin Street	0.0
20	John Ruskin Street	A215 Walworth Road	-	0.0
21	A215 Walworth Road	John Ruskin Street	B214 Albany Road	0.0
22	Portland Street	Merrow Street	B214 Albany Road	+0.2
24	A2 Old Kent Road	Shorncliffe Street	B204 Humphrey Road	0.0
25	A215 Camberwell Road	A214 Albany Road	-	0.0
26	B214 Albany Road	A215 Walworth Road	Area 1 Access	+0.1
27	B214 Albany Road	Portland Street	Wells Way	+0.1
28	Wells Way	B214 Albany Road	-	0.0
29	B214 Albany Road	Wells Way	Thurlow Street	0.0
30	B214 Albany Road	A2 Old Kent Road	Area 2 Access	0.0
31	B204 Humphrey Road	A2 Old Kent Road	-	0.0
32	A2 Old Kent Road	B214 Albany Road	-	0.0
33	Thurlow Street	Area 3/4 Access	B214 Albany Road	0.0
34	B214 Albany Road	Area 2 Access	Thurlow Street	0.0
35	B214 Albany Road	Area 1 Access	Portland Street	+0.1
38	Shorncliffe Road	B214 Albany Road	A2 Old Kent Road	+0.1
39	B214 Albany Road	Shorncliffe Street	A2 Old Kent Road	0.0

17.2.23 It can be seen that for all links the change in road traffic noise, comparing the baseline situation (scenario 1) with the situation including traffic associated with committed developments and the FDS Development Option (scenario 5), is no greater than +0.2 dB in the short, with a single exception – Rodney Place – where a short-term change of +1.0 dB is predicted.

17.2.24 Comparison of results with the adopted significance criteria reveals that, at worst, the increase in operational traffic noise associated with the FDS Development Option and committed developments would result in an effect of negligible significance along all roads, with the exception of Rodney Place where the change would be described as being of minor negative significance.

Fixed Building Services Plant

17.2.25 The cumulative effects described in the equivalent section for the Site Wide Development Option apply equally to the FDS Development Option, with the exception of the comments relating to Site 7, which are not relevant as this cumulative scheme lies some distance (in excess of 500 metres) to the north-east of the FDS Application site.

Local Air Quality

17.2.26 The cumulative effects associated with other consented developments have been accounted for in the traffic data provided for the With Development scenario and the effects on local air quality predicted deemed insignificant.

Archaeology

Site Wide Development Option

17.2.1 No cumulative effects in relation to archaeology are expected during on-site construction activities in relation to the Eileen House, Elmington, Heygate, Leisure Centre, Former London Park Hotel, 89 – 93 Newington Causeway, One the Elephant, Elephant One, Trafalgar Place and Walworth Road 1 and Walworth Road 2 as these committed developments do not link substantively with the archaeological remains known or thought to exist within the Comprehensive Development.

17.2.2 Development of Site 7 may affect existing archaeological remains, although consent has already been granted for Site 7 and therefore archaeological planning conditions already imposed to control any effects. It is considered that the Comprehensive Development has a very low potential for the survival of buried archaeological remains dating between the Prehistoric and Medieval periods, a moderate potential for the survival of remains of Post-medieval origin and a high potential for remains of Modern origin. The Comprehensive Development will be required to undertake mitigation measures to reduce the effect on anticipated buried archaeological remains, through preservation by record (e.g. by means of an appropriate level of investigation to be agreed with LBS and its archaeological advisers), as it is unlikely any archaeological deposits would warrant 'preservation *in-situ*'. Therefore, there is predicted to be an in-combination cumulative effect of negligible negative significance following the implementation of mitigation measures.

FDS Development Option

17.2.3 No cumulative effects in relation to archaeology are expected during on-site construction activities in relation to the Eileen House, Elmington, Heygate, Leisure Centre, Former London Park Hotel, 89 – 93 Newington Causeway, One the Elephant, Elephant One, Trafalgar Place and Walworth Road 1 and Walworth Road 2 as these committed developments do not link substantively with the archaeological remains known or thought to exist within the FDS Application site.

17.2.4 Development of Site 7 may affect existing archaeological remains, although consent has already been granted for Site 7 and therefore archaeological planning conditions already imposed to control any effects. It is considered that the FDS Application site has a very low potential for the survival of buried archaeological remains dating between the Prehistoric and Medieval periods, a moderate potential for the survival of remains of Post-medieval origin and a high potential for remains of Modern origin. The FDS Application site will be required to undertake mitigation measures to reduce the effect on anticipated buried archaeological remains, through preservation by record (e.g. by means of an appropriate level of investigation to be agreed with LBS and its archaeological advisers), as it is unlikely any archaeological deposits would warrant 'preservation in-situ'. Therefore, there is predicted to be an in-combination cumulative effect of negligible negative significance following the implementation of mitigation measures.

Ground Conditions, Hydrogeology and Contamination

Site Wide Development Option

17.2.5 The implementation of the mitigation measures set out within **Chapter 15** will ensure that soil and water pollution during construction and operation is minimised to an acceptable level.

17.2.6 The Comprehensive Development would remove (where necessary) and remediate (where required) sources of contamination, so any elevated levels in the soil and groundwater would be reduced.

17.2.7 Therefore providing all necessary remediation / mitigation measures are implemented, it is considered that the Comprehensive Development will have a negligible effect on the adjacent environment with regard to contamination and ground conditions, where existing ground contamination is removed/remediated.

17.2.8 There are not considered to be any cumulative effects on ground conditions from the Comprehensive Development and other committed developments in the immediate area.

FDS Development Option

17.2.9 The implementation of the mitigation measures set out within **Chapter 15** will ensure that soil and water pollution during construction and operation is minimised to an acceptable level.

17.2.10 The FDS Application would remove (where necessary) and remediate (where required) sources of contamination, so any elevated levels in the soil and groundwater would be reduced.

17.2.11 Therefore providing all necessary remediation / mitigation measures are implemented, it is considered that the FDS Application will have a negligible effect on the adjacent environment with regard to contamination and ground conditions, where existing ground contamination is removed/remediated.

17.2.1 There are not considered to be any cumulative effects on ground conditions from the FDS Development and other committed developments in the immediate area.

Water Resources, Water Quality, Flood Risk and Drainage

Site Wide Development Option

17.2.2 If the proposed construction and demolition works associated with the committed developments and the Comprehensive Development coincide the cumulative effects on water quality could be significant prior to mitigation measures being implemented. This being said, cumulative effects during construction should be minimised through good site practice and adequate pollution prevention measures such as sediment traps and providing designated areas for oil and fuel storage. It is anticipated that if the planned developments incorporate similar appropriate measures then no significant effects will occur.

17.2.3 In the context of the NPPF and the requirements of the London Plan there will be no negative effect in the management of surface water in the area as each development is completed. The quality of the surface water run-off may well be improved through the implementation of appropriate SuDS at the Comprehensive Development and consented schemes due to replacement of brownfield land.

17.2.4 Although there will be a significant increase in potable water demand and capacity required for foul drainage, developments can be connected as and when capacity is created. Due to London Plan requirements (reduction in surface water run-off) the combined discharge to TWUL sewers from cumulative schemes is not expected to increase. TWUL is responsible for providing the foul and combined sewer drainage networks and potable water supply, early engagement with them will minimise delay to development. TWUL are responsible for managing the Comprehensive Development and consented schemes to ensure no negative cumulative effects occur to water resources or water quality to downstream receptors.

FDS Development Option

17.2.5 If the proposed construction and demolition works associated with the committed developments and the FDS Application site coincide the cumulative effects on water quality could be significant prior to mitigation measures being implemented. This being said, cumulative effects during construction should be minimised through good site practice and adequate pollution prevention measures such as sediment traps and providing designated areas for oil and fuel storage. It is anticipated that if the planned developments incorporate similar appropriate measures then no significant effects will occur.

17.2.6 In the context of the NPPF and the requirements of the London Plan there will be no negative effect in the management of surface water in the area as each development is completed. The quality of the surface water run-off may well be improved through the implementation of appropriate SuDS at the FDS Application site and consented schemes due to replacement of brownfield land.

17.2.7 Although there will be a significant increase in potable water demand and capacity required for foul drainage (circa 11m3) developments can be connected as and when capacity is created. Due to London Plan requirements (reduction in surface water run-off) the combined discharge to TWUL sewers from cumulative schemes is not expected to increase. TWUL is responsible for providing the foul and combined sewer drainage networks and potable water supply, early engagement with them will minimise delay to development. TWUL are responsible for managing the FDS Application site and consented schemes to ensure no negative cumulative effects occur to water resources or water quality to downstream receptors.

Townscape, Built Heritage and Visual Impact Assessment

Site Wide Development Option

17.2.8 The effects of the construction of the Comprehensive Development and the committed developments simultaneously on townscape, built heritage and visual amenity is likely to be considerably more intrusive due to the extent of the building works in local views and within the townscape. The construction works will be viewed as a single entity with cumulative effects of noise, dust, scaffolding, plant, machinery and cranes.

17.2.9 The overall cumulative effect on townscape character and visual amenity at construction of the Comprehensive Development and the committed developments together is therefore considered to be a temporary, medium to long-term effect of negative significance at construction with both direct and indirect effects.

17.2.1 The effects of the operation of the Comprehensive Development and the committed developments on townscape character and visual amenity is likely to be, overall, an enhancement to the local townscape character and visual amenity, given the regeneration of the Site into a new urban environment of high quality built form and public open space.

17.2.2 The overall cumulative effect on townscape character and visual amenity at operation the Comprehensive Development and the committed developments is therefore considered to be of positive.

FDS Development Option

17.2.3 The effects of the construction of the FDS Development and the committed developments simultaneously on townscape character and visual amenity is likely to be considerably more intrusive due to the extent of the building works in local views and within the townscape. The construction works will be viewed as a single entity with cumulative effects of noise, dust, scaffolding, plant, machinery and cranes.

17.2.4 The overall cumulative effect on townscape character and visual amenity at construction of the FDS Development and the committed developments together is therefore considered to be a temporary, medium to long-term effect of negative significance at construction with both direct and indirect effects.

17.2.5 The effects of the operation of the FDS Development and the committed developments on townscape character and visual amenity is likely to be, overall, an enhancement to the local townscape character and

visual amenity, given the regeneration of the FDS Development site into a new urban environment of high quality built form and public open space.

17.2.6 The overall cumulative effect on townscape character and visual amenity at operation the Comprehensive Development and the committed developments is therefore considered to be of positive.

17.3 Assessment of Effect Interactions (Site Wide Development Option)

Overview

17.3.1 This section provides an assessment of potential effect interactions between the relevant environmental topics on identified sensitive receptors during construction and operation of the Comprehensive Development. Effect interactions are discussed in the appropriate technical chapters (**Chapters 6 – 16** of this ES) and these should be referred to for further detail; however this section presents a summary of the potential effect interactions as considered within this ES. The results of the assessment presented in this section are following implementation of the recommended mitigation measures, as described within **Chapters 6 – 16**.

17.3.2 The effect interactions presented in **Tables 17.5 and 17.6** below are based on professional judgements made by the technical specialists who have completed the technical assessments within **Chapters 6 – 16**, taking into account the baseline conditions at the Site and in the surrounding area together with the findings from the various technical studies.

17.3.3 In terms of effect interactions, the following sensitive receptors have been identified due to their sensitivity as assessed in this ES:

- Existing residential properties near the Site;
- Future residential properties occupied during early phases of the Comprehensive Development which may be affected by ongoing construction works elsewhere within the Site; and
- Views from key designated heritage assets.

Effects Interactions During Construction

17.3.4 **Table 17.5** comprises a summary matrix for the construction works, showing the potential effect interactions following implementation of the recommended mitigation measures, based on the assessments presented within **Chapters 6 – 16**.

17.3.5 Only residual effects with the potential for effect interactions during construction are considered, therefore likely significant effects relating to the following technical topics are excluded from **Table 17.6** on the basis that effect interactions are unlikely:

- Ground Conditions and Contamination;
- Water Resources, Water Quality, Flood Risk and Drainage;
- Socio-Economics;
- Telecommunications;
- Wind; and
- Daylight, Sunlight and Overshadowing.

Table 17.5: Matrix of Residual Effect Interactions – Construction Phase

Likely Significant Environmental Effects	Significance of Residual Effect on Sensitive Receptors		
	Existing and Future Residential Properties near to and on the Site	**Users of the Local Highway Network**	**Sensitive Townscapes and Designated Heritage Assets**

Likely Significant Environmental Effects	Significance of Residual Effect on Sensitive Receptors		
	Existing and Future Residential Properties near to and on the Site	**Users of the Local Highway Network**	**Sensitive Townscapes and Designated Heritage Assets**
Effects relating to: - Construction traffic; and	Negligible	Negligible	N/A
- Pedestrian access.	Negligible	Negligible	N/A
Effects relating to: - Construction noise at existing sensitive receptors; and	Negligible to Minor Negative (but occasionally Moderate Negative (depending on receptor location and activity being undertaken)	N/A	N/A
- Construction vibration at existing sensitive receptors.	Negligible to Minor Negative (but occasionally Moderate Negative (depending on receptor location and activity being undertaken)	N/A	N/A
Effects relating to: - Dust and PM_{10} arising from on-site activities;	Negligible	N/A	N/A
- Emissions to air of NO_2 and PM_{10} from construction vehicles and site plant.	Negligible	N/A	N/A
Effects relating to: - Changes in views from identified visual receptors; and	Moderate to Major Negative (depending on receptor location)	N/A	Minor to Major Negative (depending on receptor location)
- Changes in townscape character.	Moderate Negative	N/A	Moderate Negative
Effects relating to: - Loss of potential buried / surface archaeological remains;	N/A	N/A	Negligible
- Changes to the setting of Conservation Areas; and	N/A	N/A	Negligible to Moderate Negative (depending on receptor location and activity being undertaken)
- Changes to the setting of designated heritage assets.	N/A	N/A	Negligible to Moderate Negative (depending on receptor location and activity being undertaken)
Overall Interaction of Effects	**Negligible to Major Negative**	**Negligible**	**Negligible to Major Negative**

17.3.6 During the site enabling and construction works, the majority of the potential effect interactions relate to nearby properties and residents where temporary effects are predicted in terms of noise and vibration from construction equipment and alterations to views into the Site. These residual effects range in significance from negligible to major negative.

17.3.7 Many of the residual effects related to the construction phase will be temporary, short-term (albeit over a long period) and intermittent during the construction works. The CEMP which will be implemented during

construction will minimise and control any negative effects on the existing environment, including properties near the Site, retained habitats and protected species.

Effect Interactions During Operation

17.3.8 **Table 17.6** comprises a summary matrix for the operation of the proposed developments, showing effect interactions between the relevant environmental topics assessed following implementation of the recommended mitigation measures, based on the assessments presented within **Chapters 6 – 16**.

17.3.9 Only residual effects with the potential for effect interactions during operation are considered, therefore likely significant effects relating to the following technical topics are excluded from **Table 17.6** on the basis that effect interactions are unlikely:

- Ground Conditions and Contamination;
- Water Resources, Water Quality, Flood Risk and Drainage;
- Telecommunications;
- Wind; and
- Daylight, Sunlight and Overshadowing.

17.3.10 Once the Comprehensive Development is complete, long-term effects of the Comprehensive Development on nearby residential properties and future residential properties within the Comprehensive Development are expected to arise from changes in road traffic noise and changes in views. Effects are predicted to range from minor negative to moderate positive.

17.3.11 Ecological effects relating to habitats and species within the Site are expected overall to be positive on at least a Site level as a result of management and enhancement of new and retained habitats.

Table 17.6: Matrix of Residual Effect Interactions – Operational Phase

Likely Significant Environmental Effects	Significance of Residual Effect on Sensitive Receptors		
	Existing and Future Residential Properties near to and on the Site	Users of the Local Highway Network	Sensitive Townscapes and Designated Heritage Assets
Effects relating to: - Traffic generated during operation; and	Negligible	Negligible	N/A
- Public transport.	Minor to Moderate Positive	Minor to Moderate Positive	N/A
Effects relating to: - Noise from operational road traffic;	Negligible	Negligible	N/A
- Noise arising from fixed plant; and	Negligible	N/A	N/A
Effects relating to: - Emissions to air of NO_2 and PM_{10} from vehicle movements associated with the Comprehenisve Development	Negligible	Negligible	N/A
Effects relating to: - Connectivity, movement and public open space within the Site.	Moderate Positive	Moderate Positive	N/A

Likely Significant Environmental Effects	Significance of Residual Effect on Sensitive Receptors		
	Existing and Future Residential Properties near to and on the Site	**Users of the Local Highway Network**	**Sensitive Townscapes and Designated Heritage Assets**
- Changes in views from identified visual receptors;	Minor Positive to Major Negative (depending on receptor location)	N/A	Minor Positive to Major Negative (depending on receptor location)
- Changes in townscape character.	Moderate Positive to Minor Negative (depending on receptor location)	N/A	Moderate Positive to Minor Negative (depending on receptor location)
Effects relating to: - Provision of community facilities (schools, health facilities and recreational facilities); and	Negligible to Moderate Positive	N/A	N/A
- Housing demand.	Moderate Positive	N/A	N/A
Effects relating to: - Changes to the setting of Conservation Areas; and	Negligible to Minor Negative (depending on receptor location)	N/A	Negligible to Minor Negative (depending on receptor location)
- Changes to the setting of designated heritage assets.	Negligible to Minor Negative (depending on receptor location)	N/A	Neglagable to Minor Negative (depending on receptor location)
Effects relating to: - Increased recreation, noise and light.	N/A	N/A	N/A
Overall Interaction of Effects	**Moderate Negative to Moderate Positive**	**Negligible to Moderate Positive**	**Minor Negative to Moderate Positive**

17.4 Assessment of Effect Interactions (FDS Development Option)

Overview

17.4.1 This section provides an assessment of potential effect interactions between the relevant environmental topics on identified sensitive receptors during construction and operation of the proposed FDS Development. Effect interactions are discussed in the appropriate technical chapters (**Chapters 6 – 16** of this ES) and these should be referred to for further detail; however this section presents a summary of the potential effect interactions as considered within this ES. The results of the assessment presented in this section are following implementation of the recommended mitigation measures, as described within **Chapters 6 – 16**.

17.4.2 The effect interactions presented in **Tables 17.7 and 17.8** below are based on professional judgements made by the technical specialists who have completed the technical assessments within **Chapters 6 – 16**, taking into account the baseline conditions at the Sites and in the surrounding area together with the findings from the various technical studies.

17.4.3 In terms of effect interactions, the following sensitive receptors have been identified due to their sensitivity as assessed in this ES:

- Existing residential properties near the Site;
- Future residential properties occupied during early phases of the FDS Application site which may be affected by ongoing construction works elsewhere within the Site; and

- Views from key designated heritage assets.

Effects Interactions During Construction

17.4.4 **Table 17.7** comprises a summary matrix for the construction works, showing the potential effect interactions following implementation of the recommended mitigation measures, based on the assessments presented within **Chapters 6– 16**.

17.4.5 Only residual effects with the potential for effect interactions during construction are considered, therefore likely significant effects relating to the following technical topics are excluded from **Table 17.7** on the basis that effect interactions are unlikely:

- Ground Conditions and Contamination;
- Water Resources, Water Quality, Flood Risk and Drainage;
- Socio-Economics;
- Telecommunications;
- Wind; and
- Daylight, Sunlight and Overshadowing.

Table 17.7: Matrix of Residual Effect Interactions – Construction Phase

Likely Significant Environmental Effects	Significance of Residual Effect on Sensitive Receptors		
	Existing and Future Residential Properties near to and on the Site	**Users of the Local Highway Network**	**Sensitive Townscapes and Designated Heritage Assets**
Effects relating to: - Construction traffic; and	Negligible	Negligible	N/A
- Pedestrian access.	Negligible	Negligible	N/A
Effects relating to: - Construction noise at existing sensitive receptors; and	Negligible to Minor Negative (but occasionally Moderate Negative (depending on receptor location and activity being undertaken)	N/A	N/A
- Construction vibration at existing sensitive receptors.	Negligible to Minor Negative (but occasionally Moderate Negative (depending on receptor location and activity being undertaken)	N/A	N/A
Effects relating to: - Dust and PM_{10} arising from on-site activities;	Negligible	N/A	N/A
- Emissions to air of NO_2 and PM_{10} from construction vehicles and site plant.	Negligible	N/A	N/A
Effects relating to: - Changes in views from identified visual receptors;	Moderate to Major Negative (depending on receptor location)	N/A	Minor to Major Negative (depending on receptor location)

Likely Significant Environmental Effects	Significance of Residual Effect on Sensitive Receptors		
	Existing and Future Residential Properties near to and on the Site	**Users of the Local Highway Network**	**Sensitive Townscapes and Designated Heritage Assets**
and			
- Changes in townscape character.	Moderate Negative	N/A	Moderate Negative
Effects relating to: - Loss of potential buried / surface archaeological remains;	N/A	N/A	Negligible
- Changes to the setting of Conservation Areas; and	N/A	N/A	Negligible to Moderate Negative (depending on receptor location and activity being undertaken)
- Changes to the setting of designated heritage assets.	N/A	N/A	Negligible to Moderate Negative (depending on receptor location and activity being undertaken)
Overall Interaction of Effects	**Negligible to Major Negative**	**Negligible**	**Negligible to Major Negative**

17.4.6 During the site enabling and construction works, the majority of the potential effect interactions relate to nearby properties and residents where temporary effects are predicted in terms of noise and vibration from construction equipment and alterations to views into the Site. These residual effects range in significance from negligible to major negative.

17.4.7 Many of the residual effects related to the construction phase will be temporary, short-term (albeit over a long period) and intermittent during the construction works. The CEMP which will be implemented during construction will minimise and control any negative effects on the existing environment, including properties near the Site, retained habitats and protected species.

Effect Interactions During Operation

17.4.8 **Table 17.8** comprises a summary matrix for the operation of the FDS Application site, showing effect interactions between the relevant environmental topics assessed following implementation of the recommended mitigation measures, based on the assessments presented within **Chapters 6 – 16**.

17.4.9 Only residual effects with the potential for effect interactions during operation are considered, therefore likely significant effects relating to the following technical topics are excluded from **Table 17.8** on the basis that effect interactions are unlikely:

- Ground Conditions and Contamination;
- Water Resources, Water Quality, Flood Risk and Drainage;
- Telecommunications;
- Wind; and
- Daylight, Sunlight and Overshadowing.

17.4.10 Once the FDS Development site is complete, long-term effects of the FDS Application Development on nearby residential properties and future residential properties and other uses within the FDS Development are expected to arise from changes in road traffic noise and changes in views. Effects are predicted to range from minor negative to moderate positive.

17.4.11 Ecological effects relating to habitats and species within the Site are expected overall to be positive on at least a Site level as a result of management and enhancement of new and retained habitats.

Table 17.8: Matrix of Residual Effect Interactions – Operational Phase

Likely Significant Environmental Effects	Significance of Residual Effect on Sensitive Receptors		
	Existing and Future Residential Properties near to and on the Site	Users of the Local Highway Network	Sensitive Townscapes and Designated Heritage Assets
Effects relating to: - Traffic generated during operation; and	Negligible	Negligible	N/A
- Public transport.	Minor to Moderate Positive	Minor to Moderate Positive	N/A
Effects relating to: - Noise from operational road traffic;	Negligible	Negligible	N/A
- Noise arising from fixed plant; and	Negligible	N/A	N/A
Effects relating to: - Emissions to air of NO_2 and PM_{10} from vehicle movements associated with the Proposed Development.	Negligible	Negligible	N/A
Effects relating to: - Connectivity, movement and public open space within the Site.	Moderate Positive	Moderate Positive	N/A
- Changes in views from identified visual receptors;	Minor Positive to Major Negative (depending on receptor location)	N/A	Minor Positive to Major Negative (depending on receptor location)

Likely Significant Environmental Effects	Significance of Residual Effect on Sensitive Receptors		
	Existing and Future Residential Properties near to and on the Site	**Users of the Local Highway Network**	**Sensitive Townscapes and Designated Heritage Assets**
- Changes in townscape character.	Moderate Positive to Minor Negative (depending on receptor location)	N/A	Moderate Positive to Minor Negative (depending on receptor location)
Effects relating to: - Provision of community facilities (schools, health facilities and recreational facilities); and	Negligible to Moderate Positive	N/A	N/A
- Housing demand.	Moderate Positive	N/A	N/A
Effects relating to: - Changes to the setting of Conservation Areas; and	Negligible to Minor Negative (depending on receptor location)	N/A	Negligible to Minor Negative (depending on receptor location)
- Changes to the setting of designated heritage assets.	Negligible to Minor Negative (depending on receptor location)	N/A	Negligible to Minor Negative (depending on receptor location)
Effects relating to: - Increased recreation, noise and light.	N/A	N/A	N/A
Overall Interaction of Effects	**Moderate Negative to Moderate Positive**	**Negligible to Moderate Positive**	**Minor Negative to Moderate Positive**

17.5 Summary

17.5.1 The potential effects of the Comprehensive Development together with the committed developments have been assessed. The construction works may result in short to medium term negative effects should the committed developments be constructed at the same time as the Comprehensive Development, resulting in an increase in disturbance from construction activities, an increase in noise and dust as a result of construction activities and a change in townscape character.

17.5.2 During site preparation and construction of the Comprehensive Development, the majority of potential effect interactions relate to nearby residents where temporary effects are expected in terms of noise and vibration, dust generation, townscape views and character of the Site.

17.5.3 It is important to note that these effects will be temporary and intermittent during the construction works. The CEMP for the Comprehensive Development will reduce and control any negative effects on the existing environment, including effects on existing residential properties near the Site.

17.5.4 Once the Comprehensive Development is complete, long-term in-combination effects (negative and positive) of the Comprehensive Development on existing and future residents (within the Site) are expected to arise from changes in road traffic, changes in views, an increase in housing numbers and local facilities.

17.6 References

Ref. 17.1 Department for Communities and Local Government (DCLG) (2006), Environmental Impact Assessment: A Guide to Good Practice Procedures

Ref. 17.2 European Community (1999), Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions

Ref. 17.3 WSP (2014), Aylesbury Estate – Transport Assessment

18 Summary of Mitigation Measures

18.1 Introduction

18.1.1 From the outset, the EIA process involved an iterative approach to inform the design and, where practicable, measures to mitigate likely significant negative environmental effects are inherent in the application documents for the the Comprehensive Development to avoid, reduce or offset such effects.

18.1.2 Where the assessment has resulted in potential significant negative adverse effects mitigation has been identified to:

- Control and manage the demolition and construction activities; and
- Control the operation of the Comprehensive Development.

18.1.3 **Table 18.1** and **Table 18.2** provides a summary of the mitigation measures identified within each of the technical chapters of this ES (**Chapters 6 – 16**) for the Site Wide Development Option and the FDS Development Option.

18.1.4 It is anticipated that the mitigation measures identified within the technical chapters (**Chapters 6 - 16**) will generally be secured by appropriate planning conditions to ensure that the high quality scheme proposed by the Applicant is fully implemented.

18.2 Construction Phase

18.2.1 The mitigation measures proposed during construction have been selected for their practicality and effectiveness. Specific mitigation measures and residual effects identified for the construction works within the technical ES chapters are summarised in **Table 18.1** and **Table 18.2**, whilst general commitments are set out below.

18.2.2 It is expected that there will be planning conditions requiring the preparation and submission of a Construction Environmental Management Plan (CEMP) and Construction Logistics Plan (CLP) to LBS for approval prior to commencement of demolition andconstruction works. Implementation of the CEMP and CLP will allow management and control of the proposed demolition and construction works associated with groundworks, including the management of materials, wastewater and the storage of fuels, construction plant and construction traffic. The CEMP will provide details on the procedures and methods to be followed to minimise any potential adverse effects of construction on the local environment, relating to local air quality, noise and vibration levels, lighting, visual amenity and ground conditions. Once the CEMP is approved, contractors working on the Site would be required to comply with the requirements of the CEMP through the provision of detailed method statements.

18.3 Operational Phase

18.3.1 Many of the mitigation measures which have been identified through the EIA process rely on effective implementation once the Comprehensive Development is completed. The precise management structures for controlling these activities to ensure that effects are minimised and the design objectives are achieved will be defined at a later stage andsecured by appropriate conditions.

18.3.2 Specific mitigation measures identified for the operational phase within the technical ES chapters are summarised in **Table 18.1** and **Table 18.2**.

Table 18.1: Summary of Mitigation for Site Wide Development Option

Chapter	Stage of Development	Likely Significant Effect	Mitigation Measures
Ecology and Nature Conservation	Demolition and Construction	Non-Statutory Sites (Burgess Park SBINC II and Surrey Square SLINC)	Measures to reduce dust generation as set out in CEMP.
		Bats	■ Seasonal timing of works and working methods to avoid direct effects ■ Provision of replacement roosting opportunities
		Birds (breeding)	■ Seasonal timing / appropriate working method to reduce direct effects ■ Provision of replacement nesting habitat
		Other species of principal importance (hedgehog)	Measures to translocate individuals animals during construction if encountered
	Operation	Non-Statutory Sites (Burgess Park SBINC II and Surrey Square SLINC)	■ Habitat creation within landscaping proposals, and management of newly created habitats
		On Site Habitat	■ Habitat creation within landscaping proposals, and management of newly created habitats
		Bats	■ Sensitive lighting scheme ■ Habitat creation within landscaping proposals, and management of newly created habitats
		Birds (breeding)	■ Habitat creation within landscaping proposals, and management of newly created habitats
		Other species of principal importance (hedgehog)	■ Habitat creation within landscaping proposals, and management of newly created habitats
Socio-Economics and Population Effects	Construction	Generation of employment during construction	■ Construction workplace coordinator and management fee. Applicant community investment programme to include targeted employment and training opportunities for local residents.
		Indirect and induced employment	None required
	Operation	Changes to employment during operation	Although the effect identified is positive steps will still be taken to accommodate existing employers within the Comprehensive Development Site wherever possible in accordance with the site decanting program.
		Local Spend	None required
		Effect on Schools	■ None required
		Effect on Health	■ None required
		Effect on Housing needs	None required
Telecommunications	Construction	Use of Cranes / Temporary Works	None Required
	Operation	Television Broadcast	■ Realigning end-user reception aerials in to an alternative transmitter ■ Realigning end-user aerials to ensure maximum reception strength; ■ Upgrading end-user equipment (television reception aerials, cables and/or signal boosters/amplifiers); ■ Relocating end-user aerials or satellite dishes on building façades or rooftops to maintain a direct line of sight;

Chapter	Stage of Development	Likely Significant Effect	Mitigation Measures
			■ Switching to digital television transmissions (ie. Freeview)
		Radio Broadcast	■ None Required.
		Satellite Reception	■ None Required.
Wind	Operation	Wind conditions in the surrounding areas after the development in 35 points out of 47	No mitigation measures needed.
		Wind conditions in the surrounding areas after the development in 11 points out of 47	No mitigation measures needed.
		Wind conditions in the surrounding areas after the development in 1 out of 47 points	No mitigation measures needed.
		Wind conditions within the Site in 23 points out of 190	Screens/parapets are needed and the balconies should be recessed
		Wind conditions within the Site in 33 points out of 190	Screens/parapets are needed
		Wind conditions within the Site in 44 points out of 190	No mitigation measures needed.
		Wind conditions within the Site in 90 points out of 190	No Mitigation measures needed.
Daylight, Sunlight and Overshadowing	Operation	Daylight conditions in the surrounding after the development	No mitigation measures needed
		Sunlight conditions in the surrounding after the development	No mitigation measures needed
		Overshadowing conditions in the surrounding after the development	No mitigation measures needed
Transport & Access	Construction	Severance	Construction Logistics Plan
		Driver Delay	Construction Logistics Plan
		Pedestrian and Cyclist Delay	Construction Logistics Plan
		Pedestrian and Cyclist Amenity	Construction Logistics Plan
		Fear and Intimidation	No mitigation measures needed
		Accidents and Safety	No mitigation measures needed
	Operation	Severance	No mitigation measures needed
		Driver Delay	Detailed design of pedestrian routes and open space
		Pedestrian and Cyclist Delay	Detailed design of pedestrian routes and open space
		Pedestrian and Cyclist Amenity	Detailed design of pedestrian routes and open space
		Fear and Intimidation	Detailed design of pedestrian routes and open space
		Accidents and Safety	No mitigation measures needed
Noise	Demolition and	Noise	Prepare and implement a CEMP

Chapter	Stage of Development	Likely Significant Effect	Mitigation Measures
	Construction	Traffic	None
		Vibration	Plant will be used that minimises vibration, details included within the CEMP
	Operation	Road traffic noise	None required
		Fixed building services plant noise	At detailed design stage for the Site Wide careful selection, installation and noise attenuation of all fixed plant to ensure that the proposed plant noise emission criteria are achieved
	Site Suitability	Ambient noise	At detailed design stage for the Site Wide provision of appropriate glazing and ventilation to ensure relevant internal daytime and night-time noise criteria are achieved
Local Air Quality	Demolition and Construction	Demolition, Earthworks, Construction & Trackout	■ Implementation of a CEMP ■ Employing good site practice, including dampening of exposed road surfaces and stock piles of materials. All vehicles carrying loose aggregates should be sheeted. ■ Ensure all motorised equipment on-site is kept in good working order. ■ Restrict on-site movements where possible. ■ Use of best practice in materials storage and transportations, plant maintenance and site management
		Emissions from to Air from on-site motorised equipment	■ All motorised equipment (plant and vehicles) to be maintained and kept in good working order. ■ Implement a 'no idling' policy on-site to reduce the relesase of emissions. ■ Establish haluage routes for construction traffic that is going to haveminimal impact on existing receptors and avoids sensitive roads (as the area is already declared an AQMA). ■ Timing of large scale vehicle movements – avoid peak hour traffic.
	Operation	Increase in NO_2 concentrations as a result of the combined effects of road traffic and the on-site energy centres.	■ Mechanical Ventilation ■ Travel Plan - Promote walking, public transport and cycling. ■ Additional measures may include the provision of electric vehicle charging points within the Proposed Development.
		Increase in PM_{10} concentrations as a result of the combined effects of road traffic and the on-site energy centres.	■ Travel Plan - Promote walking, public transport and cycling. ■ Additional measures may include the provision of electric vehicle charging points within the Proposed Development.
Archaeology	Construction	Disturbance, truncation or loss of potential buried/surface archaeological remains	Archaeological fieldwork to be agreed with LBS in response to appropriate planning conditions
Ground Conditions, Hydrogeology and Contamination	Construction	Effect of Exposure to Contamination and Geotechnical Hazards on construction Staff	■ CEMP, good working practice and good housekeeping ■ PPE and RPE for construction workforce and an appropriate Health and Safety risk assessment ■ Completion site investigation works secured by planning condition. Any additional contamination that is encountered is to be remediated in accordance with a Remediation Method Statement. ■ Implementation of a watching brief during excavation to identify any unexpected contamination within the Made Ground and provide for risk assessments and treatment if required.
		Effect of Contamination on Potable Water Supply	Water supply pipes to be installed in accordance with published guidance

Chapter	Stage of Development	Likely Significant Effect	Mitigation Measures
		Effect on Third Party Occupants and Properties	CEMP, good working practice and good housekeeping
		Effect on groundwater in the Secondary (A) and Principal Aquifers	CEMP, good working practice and good housekeeping
		Effect of construction plant/processes to Controlled Waters	CEMP, good working practice and good housekeeping
	Operation	Effect of Exposure to Contamination and Geotechnical Hazards on construction Staff	Appropriate remediation / mitigation strategy including localised source removal, provision of clean engineered cover and installation of gas protection measures
		Effect on Potable Water Supply	Water supply pipes to be installed in accordance with published guidance
		Effect on Third Party Occupants and Properties	No mitigation required
		Effect on groundwater in the Secondary (A) and Principal Aquifer from existing sources of contamination.	No mitigation required
Water Resources, Water Quality, Flood Risk and Drainage	Demolition and Construction	Alteration of the drainage regime	■ A CEMP will be developed and implemented by principle contractor ■ A localised run-off management system will be employed by the principle contractor ■ Temporary above ground storage facilities will be provided
		Potential contamination of water resource	A CEMP will be developed and implemented by principle contractor including surface water management where appropriate
		Flood Risk to Construction Workers and Plant	Contractor to provide a flood emergency and contingency plan
		Leak or Breakage of temporary sewer system	A CEMP will be developed that will provide measures on temporary foul water control measures
	Operation	Alteration of the drainage regime	■ Development will discharge to the TWUL combined sewers at a minimum of 50% less existing brownfield rates as agreed with TWUL ■ The perceived flood risk associated with sheet flows to off-site areas will be alleviated.
		Effect of Surface Water Drainage	■ Increase of surface water runoff and volumes will be mitigated by SuDS techniques. ■ All SuDS and drainage to be designed in accordance with relevant standards and best practice procedure s
		Increased Potable Water	■ Correspondence with TWUL will confirm available capacity to serve the Applications Site and any off site reinforcement required. ■ Water saving measures will be considered within development areas
		Increased Combined Effluent Discharge	Correspondence with TWUL will confirm available capacity to serve the Applications Site and any off site reinforcement required.
		Increased Risk to Site Users	Overland flow routes will be maintained/ incorporated to direct overland flow routes away from habitable development.
Townscape, Built Heritage and Visual Impact Assessment	Demolition and Construction	Effects on Townscape, Built Heritage and Views	■ Implementation of good site management ; ■ Use of high quality hoardings with advertising or artwork; ■ Use of building wraps; and ■ Advance planting and tree protection.
	Operation	Effects on Townscape, Built Heritage and Views	■ Use of high quality materials in the public realm; ■ Use of appropriate lighting, signage, street furniture and planters; ■ Undertake monitoring and management of planting; and

Chapter	Stage of Development	Likely Significant Effect	Mitigation Measures
			■ Replacement of any trees that die within 5 years.

Table 18.2: Summary of Mitigation for FDS Development Option

Chapter	Stage of Development	Likely Significant Effect	Mitigation Measures
Ecology and Nature Conservation	Demolition and Construction	None-Statutory Sites (Burgess Park SBINC II)	■ Measures to reduce dust generation as set out in CEMP.
		Bats	■ Seasonal timing of works and working methods to avoid direct effects ■ Provision of replacement roosting opportunities
		Birds (breeding)	■ Seasonal timing / appropriate working method to reduce direct effects ■ Provision of replacement nesting habitat
		Other species of principal importance (hedgehog)	■ Measures to translocate individuals animals during construction if encountered
	Operation	None-Statutory Sites (Burgess Park SBINC II)	■ Habitat creation within landscaping proposals, and management of newly created habitats
		On Site Habitat	■ Habitat creation within landscaping proposals, and management of newly created habitats
		Bats	■ Sensitive lighting scheme ■ Habitat creation within landscaping proposals, and management of newly created habitats
		Birds (breeding)	■ Habitat creation within landscaping proposals, and management of newly created habitats
		Other species of principal importance (hedgehog)	■ Habitat creation within landscaping proposals, and management of newly created habitats
Socio-Economics and Population Effects	Demolition and Construction	Generation of employment during construction	■ Construction workplace coordinator and management fee. Applicant community investment programme to include targeted employment and training opportunities for local residents.
		Indirect and induced employment	None required
	Operation	Changes to employment during operation	None required
		Local Spend	None required
		Effect on Schools	■ None required
		Effect on Health	■ The Applicant intends to provide a financial contribution if FDS Option proceeds without Masterplan Application development
		Effect on Housing needs	None required
		Generation of employment during construction	None required
Telecommunications	Demolition and Construction	Use of Cranes / Temporary Works	None Required
	Operation	Television Broadcast	■ Realigning end-user reception aerials in to an alternative transmitter ■ Realigning end-user aerials to ensure maximum reception strength; ■ Upgrading end-user equipment (television reception aerials, cables and/or signal boosters/amplifiers); ■ Relocating end-user aerials or satellite dishes on building façades or rooftops to maintain a direct line of sight; ■ Switching to digital television transmissions (ie. Freeview); and/or ■ Switching end users' systems to satellite, subscription cable or ADSL services.

Chapter	Stage of Development	Likely Significant Effect	Mitigation Measures
		Radio Broadcast	■ None Required.
		Satellite Reception	■ None Required.
Wind	Operation	Wind conditions in the surrounding areas after the development	Screens/parapets are needed
Daylight, Sunlight and Overshadowing	Operation	Daylight conditions in the surrounding after the development	No mitigation measures needed
		Sunlight conditions in the surrounding after the development	No mitigation measures needed
		Overshadowing conditions in the surrounding after the development	No mitigation measures needed
Transport & Access	Demolition and Construction	Severance	Construction Logistics Plan
		Driver Delay	Construction Logistics Plan
		Pedestrian and Cyclist Delay	Construction Logistics Plan
		Pedestrian and Cyclist Amenity	Construction Logistics Plan
		Fear and Intimidation	n/a
		Accidents and Safety	n/a
	Operation	Severance	n/a
		Driver Delay	Detailed design of pedestrian routes and open space
		Pedestrian and Cyclist Delay	Detailed design of pedestrian routes and open space
		Pedestrian and Cyclist Amenity	Detailed design of pedestrian routes and open space
		Fear and Intimidation	Detailed design of pedestrian routes and open space
		Accidents and Safety	n/a
Noise	Demolition and Construction	Noise	Prepare and implement a CEMP
		Traffic	None
		Vibration	Plant will be used that minimises vibration, details included within the CEMP
	Operation	Road traffic noise	None required
		Fixed building services plant noise	At detailed design stage for careful selection, installation and noise attenuation of all fixed plant to ensure that the proposed plant noise emission criteria are achieved
	Site Suitability	Ambient noise	At detailed design stage for the Site Wide provision of appropriate glazing and ventilation to ensure relevant internal daytime and night-time noise criteria are achieved
Local Air Quality	Demolition and Construction	Demolition, Earthworks, Construction & Trackout	■ Implementation of a CEMP. ■ Employing good site practice, including dampening of exposed road surfaces and stock piles of materials. All vehicles carrying loose aggregates should be sheeted. ■ Ensure all motorised equipment on-site is kept in good working order. ■ Restrict on-site movements where possible.

Chapter	Stage of Development	Likely Significant Effect	Mitigation Measures
			■ Use of best practice in materials storage and transportations, plant maintenance and site management
		Emissions from to Air from on-site motorised equipment	■ All motorised equipment (plant and vehicles) to be maintained and kept in good working order. ■ Implement a 'no idling' policy on-site to reduce the relesase of emissions. ■ Establish haluage routes for construction traffic that is going to haveminimal impact on existing receptors and avoids sensitive roads (as the area is already declared an AQMA). ■ Timing of large scale vehicle movements – avoid peak hour traffic.
	Operation	Increase in NO_2 concentrations as a result of the combined effects of road traffic and the on-site energy centres.	■ Mechanical Ventilation ■ Travel Plan - Promote walking, public transport and cycling. ■ Additional measures may include the provision of electric vehicle charging points within the Proposed Development.
		Increase in PM_{10} concentrations as a result of the combined effects of road traffic and the on-site energy centres.	■ Travel Plan - Promote walking, public transport and cycling. ■ Additional measures may include the provision of electric vehicle charging points within the Proposed Development.
Archaeology	Demolition and Construction	Disturbance, truncation or loss of potential buried/surface archaeological remains	Archaeological fieldwork to be agreed with LBS in response to appropriate planning conditions
Ground Conditions, Hydrogeology and Contamination	Demolition and Construction	Effect of Exposure to Contamination and Geotechnical Hazards on construction Staff	■ CEMP, good working practice and good housekeeping ■ PPE and RPE for construction workforce and an appropriate Health and Safety risk assessment ■ Completion site investigation works secured by planning condition. Any additional contamination that is encountered is to be remediated in accordance with a Remediation Method Statement. ■ Implementation of a watching brief during excavation to identify any unexpected contamination within the Made Ground and provide for risk assessments and treatment if required.
		Effect of Contamination on Potable Water Supply	Water supply pipes to be installed in accordance with published guidance
		Effect on Third Party Occupants and Properties	CEMP, good working practice and good housekeeping
		Effect on groundwater in the Secondary (A) and Principal Aquifers	CEMP, good working practice and good housekeeping
		Effect of construction plant/processes to Controlled Waters	CEMP, good working practice and good housekeeping
	Operation	Effect of Exposure to Contamination and Geotechnical Hazards on construction Staff	Appropriate remediation / mitigation strategy including localised source removal, provision of clean engineered cover and installation of gas protection measures
		Effect on Potable Water Supply	Water supply pipes to be installed in accordance with published guidance
		Effect on Third Party Occupants and Properties	No mitigation required
		Effect on groundwater in the Secondary (A) and Principal Aquifer from existing sources of contamination.	No mitigation required
Water Resources, Water Quality, Flood Risk and Drainage	Demolition and Construction	Alteration of the drainage regime	■ A CEMP will be developed and implemented by principle contractor ■ A localised run-off management system will be employed by the principle contractor ■ Temporary above ground storage facilities will be provided

Chapter	Stage of Development	Likely Significant Effect	Mitigation Measures
		Potential contamination of water resource	A CEMP will be developed and implemented by principle contractor including surface water management where appropriate
		Flood Risk to Construction Workers and Plant	Contractor to provide a flood emergency and contingency plan
		Leak or Breakage of temporary sewer system	A CEMP will be developed that will provide measures on temporary foul water control measures
	Operation	Alteration of the drainage regime	■ Development will discharge to the TWUL combined sewers at a minimum of 50% less existing brownfield rates as agreed with TWUL ■ The perceived flood risk associated with sheet flows to off-site areas will be alleviated.
		Effect of Surface Water Drainage	■ Increase of surface water runoff and volumes will be mitigated by SuDS techniques. ■ All SuDS and drainage to be designed in accordance with relevant standards and best practice procedures
		Increased Potable Water	■ Correspondence with TWUL will confirm available capacity to serve the FDS and any off site reinforcement required. ■ Water saving measures will be considered within development areas
		Increased Combined Effluent Discharge	Correspondence with TWUL will confirm available capacity to serve the FDS and any off site reinforcement required.
		Increased Risk to Site Users	Overland flow routes will be maintained/ incorporated to direct overland flow routes away from habitable development.
Townscape, Built Heritage and Visual Impact Assessment	Demolition and Construction	Effects on Townscape, Built Heritage and Views	■ Implementation of good site management ; ■ Use of high quality hoardings with advertising or artwork; ■ Use of building wraps; and ■ Advance planting and tree protection.
	Operation	Effects on Townscape, Built Heritage and Views	■ Use of high quality materials in the public realm; ■ Use of appropriate lighting, signage, street furniture and planters; ■ Undertake monitoring and management of planting; and ■ Replacement of any trees that die within 5 years.

19 Summary of Residual Effects

19.1 Introduction

19.1.1 The likely significant residual environmental effects of the Comprehensive Development have been assessed. These are the potential likely significant effects following the implementation of the proposed mitigation measures, and are outlined below and in the preceding technical Chapters of this ES (**Chapters 6 - 16**) and summarised in **Chapter 18 'Summary of Mitigation measures'**.

19.1.2 Each technical Chapter presents a detailed consideration of the likely residual effects. This Chapter provides a summary of the residual effects of the construction and operational phases of the Comprehensive Development and the FDS Development Option.

19.1.3 In reality however, it is the operational residual effects that are of greater relevance as they are generally potentially permanent in nature whereas construction effects are often less significant due to their temporary nature (albeit for a long period). A summary of residual effects are outlined below, focussing on the operational phase of the Site Wide Development Option and the FDS Development Option.

19.2 Residual Effects

Ecology and Nature Conservation

Site Wide Development Option

19.2.1 Following implementation of the appropriate identified mitigation measures the following residual effects upon ecological receptors are anticipated:

- A direct, temporary, negative effect on Burgess Park and Surrey Square is anticipated at Site level as a result of dust deposition during construction activities; however there will be a direct, temporary, negative effects of negligible significance during construction providing the mitigation measures are implemented properly;
- A temporary and permanent, direct, negative effect on roosting bats is anticipated of significance at the Site level as a result of habitat loss and fragmentation during construction activities; however, as newly created habitat becomes established, there should be a positive long term residual effect of significance at the Site level for this species group;
- A temporary and permanent, negative effect on breeding birds is anticipated as a result of the temporary habitat removal during construction at a Site level; however, there will be a permanent positive long term direct effect at Site level, anticipated on account of habitat creation and enhancement; and
- There will be a permanent positive long term direct effect at Site level, as a result of operational phase habitat creation and management of retained habitat for Species of Principle Importance.

FDS Development Option

19.2.2 Following implementation of appropriate mitigation the following residual effects upon ecological receptors are anticipated:

- A direct, temporary, negative effect on Burgess Park and Surrey Square is anticipated at Site level as a result of dust deposition during construction activities; however there will be a direct, temporary, negative effects of negligible significance during construction providing the mitigation measures are implemented properly;

- A temporary and permanent, direct, negative effect on roosting bats is anticipated of significance at the Site level as a result of habitat loss and fragmentation during construction activities; however, following mitigation there will be a negligible effect at the Site level for this species group;
- A temporary and permanent, negative effect on breeding birds is anticipated as a result of the temporary habitat removal during construction at a local level; however, the effects upon the breeding birds during the demolition and construction phase are assessed to be of negligible significance; and
- There will be a negligible effect at Site level, as a result of operational phase habitat creation and management of retained habitat for Species of Principle importance.

19.2.3 All other residual effects are anticipated to be negligible following implementation of appropriate mitigation measures. Although temporary effects during the construction period are anticipated, the mitigation proposed is considered sufficient to enable the scheme to proceed in accordance with applicable legislation and wherever possible in line with relevant planning policy.

Socio-Economics

19.2.4 The Comprehensive Development and the FDS Development alonewill include opportunities for employment, helping to meet local employment needs and provide the opportunity for people to live and work locally if they choose to do so.

19.2.5 During the Site Wide Development Option construction works, it is anticipated that the Comprehensive Development will provide approximately 616 Full Time Equivalent jobs and the FDS Development Option will provide approximately 184 Full Time Equivalent jobs, which would be expected to be filled in part by workers in the local area. Additional jobs are expected to also be created through induced employment. The presence of these workers in the area is likely to boost the local economy through the increase in spending. Further jobs will be created through indirect spend in the local community. During the operation of the Site Wide Development Option and FDS Development Option, changes (both positive and negative) will occur to employment dependent on the retail floor space delivered.

19.2.6 The Comprehensive Development will provide a range of housing options, including affordable housing, which will help to meet housing demands in LBS.

19.2.7 On the basis of available information sufficient capacity exists within primary and secondary schools to accommodate the predicted child yield from the Comprehensive Development.

19.2.8 The public open space and community facilities to be delivered as part of the Comprehensive Development will meet the demands of the new residents, and will also serve the wider community.

19.2.9 The residual effects are considered to range from moderate negative (floor space dependent) to moderate positive significance.

Telecommunications

19.2.10 A combination of a desk study and site visit identified that residents surrounding the Site Wide Development Option and the FDS Development Option will receive adequate broadcasts from the Crystal Palace transmitter to the south-west of the Site.

19.2.11 During the operational phase of the Site Wide Development Option and the FDS Development Option, a few properties to the north may experience interference to TV, Radio and Satellite broadcasts from the Crystal Palace transmitter with either a lower strength signal or loss of a signal. Realignment of TV aerials should restore these signals.

Wind

19.2.12 To predict the local wind environment and subsequent pedestrian comfort within and immediately surrounding the Site, the wind assessment used the Integrated Environmental Solution (IES) Virtual Environment (VE) Computational Fluid Dynamics (CFD) model to simulate local wind conditions. A quantified assessment of the potential wind environment of the existing conditions at the Site was used to establish the 'Baseline Scenario'. This was followed by an assessment of the Site with the Comprehensive Development in place in order to determine the effect. The surroundings of the Site, including the cumulative schemes, were

included in both the 'Baseline Scenario' and the 'Proposed Scenario' to directly derive the effect of the change in massing of the Comprehensive Development compared to the baseline condition

19.2.13 During the Operation of the Site Wide Development Option and FDS Development Option wind conditions will remain the same or have a minor positive effect due to plot orientation and provision of open space and landscaping.

Daylight, Sunlight and Overshadowing

19.2.14 During the demolition and construction phases, there are not expected to be any negative significant effects.

19.2.15 When the development is completed (for both the Site Wide Development Option and the FDS Development Option), in terms of daylight, sunlight and overshadowing, residual effects will range from negligible to minor positive.

Transportation and Access

19.2.16 The Site has good existing public transport links and will be close to a range of local facilities, thereby reducing reliance on private car use. The Comprehensive Development will be accessible by the underground and bus public transport services. The transport aspects of the Comprehensive Development will encourage the use of sustainable forms of transport and reduce the need to travel.

19.2.17 Construction vehicles associated with the Site Wide Development Option and FDS Development Option will have a short-term minor negative effect on severance, driver delay, and pedestrian and cycles.

19.2.18 Careful consideration has been given to providing a safe permeable environment for the movement of pedestrians and cyclists across the Site. The pedestrian facilities provided can comfortably accommodate the highest levels of demand generated by both the Comprehensive Development and the wider area.

19.2.19 Once the Site Wide Development Option is operational, driver delay is forecast to have a minor negative effect, with moderate beneficial effects on cyclists and pedestrians as a result of the improved permeability of the development and crossing facilities. The Comprehensive Development design and proposed new facilities for pedestrian and cyclists will result in a moderate beneficial effect upon amenity and fear/intimidation.

19.2.20 Once the FDS Development Option is operational there will be a moderate negative effect on severance at the Albany Road / Portland Street junction, with negligible effects elsewhere. The design of the FDS Development results in minor beneficial effects on pedestrian and cyclist amenity, and fear / intimidation.

19.2.21 The location of the Comprehensive Development provides access to a number of high quality and frequent public transport services, which represent an attractive alternative to travel by car, particularly for journeys into Central London.

19.2.22 Internal connectivity within the Site Comprehensive Development has been maximised to evenly distribute traffic, to avoid the build-up of traffic in particular points. Internal routes have been designed to enforce a low speed environment.

19.2.23 The residual effects are considered to range from moderate negative to minor beneficial significance.

Noise

19.2.24 Adoption of mitigation measures during the construction phase of the Comprehensive Development are expected to result in effects of minor negative significance, with occasional moderate to major negative effects during some activities near sensitive receptors. Vibration as a result of demolition and construction activities will have a minor negative effect.

19.2.25 The changes in road traffic noise as a result of the Comprehensive Development are anticipated to be negligible. A noise emission limit has been identified to minimise noise effects of all new fixed plant. Providing care is taken in the selection, location, installation and attenuation of the fixed plant to ensure that the noise emission limit is achieved, residual effects are anticipated to be negligible.

Local Air Quality

19.2.26 The Comprehensive Development is predicted to give rise to an imperceptible increase in nitrogen dioxide concentrations and fine particulates. During construction and operation of the Comprehensive Development there are considered to negligible residual effects on local air quality.

Archaeology and Cultural Heritage

19.2.27 The assessment has determined that truncation or loss of potential buried/surface archaeological remains will have a negligible to minor negative effect across both the Site Wide Development Option and the FDS Development Option.

Ground Conditions, Hydrogeology and Contamination

19.2.28 During the construction phase of Site Wide Development Option and the FDS Development Option the effect of exposure to contamination and geotechnical hazards on construction staff and the effect on groundwater and aquifers are likely to be of negligible to low significance.

19.2.29 Once operational, following the implementation of the recommended mitigation measures the residual effects are expected to be of negligible to low negative significance for both the Site Wide Development Option and the FDS Development Option.

Water Resources, Water Quality, Flood Risk and Drainage

19.2.30 Following the implementation of the recommended mitigation measures the residual effects relating to flood risk and potential contamination to surface water are anticipated to be negligible during construction of the Site Wide Development Option and the FDS Development Option.

19.2.31 Once operational negligible effects will arise from the Site Wide Development Option and the FDS Development Option. However, there will be minor positive effects on the alteration of the existing drainage regime due to the introduction of SuDS and other drainage arrangements for both the FDS and Site Wide Development Options.

19.3 Conclusions

19.3.1 The Comprehensive Development is for a residential-led development which will deliver up to 3,560 residential dwellings and supporting services and facilities, including business space, retail, and community / leisure use.

19.3.2 The Comprehensive Development is considered to be appropriate in terms of its location and viability including links to public transport services. The Comprehensive Development will provide a range of dwellings as well as retail / commercial and community facilities as well as areas of open space which will deliver benefits to the local and wider community, along with improved pedestrian and cycle provision around the Site.

19.3.3 The design of the Comprehensive Development and commitments that have been made to the proposed management practices during construction and operation incorporate a range of enhancement and mitigation measures. These measures will minimise any significant environmental effects and ensure that the sustainability and environmental performance of the Comprehensive Development is optimised.

19.3.4 Planning conditions, obligations or other means may be used to secure the delivery of the mitigation and enhancement measures set out in this ES and in other documents submitted in support of the planning applications.

19.3.5 A summary of the residual effects for the Site Wide Development Option and the FDS Development Option is provided in **Tables 19.1** and **19.2** below.

Table 19.1: Site Wide Development Option - Summary of Residual Effects

Chapter	Stage of Development	Description of Residual Effect	Significance of Residual Effects				
			Major, Moderate, Minor, Negligible	Positive / Negative	Permanent / Temporary	Direct / Indirect	Short / Medium / Long Term
Ecology and Nature Conservation	Construction	None-Statutory Sites (Burgess Park SBINC II and Surrey Square SLINC)	Negligible	NA	-	-	-
		Bats	Negligible	NA	-	-	-
		Birds (breeding)	Negligible	NA	-	-	-
		Other species of principal importance (hedgehog)	Negligible	NA	-	-	-
	Operation	None-Statutory Sites (Burgess Park SBINC II and Surrey Square SLINC)	Minor	Positive	Positive	Direct	Long Term
		On Site Habitat	Minor	Positive	Positive	Direct	Long Term
		Bats	Minor	Positive	Positive	Direct & Indirect	Long Term
		Birds (breeding)	Minor	Positive	Positive	Direct	Long Term
		Other species of principal importance (hedgehog)	Minor	Positive	Positive	Direct	Long Term
Socio-Economics and Population	Construction	Generation of employment during construction	Major	Positive	Temporary	Direct	Medium Term
		Indirect and induced employment	Moderate	Positive	Temporary	Indirect	Medium Term
	Operation	Changes to employment during operation	Moderate	Positive	Permanent	Direct	Long Term
		Local Spend	Moderate	Positive	Permanent	Direct	Long Term
		Effect on Schools	Negligible	Positive	Permanent	Direct	Long Term
		Effect on Health	Minor to moderate	Positive	Permanent	Direct	Long Term
		Effect on Housing needs	Moderate	Positive	Permanent	Direct	Long Term
Telecommunications	Construction	Use of Cranes / Temporary Works	Minor	Negative	Temporary	Direct	Medium Term
	Operation	Television Broadcast	Negligible	N/A	N/A	N/A	N/A
		Radio Broadcast	Negligible	N/A	N/A	N/A	N/A
		Satellite Reception	Negligible	N/A	N/A	N/A	N/A

Chapter	Stage of Development	Description of Residual Effect	Significance of Residual Effects				
			Major, Moderate, Minor, Negligible	Positive / Negative	Permanent / Temporary	Direct / Indirect	Short / Medium / Long Term
Wind	Operation	Wind conditions in the surrounding areas after the development in 35 points out of 47	N/A	Negligible	Permanent	Direct	Long Term
		Wind conditions in the surrounding areas after the development in 11 points out of 47	Minor	Positive	Permanent	Direct	Long Term
		Wind conditions in the surrounding areas after the development in 1 out of 47 points	Moderate	Positive	Permanent	Direct	Long Term
		Wind conditions within the Site in 23 points out of 190	N/A	Negligible	Permanent	Direct	Long Term
		Wind conditions within the Site in 33 points out of 190	N/A	Negligible	Permanent	Direct	Long Term
		Wind conditions within the Site in 44 points out of 190	N/A	Negligible	Permanent	Direct	Long Term
		Wind conditions within the Site in 90 points out of 190	Minor	Positive	Permanent	Direct	Long Term
Daylight, Sunlight and Overshadowing	**Operation**	Daylight conditions in the surrounding after the development in 2 windows out of 993	N/A	Negligible	Permanent	Direct	Long Term
		Daylight conditions in the surrounding after the development in 868 windows out of 993	N/A	Negligible	Permanent	Direct	Long Term
		Daylight conditions in the surrounding after the development in 51 windows out of 993	Minor	Positive	Permanent	Direct	Long Term
		Daylight conditions in the surrounding after the development in 37 windows out of 993	Moderate	Positive	Permanent	Direct	Long Term
		Daylight conditions in the surrounding after the development in 35 windows out of 993	Major	Positive	Permanent	Direct	Long Term
		Sunlight conditions in the surrounding after the development in 607 out of 611	N/A	Negligible	Permanent	Direct	Long Term
		Sunlight conditions in the surrounding after the development in 1 out of 611	Minor	Positive	Permanent	Direct	Long Term
		Sunlight conditions in the surrounding after the development in 1 out of 611	Moderate	Positive	Permanent	Direct	Long Term
		Sunlight conditions in the surrounding after the development in 2 out of 611	Major	Positive	Permanent	Direct	Long Term
		Overshadowing conditions in the surrounding after the development in 1 out of 65	N/A	Negligible	Permanent	Direct	Long Term
		Overshadowing conditions in the surrounding after the development in 34 out of 65	N/A	Negligible	Permanent	Direct	Long Term

Chapter	Stage of Development	Description of Residual Effect	Significance of Residual Effects				
			Major, Moderate, Minor, Negligible	Positive / Negative	Permanent / Temporary	Direct / Indirect	Short / Medium / Long Term
		Overshadowing conditions in the surrounding after the development in 8 out of 65	Minor	Positive	Permanent	Direct	Long Term
		Overshadowing conditions in the surrounding after the development in 7 out of 65	Moderate	Positive	Permanent	Direct	Long Term
		Overshadowing conditions in the surrounding after the development in 15 out of 65	Major	Positive	Permanent	Direct	Long Term
Transport and Access	Construction	Severance	Minor	Negative	Temporary	Direct	Medium Term
		Driver Delay	Minor	Negative	Temporary	Direct	Medium Term
		Pedestrian and Cyclist Delay	Minor	Negative	Temporary	Direct	Medium Term
		Pedestrian and Cyclist Amenity	Minor	Negative	Temporary	Direct	Medium Term
		Fear and Intimidation	Negligible	n/a	n/a	n/a	n/a
		Accidents and Safety	Negligible	n/a	n/a	n/a	n/a
	Operation	Severance	Negligible	n/a	n/a	n/a	n/a
		Driver Delay	Minor	Negative	Permanent	Direct	Long Term
		Pedestrian and Cyclist Delay	Moderate	Positive	Permanent	Direct	Long Term
		Pedestrian and Cyclist Amenity	Moderate	Positive	Permanent	Direct	Long Term
		Fear and Intimidation	Moderate	Positive	Permanent	Direct	Long Term
		Accidents and Safety	Negligible	n/a	n/a	n/a	n/a
Noise	Construction	Noise	Mostly minor, but occasion-ally moderate to major when works are close	Negative	Temporary	Direct	Medium Term
		Traffic	Negligible	N/A	Permanent	Direct	Medium Term
		Vibration	Minor at worst	Negative	Temporary	Direct	Medium Term
	Operation	Road traffic noise	Negligible	N/A	Permanent	Direct	Long Term
		Fixed building services plant noise	Negligible	N/A	Permanent	Direct	Long Term
	Site Suitability	Ambient noise	N/A	N/A	N/A	N/A	N/A

Chapter	Stage of Development	Description of Residual Effect	Significance of Residual Effects				
			Major, Moderate, Minor, Negligible	Positive / Negative	Permanent / Temporary	Direct / Indirect	Short / Medium / Long Term
Local Air Quality	Construction	Demolition, Earthworks, Construction & Trackout	Negligible	N/A	N/A	N/A	N/A
		Emissions from to Air from on-site motorised equipment	Negligible	N/A	N/A	N/A	N/A
	Operation	Increase in NO_2 concentrations as a result of the combined effects of road traffic and the on-site energy centres.	Negligible	N/A	N/A	N/A	N/A
		Increase in PM_{10} concentrations as a result of the combined effects of road traffic and the on-site energy centres.	Negligible	N/A	N/A	N/A	N/A
Archaeology	Construction	Disturbance, truncation or loss of potential buried/surface archaeological remains	Minor Negligible	Negative Negative	Permanent Permanent	Direct Direct	MediumTerm MediumTerm
Ground Conditions, Hydrogeology & Contamination	Construction	Effect of Exposure to Contamination and Geotechnical Hazards on construction Staff	Negligible to Minor	Negative	Temporary	Direct	MediumTerm
		Effect of Contamination on Potable Water Supply	Negligible	N/A	Permanent	Direct	MediumTerm
		Effect on Third Party Occupants and Properties	Negligible	N/A	Temporary	Direct	MediumTerm
		Effect on groundwater in the Secondary (A) and Principal Aquifers	Negligible	N/A	Temporary	Direct	Medium Term - Long Term
		Effect of construction plant/processes to Controlled Waters	Negligible	N/A	Temporary	Direct	Medium Term
	Operation	Effect of Exposure to Contamination and Geotechnical Hazards on construction Staff	Negligible to Minor	Negative	Permanent	Direct	Medium Term - Long Term
		Effect on Potable Water Supply	Negligible	N/A	Temporary	Direct	Short Term
		Effect on Third Party Occupants and Properties	Negligible	N/A	Temporary	Direct	Short Term
		Effect on groundwater in the Secondary (A) and Principal Aquifer from existing sources of contamination.	Negligible	N/A	Temporary	Direct	Short Term

Chapter	Stage of Development	Description of Residual Effect	Significance of Residual Effects				
			Major, Moderate, Minor, Negligible	Positive / Negative	Permanent / Temporary	Direct / Indirect	Short / Medium / Long Term
Water Resources, Water Quality, Flood Risk and Drainage Effects	**Construction**	Alteration of the drainage regime	Negligible	N/A	N/A	N/A	N/A
		Potential contamination of water resource	Negligible	N/A	N/A	N/A	N/A
		Flood Risk to Construction Workers and Plant	Negligible	N/A	N/A	N/A	N/A
		Leak or Breakage of temporary sewer system	Negligible	N/A	N/A	N/A	N/A
	Operation	Alteration of the drainage regime	Negligible (development flows and volumes) Minor (off site sheet flow)	N/A Positive	N/A Permanent	N/A Direct	N/A Long Term
		Effect of Surface Water Drainage	Negligible	N/A	N/A	N/A	N/A
		Increased Potable Water	Negligible	N/A	N/A	N/A	N/A
		Increased Combined Effluent Discharge	Negligible	N/A	N/A	N/A	N/A
		Increased Risk to Site Users	Negligible	N/A	N/A	N/A	N/A

Table 19.2: FDS Development Option - Summary of Residual Effects

Chapter	Stage of Development	Description of Residual Effect	Significance of Residual Effects				
			Major, Moderate, Minor, Negligible	Positive / Negative	Permanent / Temporary	Direct / Indirect	Short / Medium / Long Term
Ecology and Nature Conservation	Construction	None-Statutory Sites (Burgess Park SBINC II)	Negligible	NA	-	-	-
		Bats	Negligible	NA	-	-	-
		Birds (breeding)	Negligible	NA	-	-	-
		Other species of principal importance (hedgehog)	Negligible	NA	-	-	-
	Operation	None-Statutory Sites (Burgess Park SBINC II)	Minor	Positive	Positive	Direct	Long Term
		On Site Habitat	Minor	Positive	Positive	Direct	Long Term
		Bats	Minor	Positive	Positive	Direct & Indirect	Long Term
		Birds (breeding)	Minor	Positive	Positive	Direct	Long Term
		Other species of principal importance (hedgehog)	Minor	Positive	Positive	Direct	Long Term
Socio-Economics and Population	Construction	Generation of employment during construction	Moderate	Positive	Temporary	Direct	Medium Term
		Indirect and induced employment	Moderate	Positive	Temporary	Indirect	Medium Term
	Operation	Changes to employment during operation	Negligible	Positive	Permanent	Direct	Long Term
		Local Spend	Minor	Positive	Permanent	Direct	Long Term
		Effect on Schools	Negligible	Positive	Permanent	Direct	Long Term
		Effect on Health	Negligible	Positive	Permanent	Direct	Long Term
		Effect on Housing needs	Minor	Positive	Permanent	Direct	Long Term
Telecommunications	Construction	Use of Cranes / Temporary Works	Minor	Negative	Temporary	Direct	Short Term
	Operation	Television Broadcast	Negligible	N/A	N/A	N/A	N/A
		Radio Broadcast	Negligible	N/A	N/A	N/A	N/A
		Satellite Reception	Negligible	N/A	N/A	N/A	N/A
Wind	Operation	Wind conditions in the surrounding areas after the development in 5 points out of 15	N/A	Negligible	Permanent	Direct	Long Term
		Wind conditions in the surrounding areas after the development in 9 points out of 15	Minor	Positive	Permanent	Direct	Long Term
		Wind conditions on the surrounding areas after the development in 1 out of 15 points	Moderate	Positive	Permanent	Direct	Long Term

Chapter	Stage of Development	Description of Residual Effect	Significance of Residual Effects				
			Major, Moderate, Minor, Negligible	Positive / Negative	Permanent / Temporary	Direct / Indirect	Short / Medium / Long Term
		Wind conditions within the Site in 18 points out of 97	N/A	Negligible	Permanent	Direct	Long Term
		Wind conditions within the Site in 22 points out of 190	N/A	Negligible	Permanent	Direct	Long Term
		Wind conditions within the Site in 12 points out of 97	N/A	Negligible	Permanent	Direct	Long Term
		Wind conditions within the Site in 45 points out of 97	Minor	Positive	Permanent	Direct	Long Term
Daylight, Sunlight and Overshadowing	Operation	Daylight conditions in the surrounding after the development in 350 windows out of 429	N/A	Negligible	Permanent	Direct	Long Term
		Daylight conditions in the surrounding after the development in 34 windows out of 429	Minor	Positive	Permanent	Direct	Long Term
		Daylight conditions in the surrounding after the development in 14 windows out of 429	Moderate	Positive	Permanent	Direct	Long Term
		Daylight conditions in the surrounding after the development in 31 windows out of 429	Major	Positive	Permanent	Direct	Long Term
		Sunlight conditions in the surrounding after the development in 259 out of 262	N/A	Negligible	Permanent	Direct	Long Term
		Sunlight conditions in the surrounding after the development in 1 out of 262	Moderate	Positive	Permanent	Direct	Long Term
		Sunlight conditions in the surrounding after the development in 2 out of 262	Major	Positive	Permanent	Direct	Long Term
		Overshadowing conditions in the surrounding after the development in 5 out of 25	N/A	Negligible	Permanent	Direct	Long Term
		Overshadowing conditions in the surrounding after the development in 2 out of 25	Minor	Positive	Permanent	Direct	Long Term
		Overshadowing conditions in the surrounding after the development in 4 out of 25	Moderate	Positive	Permanent	Direct	Long Term
		Overshadowing conditions in the surrounding after the development in 14 out of 25	Major	Positive	Permanent	Direct	Long Term
Transport and Access	Construction	Severance	Minor	Negative	Temporary	Direct	Short Term
		Driver Delay	Minor	Negative	Temporary	Direct	Short Term
		Pedestrian and Cyclist Delay	Minor	Negative	Temporary	Direct	Short Term
		Pedestrian and Cyclist Amenity	Minor	Negative	Temporary	Direct	Short Term

Chapter	Stage of Development	Description of Residual Effect	Significance of Residual Effects				
			Major, Moderate, Minor, Negligible	Positive / Negative	Permanent / Temporary	Direct / Indirect	Short / Medium / Long Term
		Fear and Intimidation	Negligible	n/a	n/a	n/a	n/a
		Accidents and Safety	Negligible	n/a	n/a	n/a	n/a
	Operation	Severance	Negligible	n/a	n/a	n/a	n/a
		Driver Delay	Moderate	Negative	Permanent	Direct	Long Term
		Pedestrian and Cyclist Delay	Negligible	n/a	n/a	n/a	n/a
		Pedestrian and Cyclist Amenity	Minor	Positive	Permanent	Direct	Long Term
		Fear and Intimidation	Minor	Positive	Permanent	Direct	Long Term
		Accidents and Safety	Negligible	n/a	n/a	n/a	n/a
Noise	Construction	Noise	Mostly minor, but occasion-ally moderate to major when works are close	Negative	Temporary	Direct	Medium Term – Long Term
		Traffic	Negligible	N/A	Permanent	Direct	Medium Term – Long Term
		Vibration	Minor at worst	Negative	Temporary	Direct	Medium Term – Long Term
	Operation	Road traffic noise	Negligible	N/A	Permanent	Direct	Long Term
		Fixed building services plant noise	Negligible	N/A	Permanent	Direct	Long Term
	Site Suitability	Ambient noise	N/A	N/A	N/A	N/A	N/A
Local Air Quality	Construction	Demolition, Earthworks, Construction & Trackout	Negligible	N/A	N/A	N/A	N/A
		Emissions from to Air from on-site motorised equipment	Negligible	N/A	N/A	N/A	N/A
	Operation	Increase in NO_2 concentrations as a result of the combined effects of road traffic and the on-site energy centres.	Negligible	N/A	N/A	N/A	N/A
		Increase in PM_{10} concentrations as a result of the combined effects of road traffic and the on-site energy centres.	Negligible	N/A	N/A	N/A	N/A

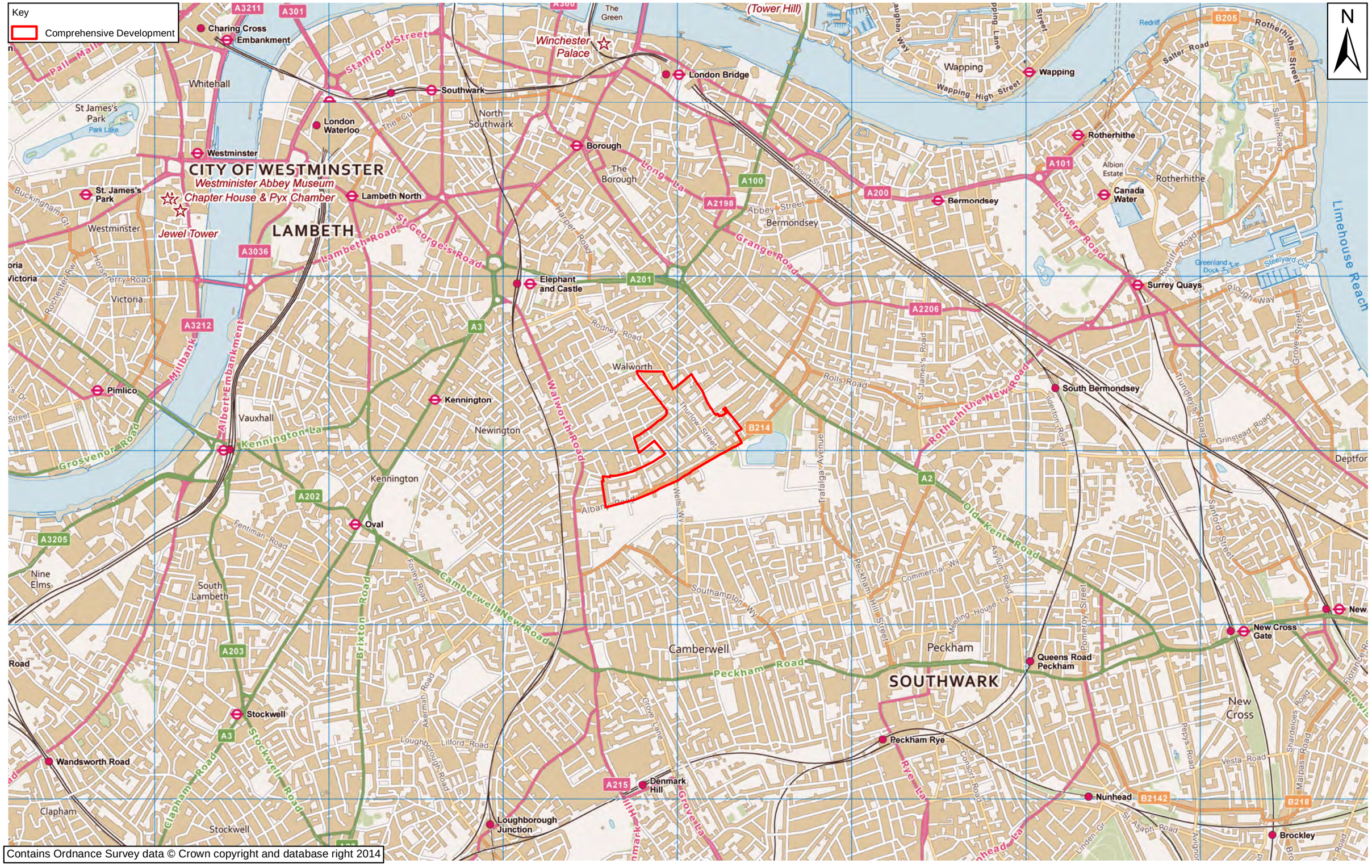
Chapter	Stage of Development	Description of Residual Effect	Significance of Residual Effects				
			Major, Moderate, Minor, Negligible	Positive / Negative	Permanent / Temporary	Direct / Indirect	Short / Medium / Long Term
Archaeology	Construction	Disturbance, truncation or loss of potential buried/surface archaeological remains	Minor Negligible	Negative Negative	Permanent Permanent	Direct Direct	Long Term Long Term
Ground Conditions, Hydrogeology & Contamination	Construction	Effect of Exposure to Contamination and Geotechnical Hazards on construction Staff	Negligible to Minor	Negative	Temporary	Direct	Short Term
		Effect of Contamination on Potable Water Supply	Negligible	N/A	Permanent	Direct	Long Term
		Effect on Third Party Occupants and Properties	Negligible	N/A	Temporary	Direct	Short Term
		Effect on groundwater in the Secondary (A) and Principal Aquifers	Negligible to Minor	Negative	Temporary	Direct	Medium Term – Long Term
		Effect of construction plant/processes to Controlled Waters	Negligible	N/A	Temporary	Direct	Medium Term
	Operation	Effect of Exposure to Contamination and Geotechnical Hazards on construction Staff	Negligible to Minor	Negative	Permanent	Direct	Medium Term - Long Term
		Effect on Potable Water Supply	Negligible	N/A	Temporary	Direct	Short Term
		Effect on Third Party Occupants and Properties	Negligible	N/A	Temporary	Direct	Short Term
		Effect on groundwater in the Secondary (A) and Principal Aquifer from existing sources of contamination.	Negligible	N/A	Temporary	Direct	Short Term
Water Resources, Water Quality, Flood Risk and Drainage	Construction	Alteration of the drainage regime	Negligible	N/A	N/A	N/A	N/A
		Potential contamination of water resource	Negligible	N/A	N/A	N/A	N/A
		Flood Risk to Construction Workers and Plant	Negligible	N/A	N/A	N/A	N/A
		Leak or Breakage of temporary sewer system	Negligible	N/A	N/A	N/A	N/A
	Operation	Alteration of the drainage regime	Negligible (development flows and volumes) Minor (off site sheet flow)	N/A Positive	N/A Permanent	N/A Direct	N/A Long Term
		Effect of Surface Water Drainage	Negligible	N/A	N/A	N/A	N/A
		Increased Potable Water	Negligible	N/A	N/A	N/A	N/A

Chapter	Stage of Development	Description of Residual Effect	Significance of Residual Effects				
			Major, Moderate, Minor, Negligible	Positive / Negative	Permanent / Temporary	Direct / Indirect	Short / Medium / Long Term
		Increased Combined Effluent Discharge	Negligible	N/A	N/A	N/A	N/A
		Increased Risk to Site Users	Negligible	N/A	N/A	N/A	N/A

Site Location Plan

Scale @ A3 : 20,000

Figure 1.1



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Client: Notting Hill Housing Trust

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Checked: CP
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Revision: A
Date: September 2014

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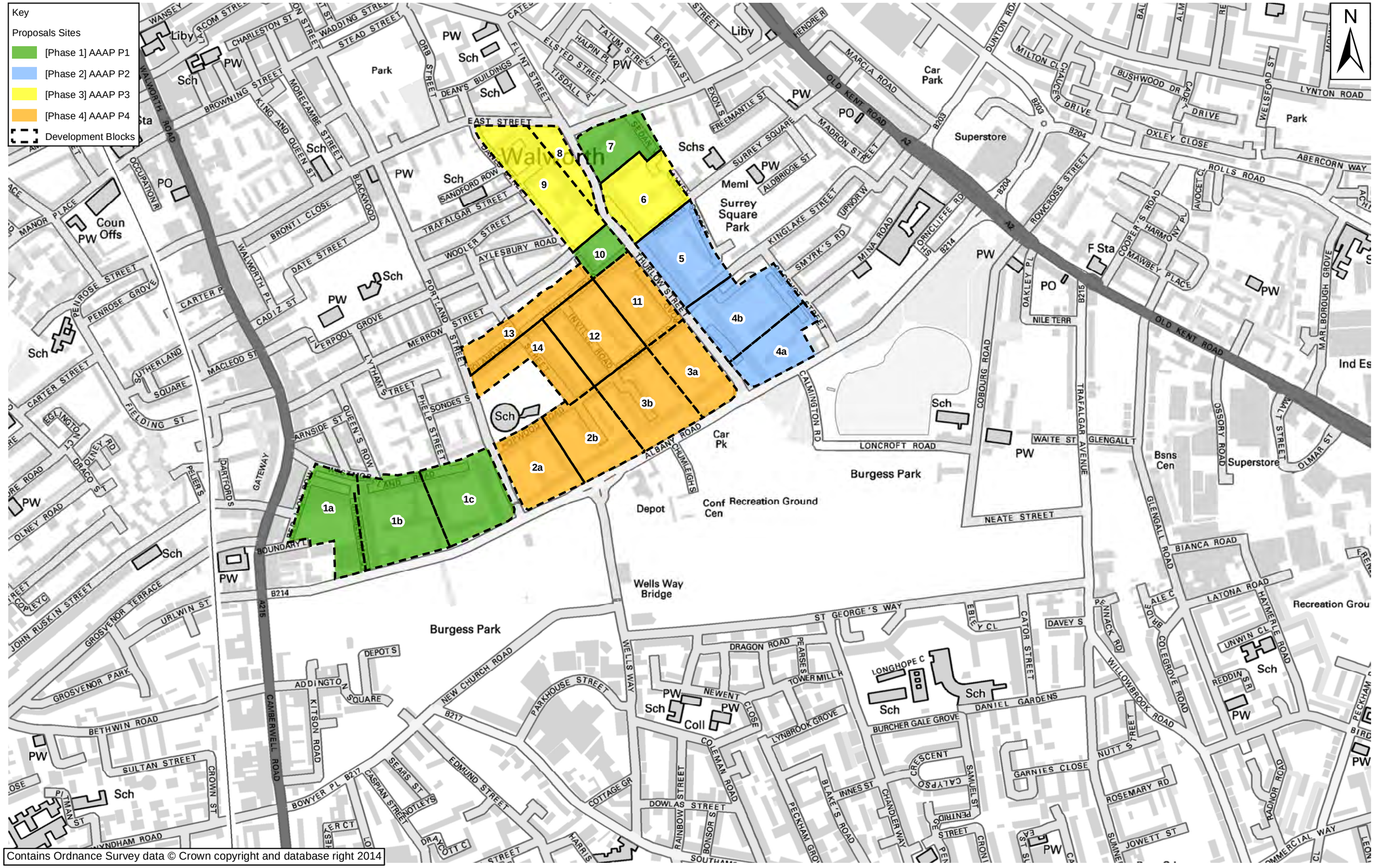

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The Masterplan Application Boundary

Scale @ A3 : 6,000

Figure 1.4

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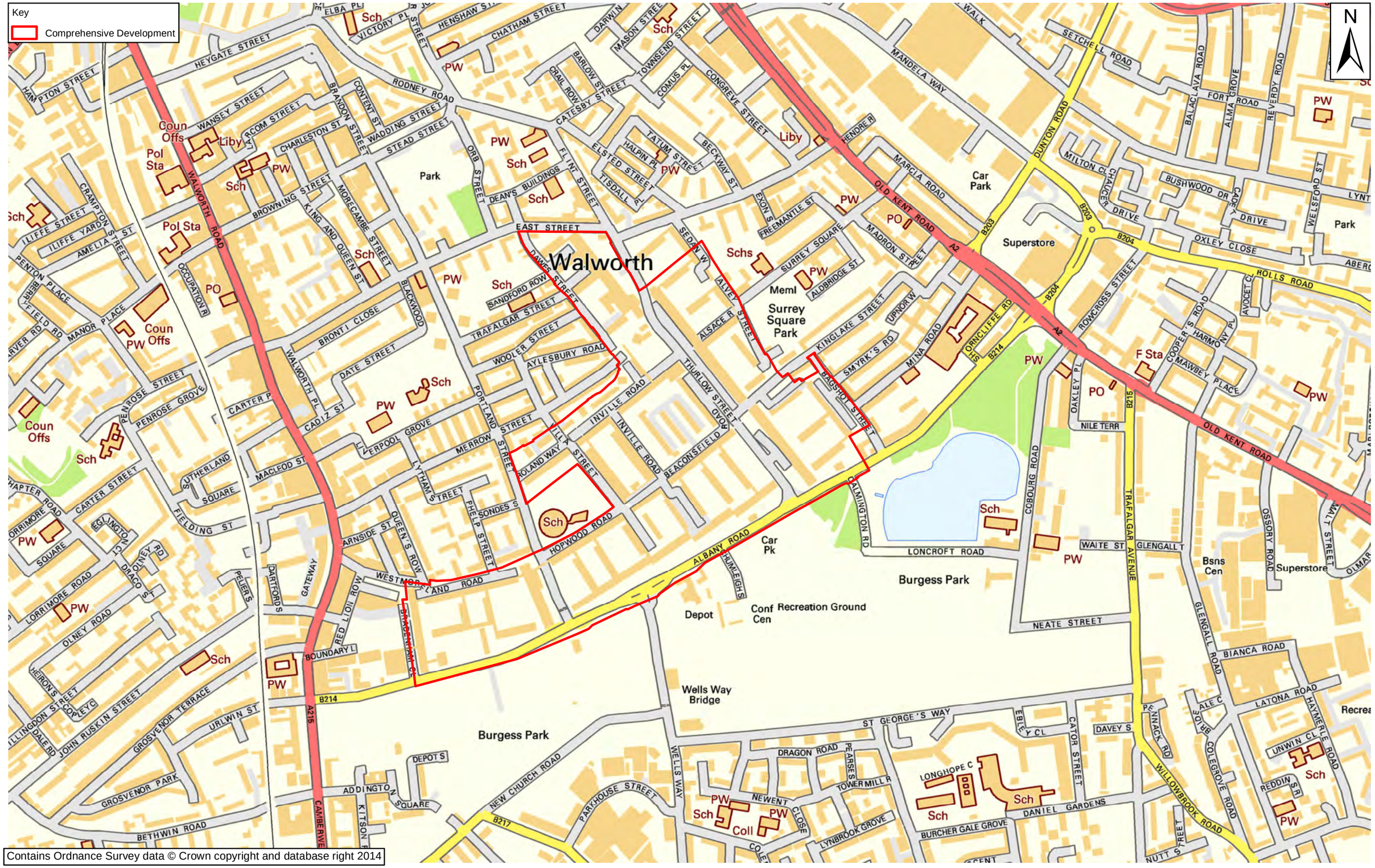

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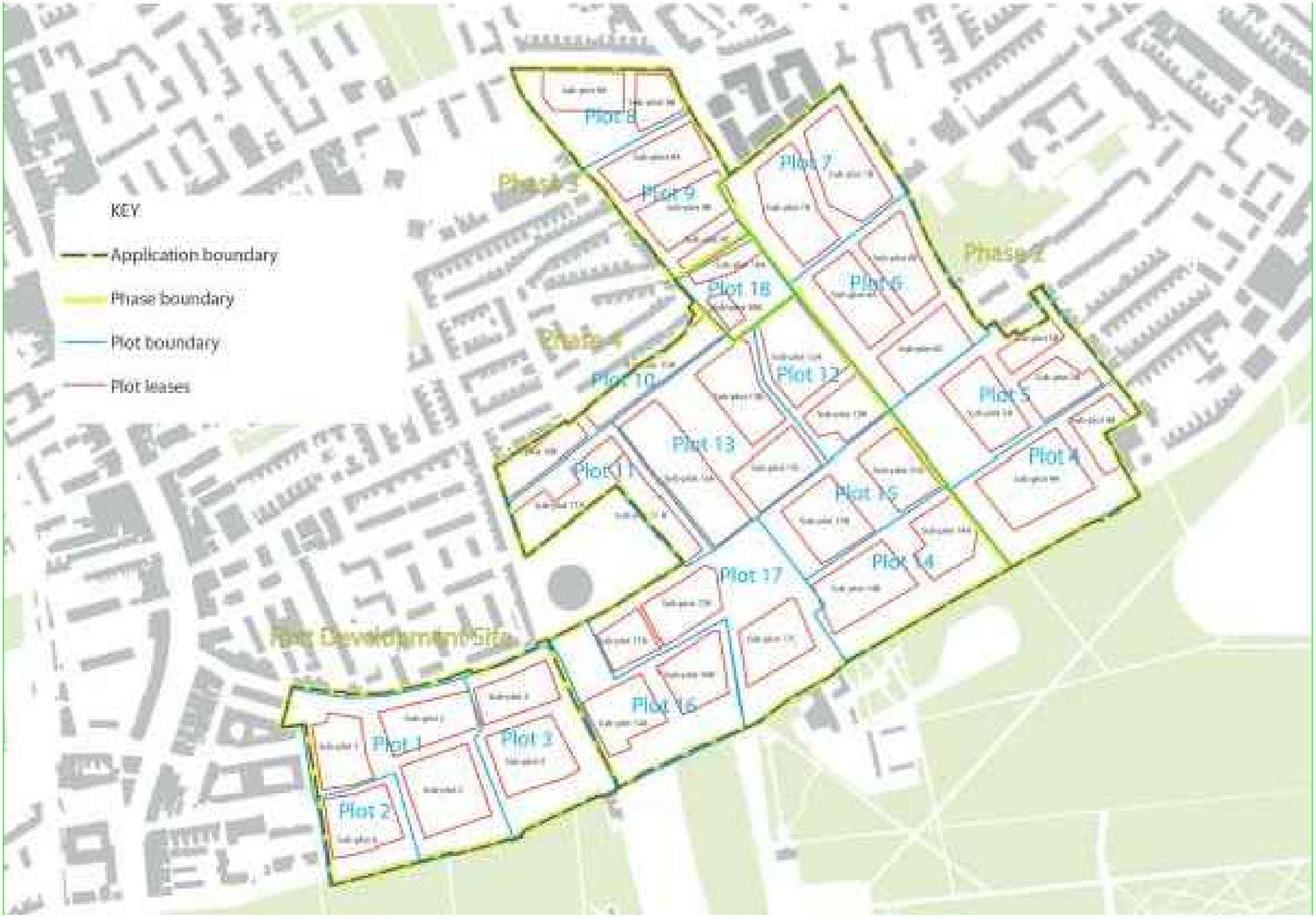

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First Development Site Ground Floor Plan

Figure 3.3

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Block 1
Ground Floor Plan

Block 1
First Floor Plan

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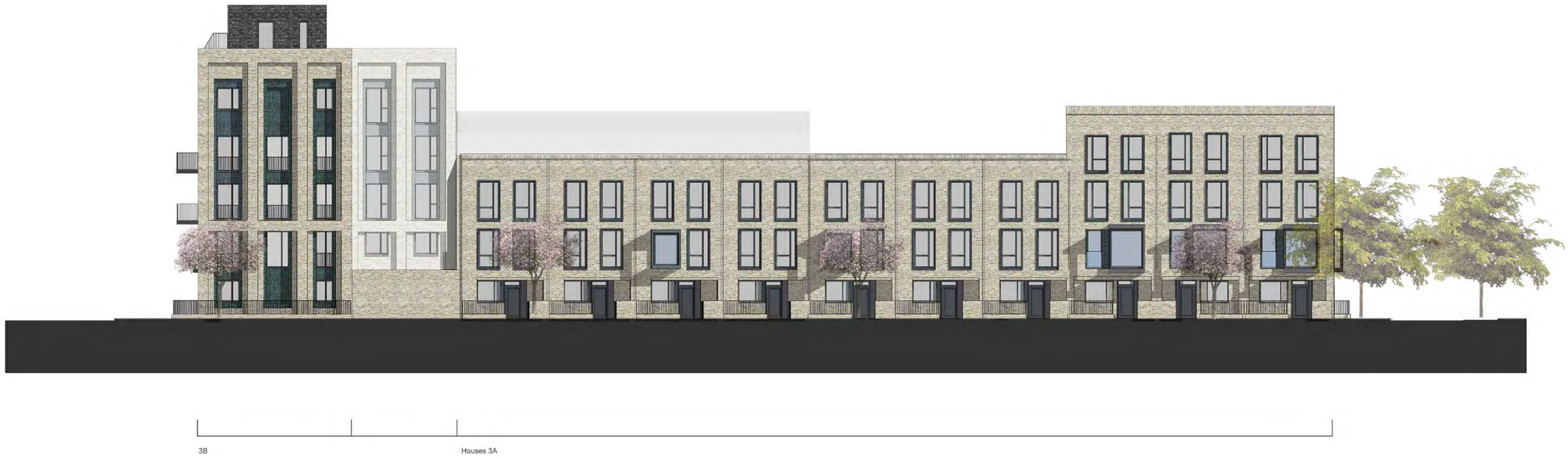

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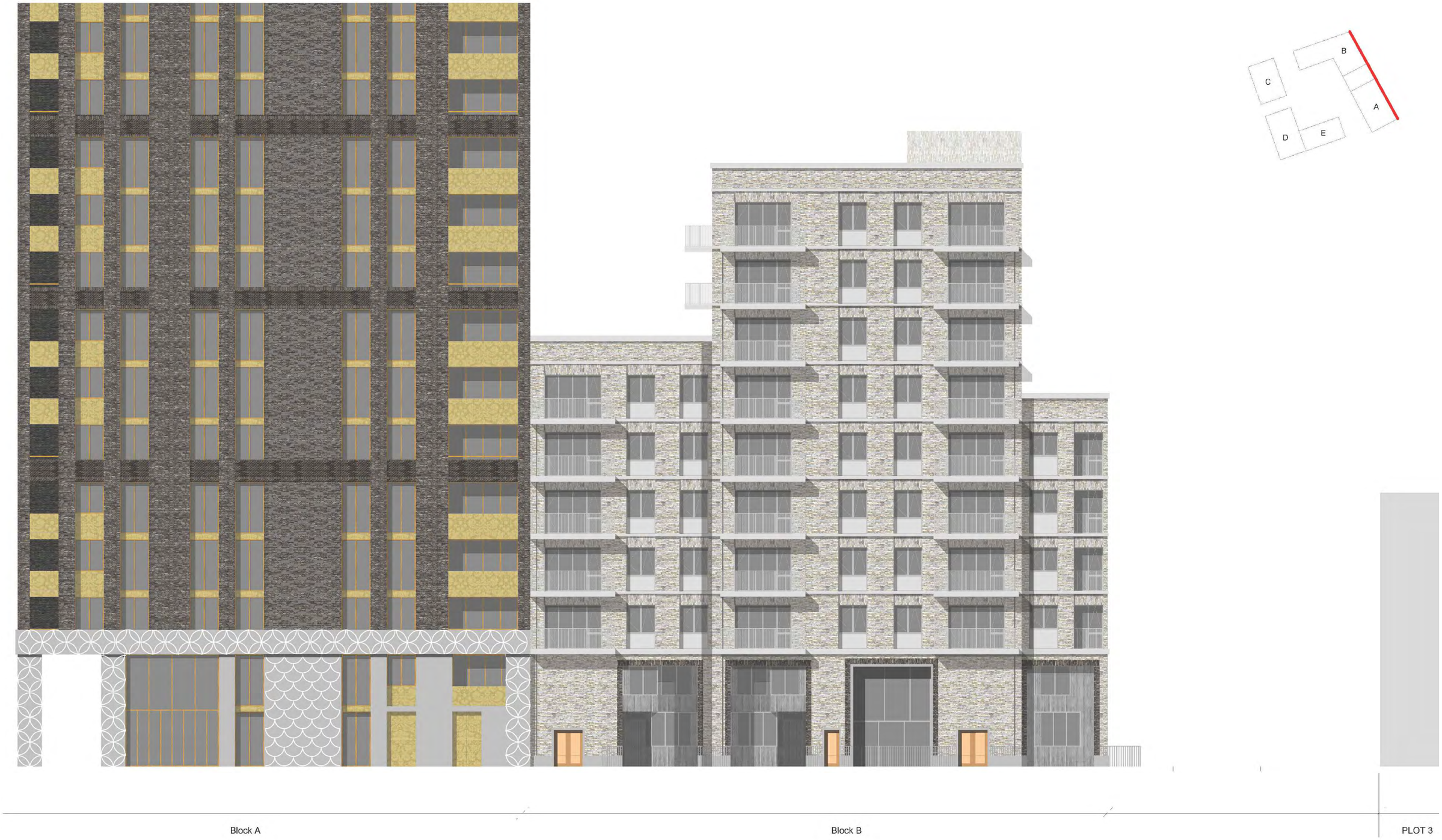

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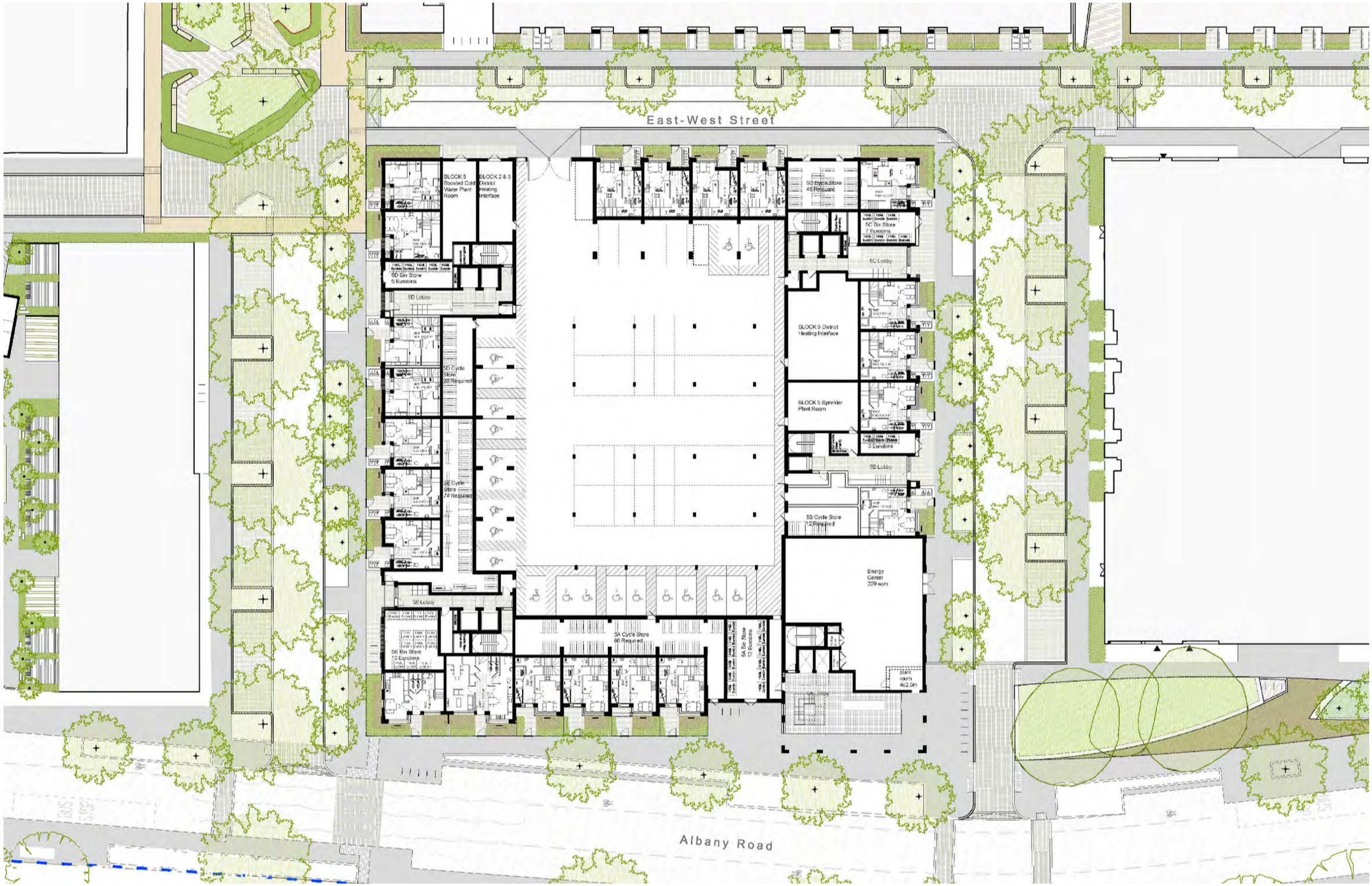

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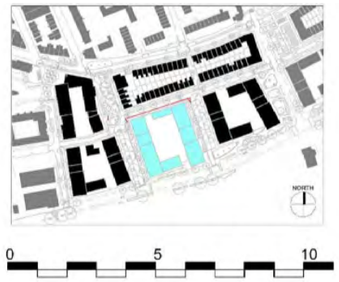

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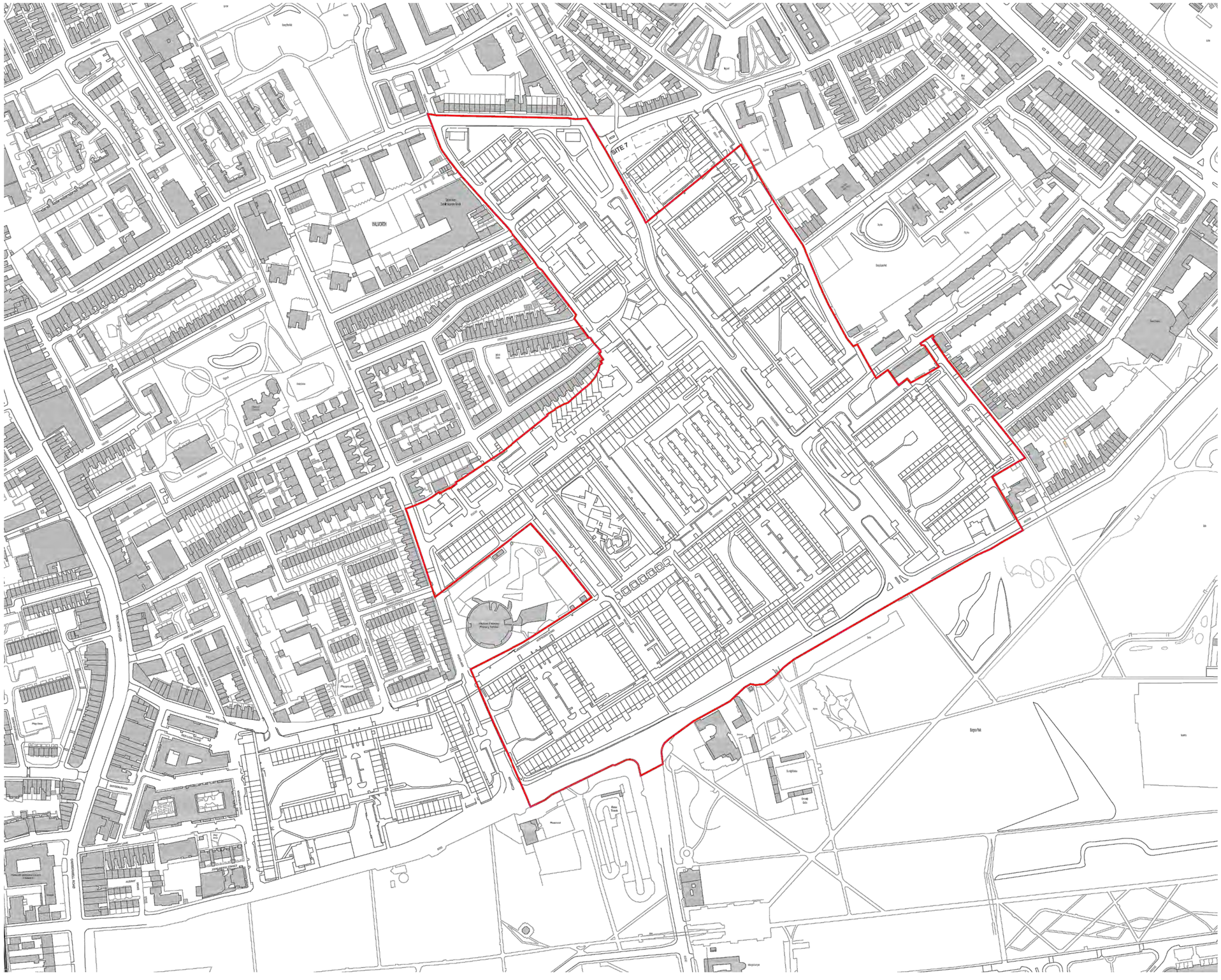

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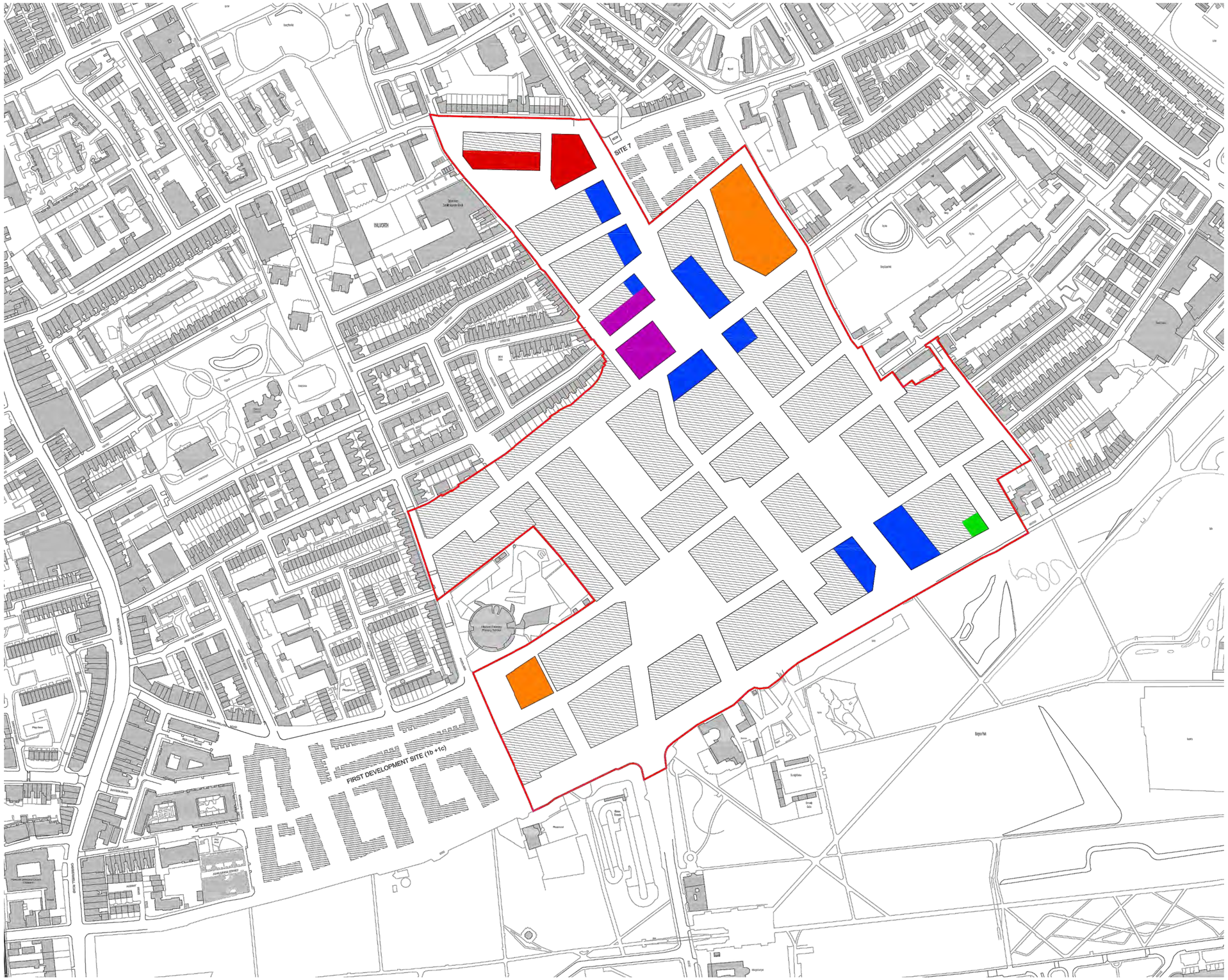


Flexible Uses
(C3) Residential
(B1) Employment

Flexible Uses
(C3) Residential
(D1) Early years Facility

Flexible Uses
(C3) Residential
(A1/A3/A4) Retail or;
(B1) Workspace

Flexible Uses
(C3) Residential
(A1) Retail
(D1) Medical Facility
(D1) Community Facility
(D1) Early Years Facility

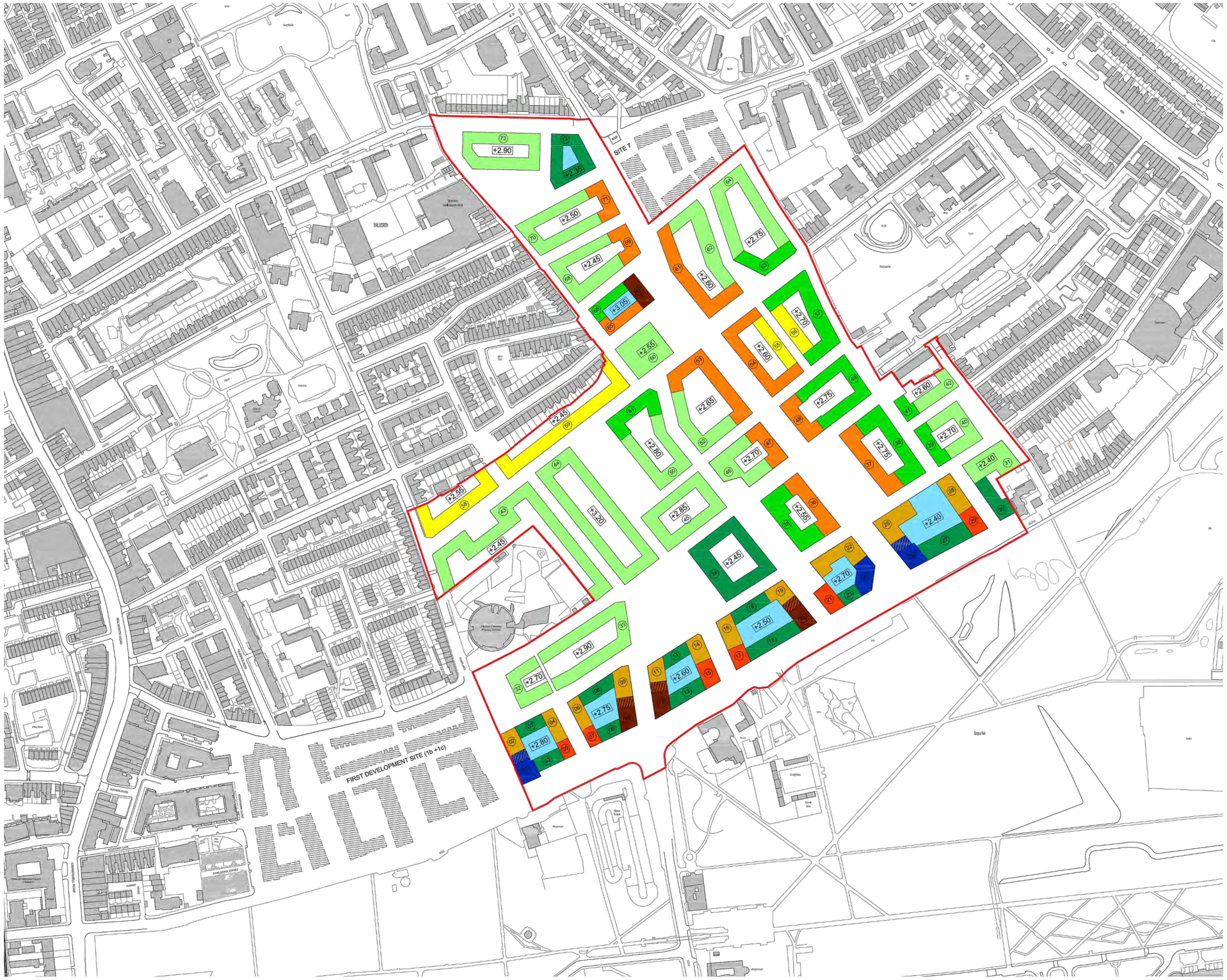
NOTE
Purple flexible uses could be extended to upper floors

(sui generis) Energy Centre:
Indicative location, size to be determined

(C3) Residential

PROJECT: Aylesbury Estate, Southwark
PROJECT No: 62003762
CLIENT: Notting Hill Housing Trust

DRAWN: GH
CHECKED: TS
APPROVED: TS
REVISION: A
DATE: September 2014



- 0 - 1 storeys
- 2 - 3 storeys
- 3 - 4 storeys
- 3 - 6 storeys
- 4 - 6 storeys
- 4 - 8 storeys
- 6 - 8 storeys
- 7 - 9 storeys
- 10 - 15 storeys
- 16 - 20 storeys
- Transition Height: If height not incorporated into building to south then must not exceed height of building to north

NOTE

Storey Height Assumptions

Residential FFL to FFL:	3.15m
Non-Residential uses at GF :	+1.35m
Townhouses:	+3m (roof use only)
Towers:	+4.5m (roof use only)
All other typologies:	+0.5m (roof use only)

1	Original Site AOD:**+2.80**	Max height: **+67.50**
2	Original Site AOD:**+2.80**	Max height: **+25.70**
3	Original Site AOD:**+2.80**	Max height: **+19.40**
4	Original Site AOD:**+2.80**	Max height: **+25.70**
5	Original Site AOD:**+2.80**	Max height: **+28.85**
6	Original Site AOD:**+2.75**	Max height: **+25.70**
7	Original Site AOD:**+2.75**	Max height: **+28.85**
8	Original Site AOD:**+2.75**	Max height: **+19.40**
9	Original Site AOD:**+2.75**	Max height: **+25.70**
10	Original Site AOD:**+2.75**	Max height: **+51.75**
11	Original Site AOD:**+2.60**	Max height: **+25.70**
12	Original Site AOD:**+2.60**	Max height: **+51.75**
13	Original Site AOD:**+2.60**	Max height: **+47.75**
14	Original Site AOD:**+2.60**	Max height: **+25.70**
15	Original Site AOD:**+2.60**	Max height: **+28.85**
16	Original Site AOD:**+2.50**	Max height: **+25.70**
17	Original Site AOD:**+2.50**	Max height: **+28.85**
18	Original Site AOD:**+2.50**	Max height: **+19.40**
19	Original Site AOD:**+2.50**	Max height: **+25.70**
20	Original Site AOD:**+2.50**	Max height: **+51.75**
21	Original Site AOD:**+2.70**	Max height: **+28.85**
22	Original Site AOD:**+2.70**	Max height: **+27.05**
23	Original Site AOD:**+2.70**	Max height: **+19.40**
24	Original Site AOD:**+2.70**	Max height: **+68.85**
25	Original Site AOD:**+2.40**	Max height: **+27.05**
26	Original Site AOD:**+2.40**	Max height: **+68.85**
27	Original Site AOD:**+2.40**	Max height: **+19.40**
28	Original Site AOD:**+2.40**	Max height: **+25.70**
29	Original Site AOD:**+2.40**	Max height: **+28.85**
30	Original Site AOD:**+2.40**	Max height: **+19.40**
31	Original Site AOD:**+2.40**	Max height: **+15.60**
32	Original Site AOD:**+2.70**	Max height: **+16.95**
33	Original Site AOD:**+2.90**	Max height: **+15.60**
34	Original Site AOD:**+2.45**	Max height: **+19.40**
35	Original Site AOD:**+2.55**	Max height: **+19.40**
36	Original Site AOD:**+2.55**	Max height: **+25.70**
37	Original Site AOD:**+2.75**	Max height: **+25.70**
38	Original Site AOD:**+2.75**	Max height: **+19.40**
39	Original Site AOD:**+2.70**	Max height: **+19.40**
40	Original Site AOD:**+2.70**	Max height: **+15.60**
41	Original Site AOD:**+2.60**	Max height: **+19.40**
42	Original Site AOD:**+2.60**	Max height: **+15.60**
43	Original Site AOD:**+2.45**	Max height: **+15.60**
44	Original Site AOD:**+3.20**	Max height: **+15.60**
45	Original Site AOD:**+2.85**	Max height: **+15.60**
46	Original Site AOD:**+2.70**	Max height: **+15.60**
47	Original Site AOD:**+2.70**	Max height: **+25.70**
48	Original Site AOD:**+2.75**	Max height: **+25.70**
49	Original Site AOD:**+2.75**	Max height: **+19.40**
50	Original Site AOD:**+2.80**	Max height: **+15.60**
51	Original Site AOD:**+2.80**	Max height: **+19.40**
52	Original Site AOD:**+2.65**	Max height: **+15.60**
53	Original Site AOD:**+2.65**	Max height: **+27.05**
54	Original Site AOD:**+2.60**	Max height: **+27.05**
55	Original Site AOD:**+2.60**	Max height: **+12.45**
56	Original Site AOD:**+2.70**	Max height: **+12.45**
57	Original Site AOD:**+2.70**	Max height: **+19.40**
58	Original Site AOD:**+2.55**	Max height: **+12.45**
59	Original Site AOD:**+2.45**	Max height: **+12.45**
60	Original Site AOD:**+2.55**	Max height: **+16.95**
61	Original Site AOD:**+2.60**	Max height: **+27.05**
62	Original Site AOD:**+2.60**	Max height: **+15.60**
63	Original Site AOD:**+2.75**	Max height: **+20.75**
64	Original Site AOD:**+2.75**	Max height: **+16.95**
65	Original Site AOD:**+3.05**	Max height: **+27.05**
66	Original Site AOD:**+3.05**	Max height: **+19.40**
67	Original Site AOD:**+3.05**	Max height: **+53.10**
68	Original Site AOD:**+2.45**	Max height: **+15.60**
69	Original Site AOD:**+2.45**	Max height: **+27.05**
70	Original Site AOD:**+2.50**	Max height: **+15.60**
71	Original Site AOD:**+2.50**	Max height: **+27.05**
72	Original Site AOD:**+2.35**	Max height: **+20.75**
73	Original Site AOD:**+2.90**	Max height: **+16.95**

PROJECT: Aylesbury Estate, Southwark
PROJECT No: 62003762
CLIENT: Notting Hill Housing Trust

DRAWN: GH
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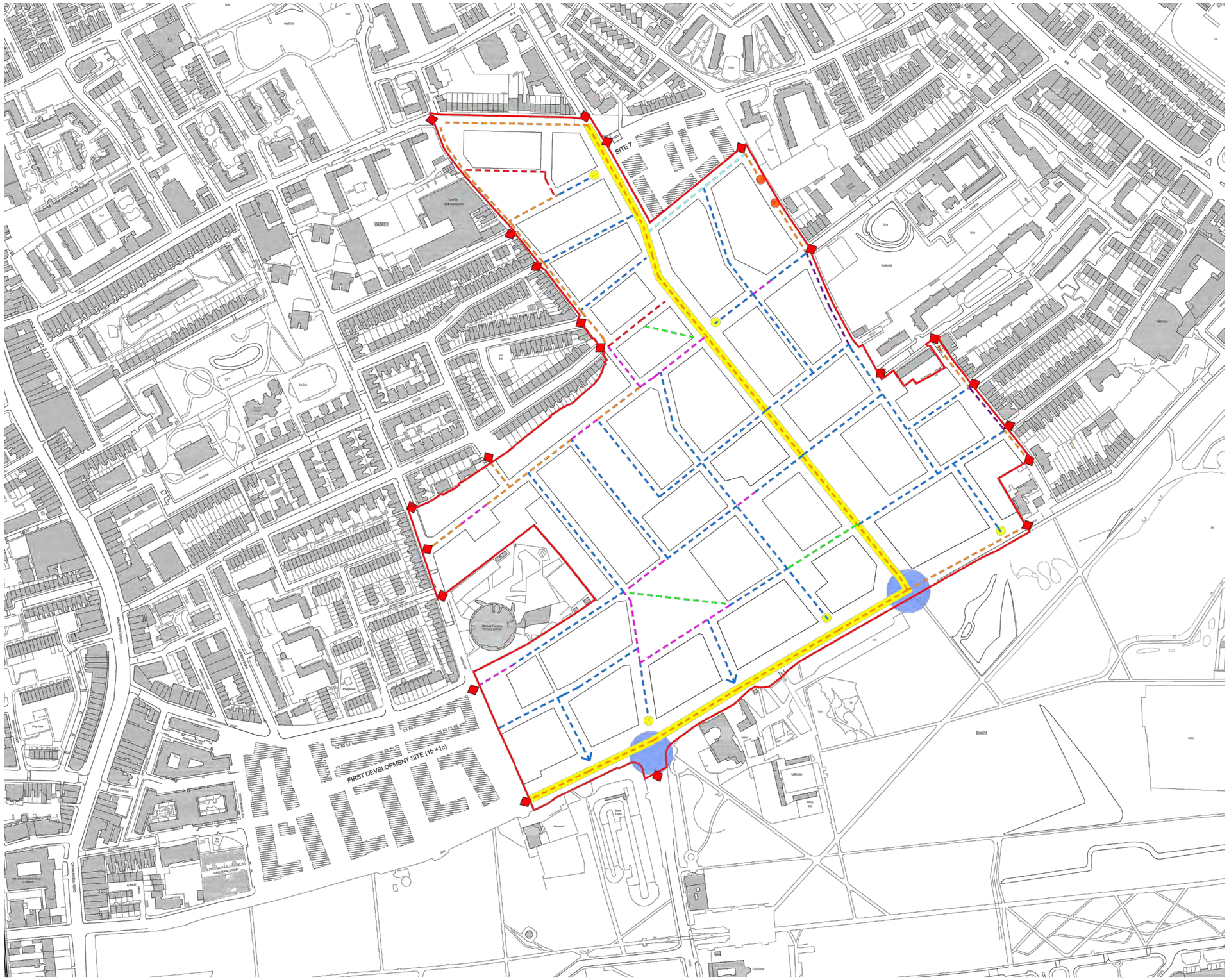

PROJECT: Aylesbury Estate, Southwark
PROJECT No: 62003762
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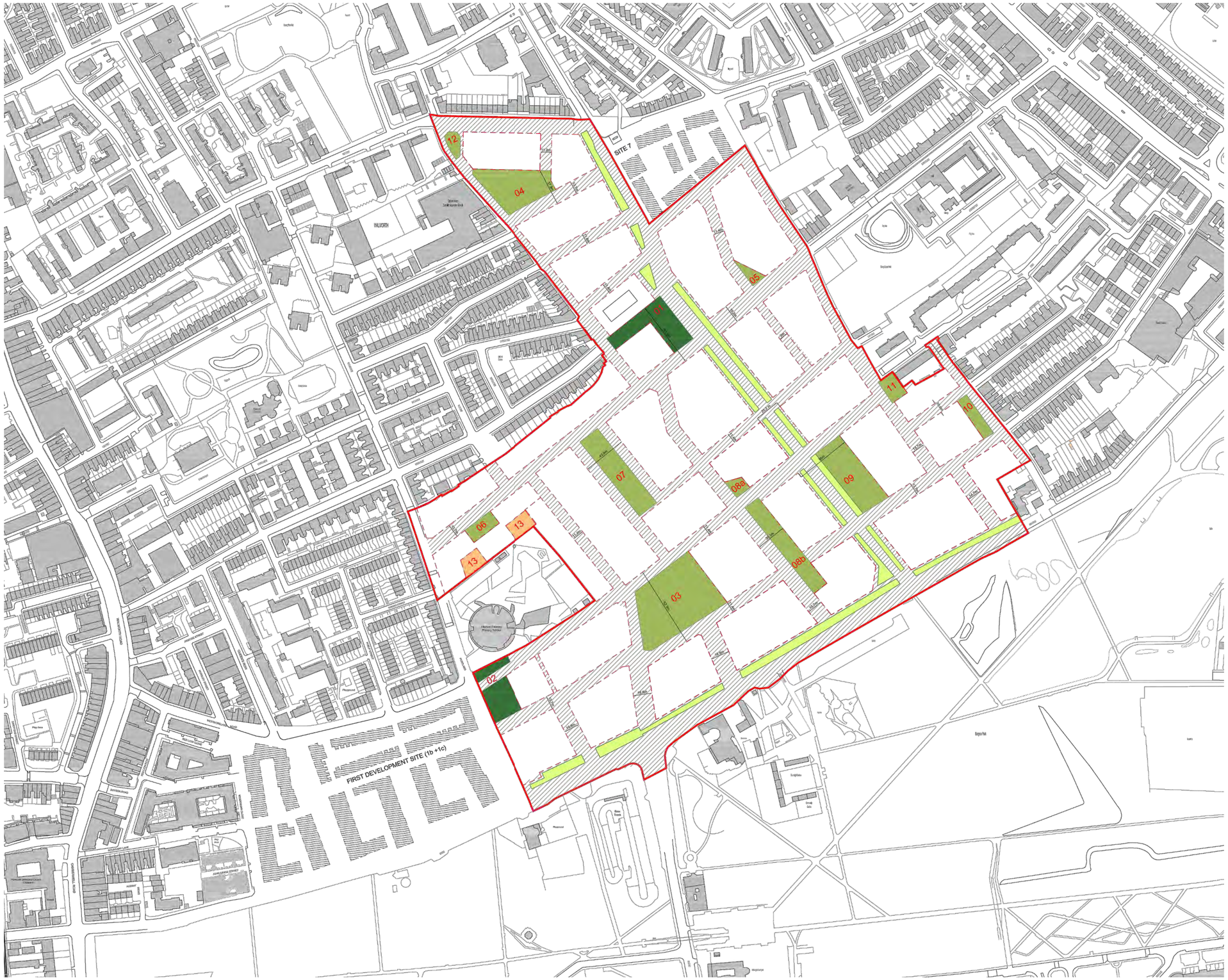
REVISION: A
DATE: September 2014



Public open space - Adopted (Civic)

01 Aylesbury Square
MIN: 1,500 Sqm
02 School Square

Public open space - Non adopted (Parks)

03 Gaitskell Park
04 Dawes Park
05 Alsace Park
06 Inville Park
07 Missenden Park
08 Planes Park
09 Thurlow Park
10 Bagshot Park
11 Kinglake Park
12 East Street Park

Total Public Open Space:
Adopted (Civic) + Non adopted (Parks):
MIN: 19,542 Sqm

13 - Community Gardens

Public open space - Adopted (Streets)
MIN: 5,441 Sq**m**

TOTAL PUBLIC OPEN SPACE
MIN: 24,983 Sqm

Minimum public realm

Maximum building line

PROJECT: Aylesbury Estate, Southwark
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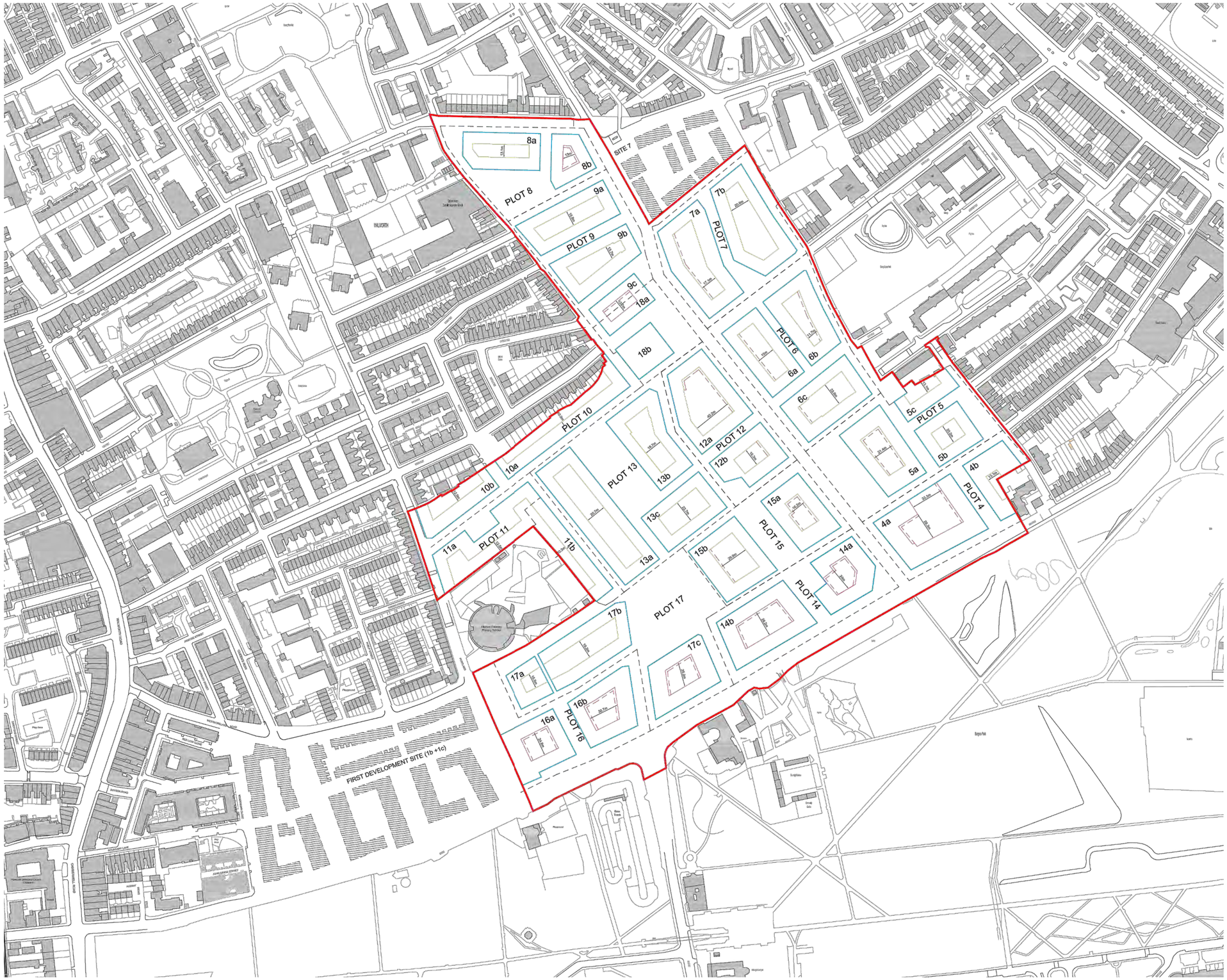

- Maximum building line
  NOTE
  Balconies or any other projections must fit between Max and Min building lines
- Plot parcel
- Minimum private amenity space
- Minimum private amenity space at upper floors if ground floor used for podium
- Maximum balcony line (2.0 m offset)

PROJECT: Aylesbury Estate, Southwark
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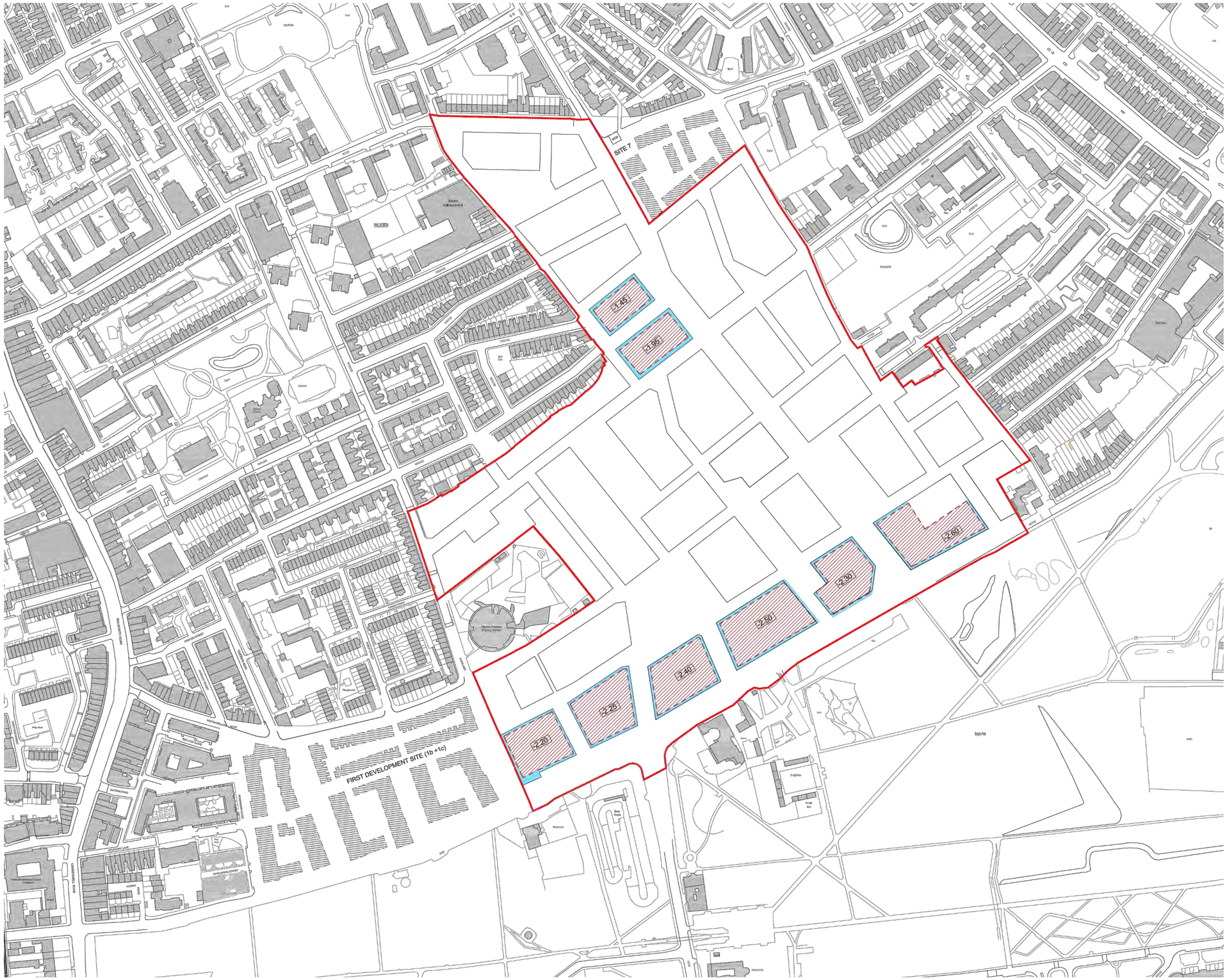

Maximum basement area

Maximum building line

No basement zone (3.0 m offset)

Basement depth max AOD (depth of 4.5m)

PROJECT: Aylesbury Estate, Southwark

PROJECT No: 62003762

CLIENT: Notting Hill Housing Trust

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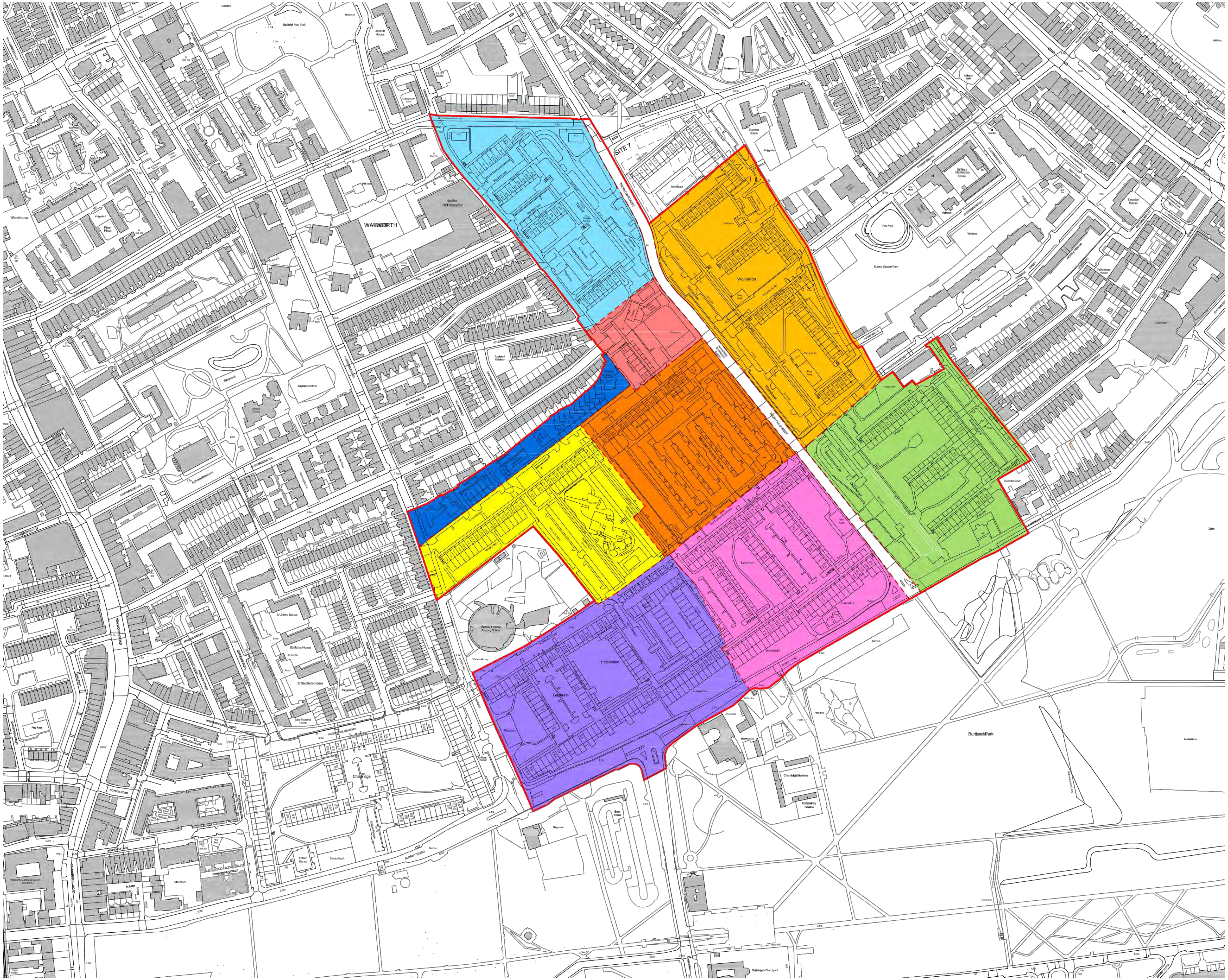

- Stage 2a
- Stage 2b
- Stage 2c
- Stage 3
- Stage 4a
- Stage 4b
- Stage 4c
- Stage 4d
- Stage 4e

PROJECT: Aylesbury Estate, Southwark
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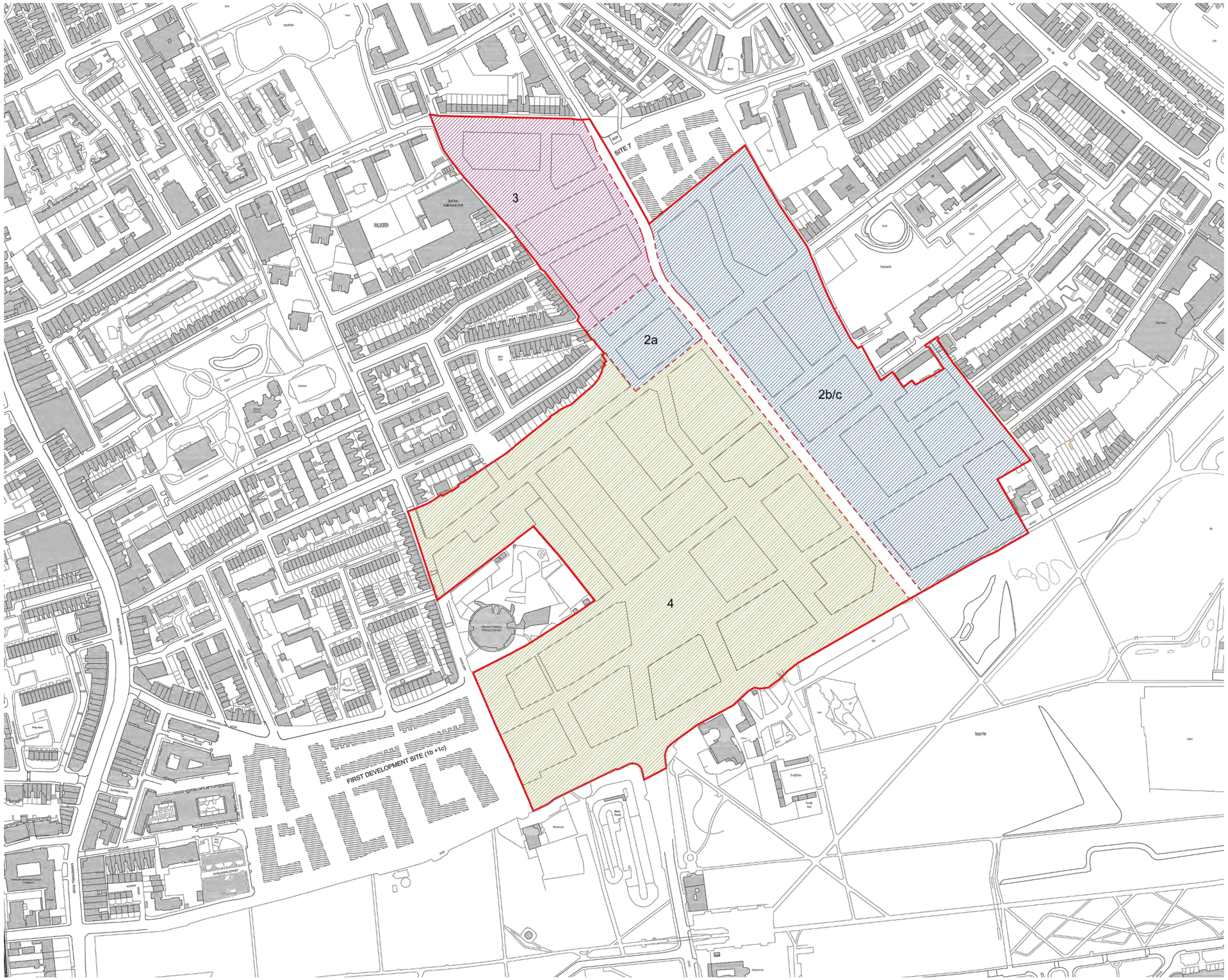

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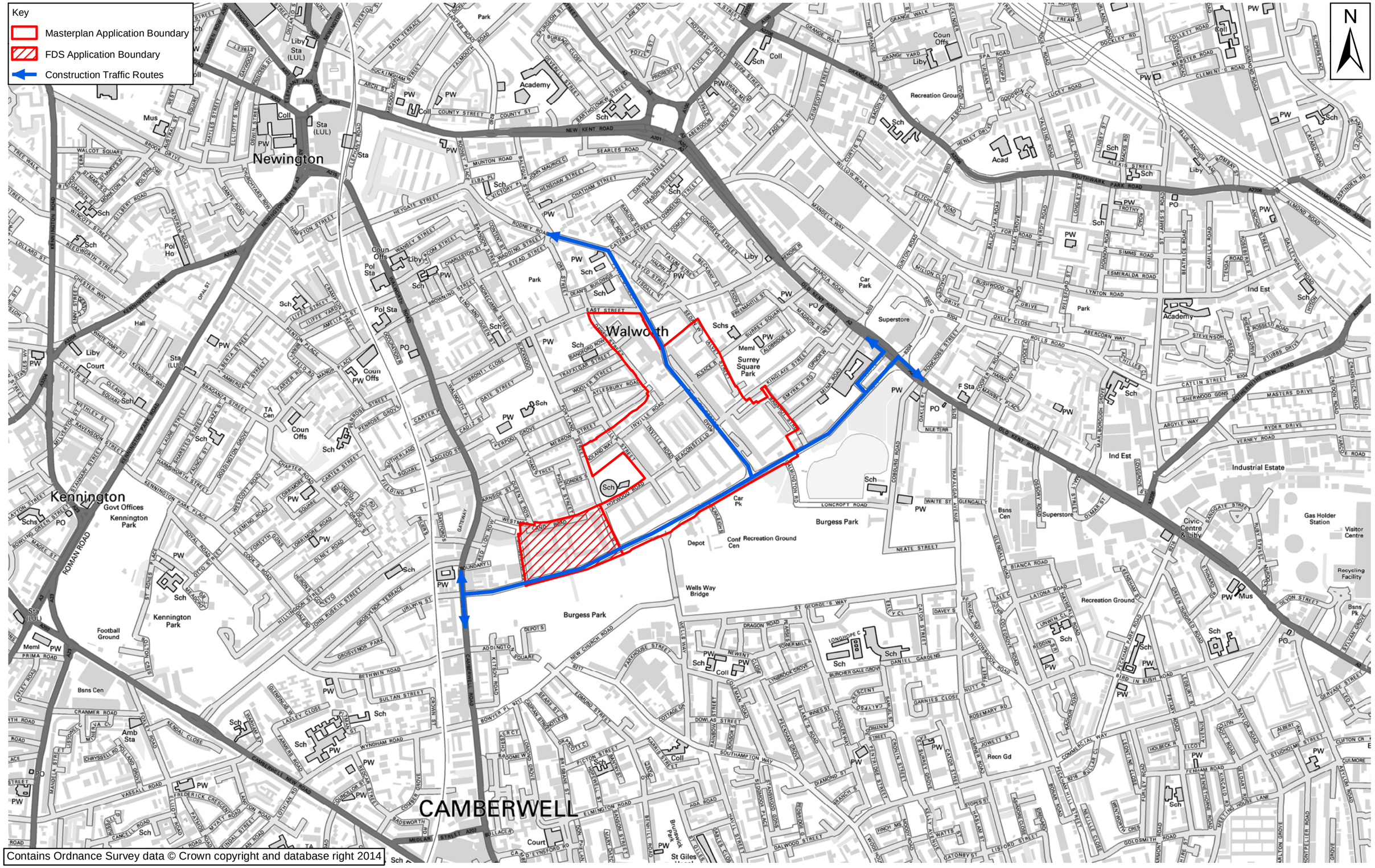
PROJECT No: 62003762
CLIENT: Notting Hill Housing Trust

DRAWN: GH
CHECKED: TS
APPROVED: TS
REVISION: A
DATE: September 2014

Construction Traffic Routes

Scale @ A3 : 10,000

Figure 5.1



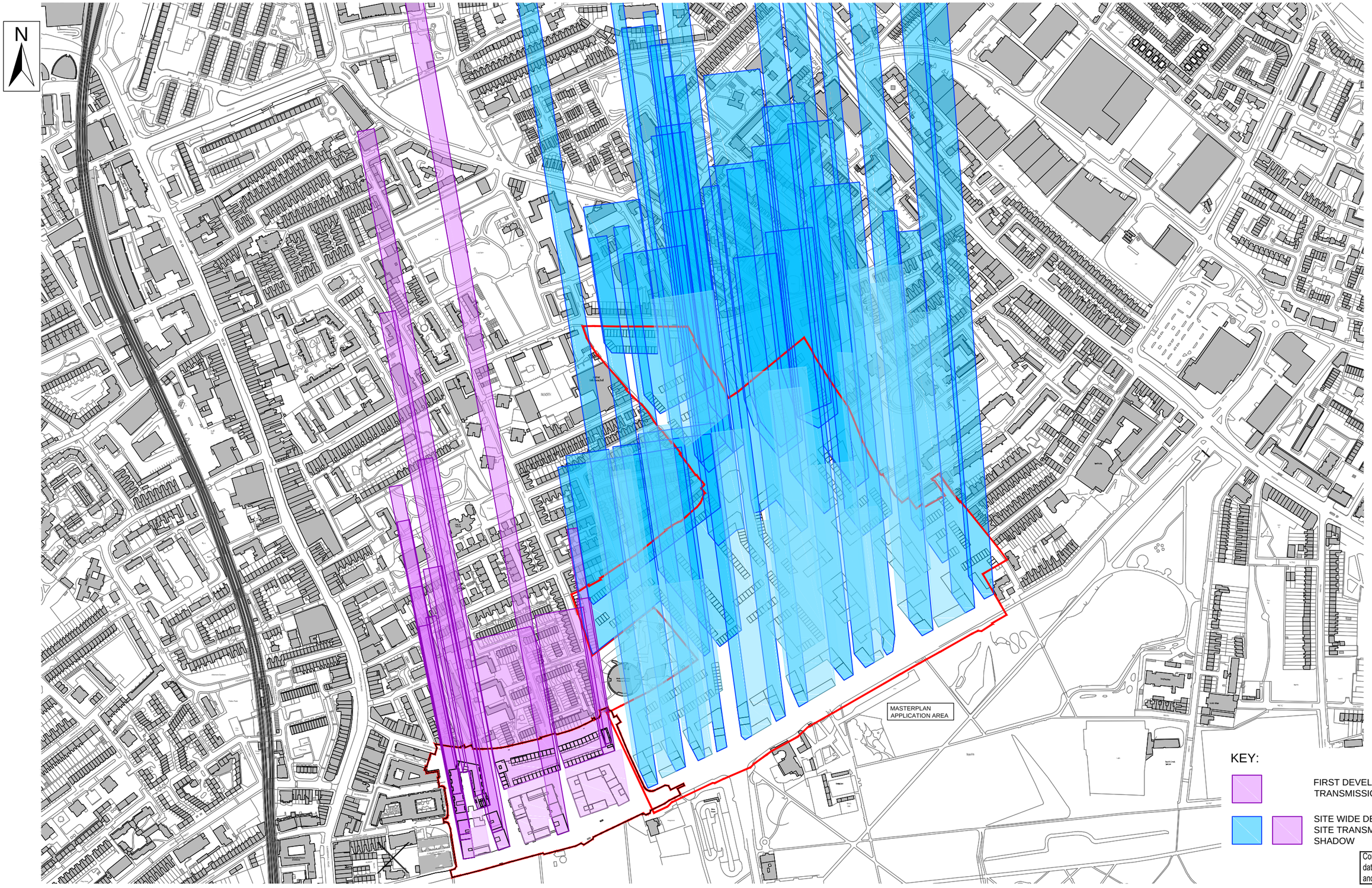
PROJECT: Aylesbury Estate, Southwark

PROJECT No: 62003762

Client: Notting Hill Housing Trust

Drawn: GH
Checked: TS
Approved: TS
Revision: A
Date: September 2014

WSP



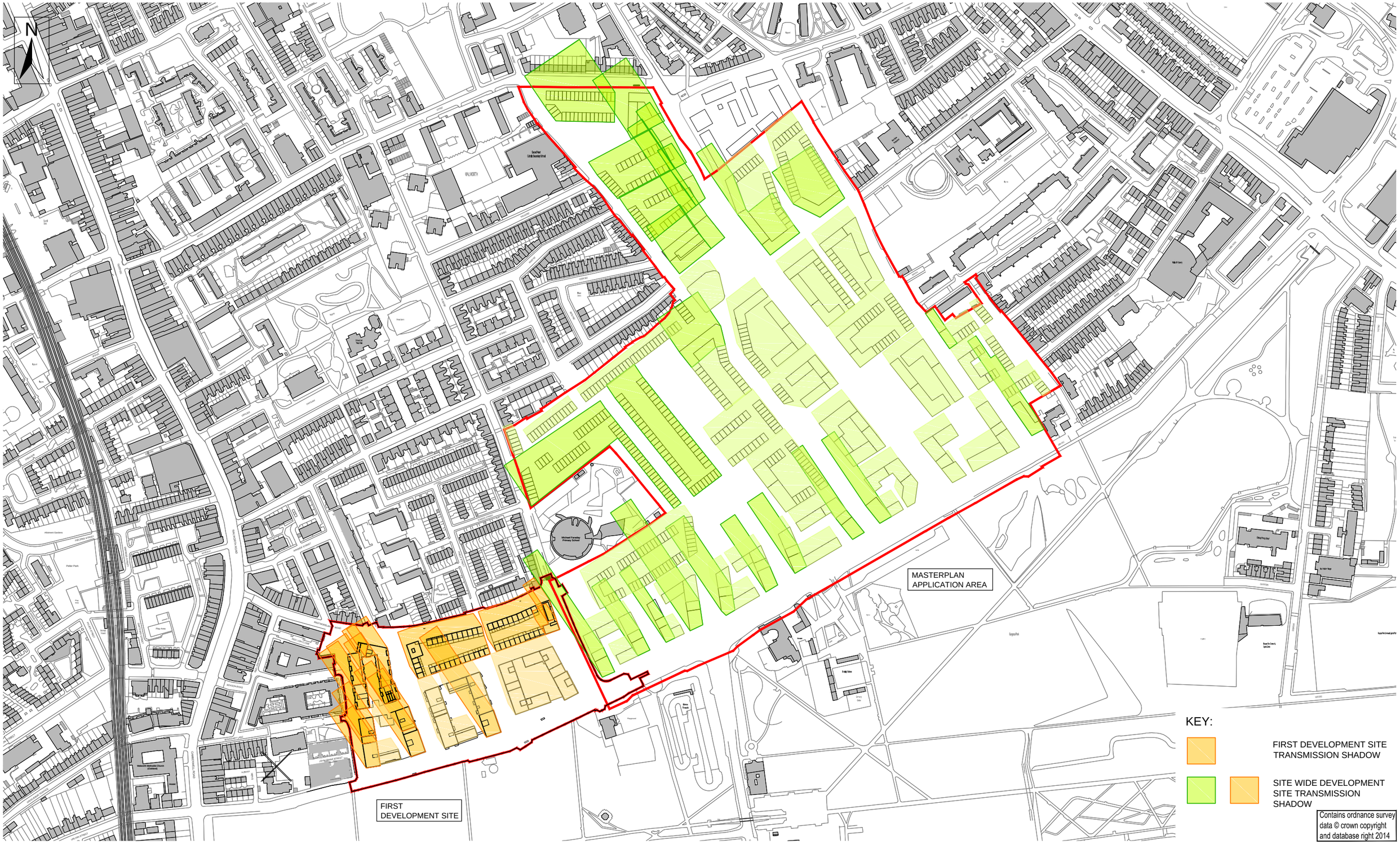
PROJECT: Aylesbury

PROJECT No:

CLIENT: ----------

DRAWN: AB
CHECKED:
APPROVED:
REVISION: DRAFT
DATE:

WSP



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PROJECT No: ----

CLIENT: ---

DRAWN: AB

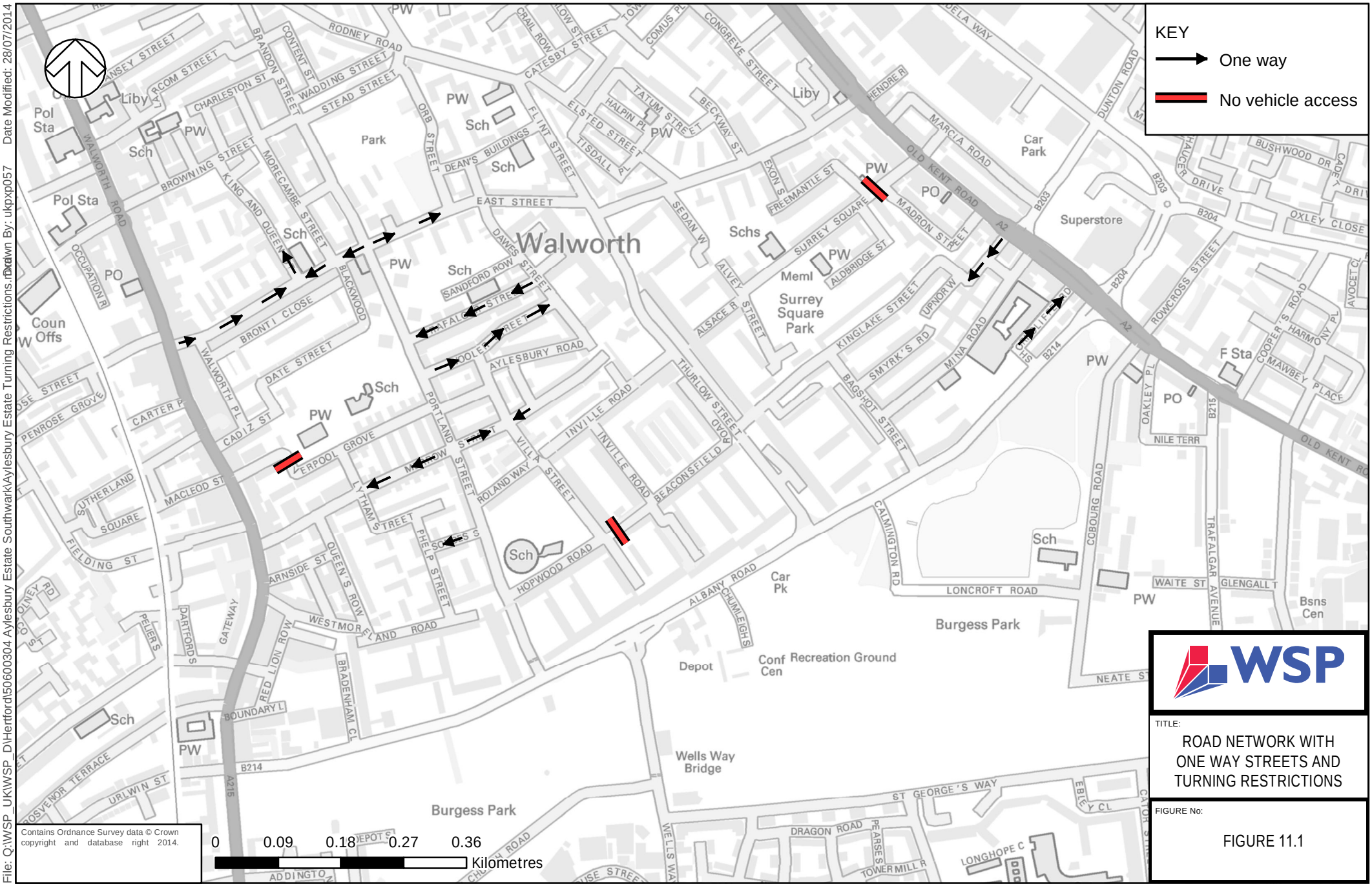
CHECKED:

APPROVED:

REVISION: DRAFT

DATE:

WSP


KEY
One way
No vehicle access
Walworth
Park
Surrey Square Park
Burgess Park
Wells Way Bridge
Superstore
Car Park
Car Pk
Depot
Conf Cen
Recreation Ground
Bsns Cen
Meml
Coun Offs
Pol Sta
F Sta
Liby
Schs
PO
PW
Sch
WALWORTH ROAD
EAST STREET
AYLESBURY ROAD
OLD KENT ROAD
A2
B214
B203
B204
B215
A215
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0
0.09
0.18
0.27
0.36
Kilometres
WSP
TITLE:
ROAD NETWORK WITH ONE WAY STREETS AND TURNING RESTRICTIONS
FIGURE No:
FIGURE 11.1
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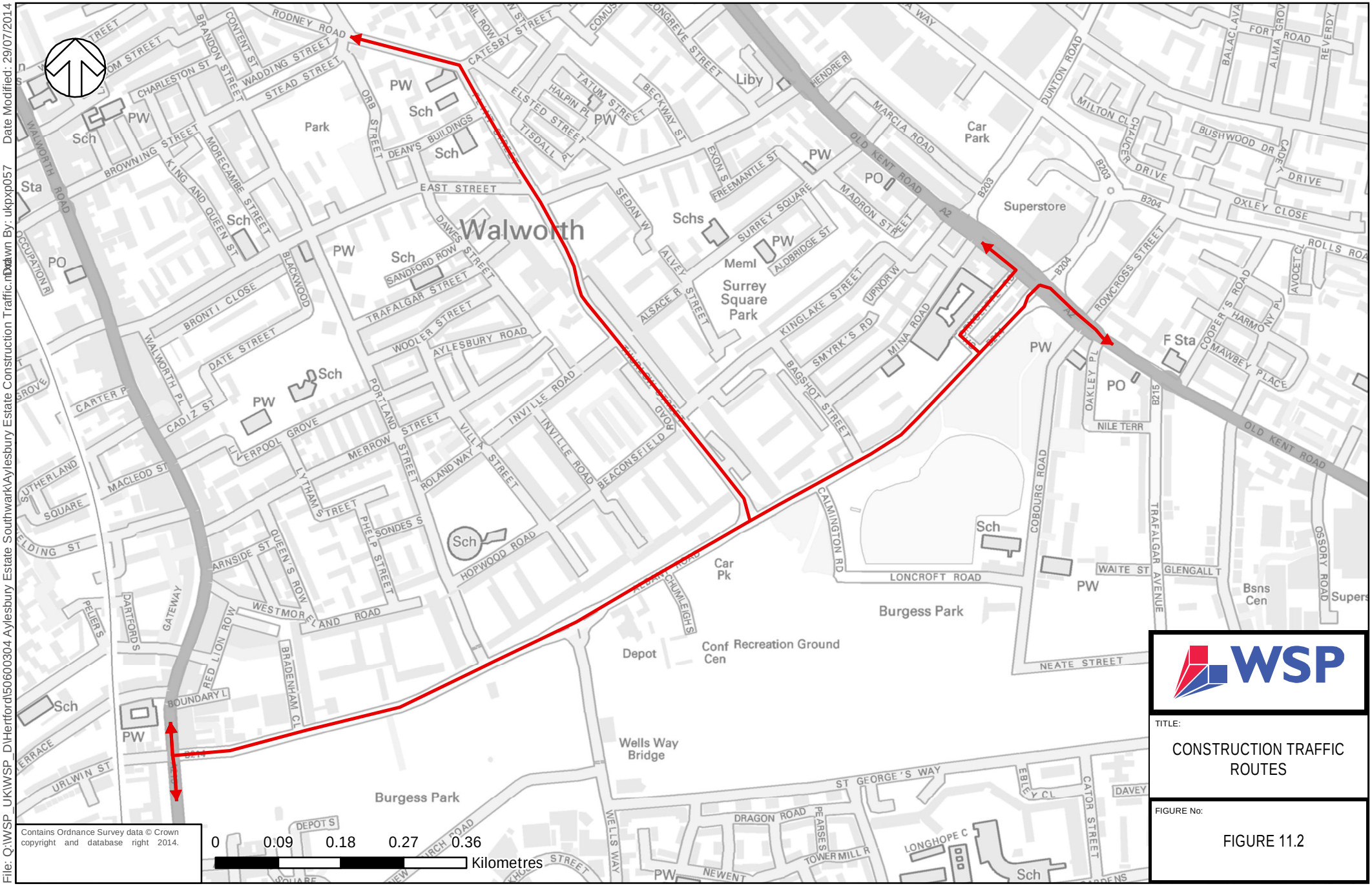
Drawn By: ukpxp057
Date Modified: 28/07/2014



0 0.09 0.18 0.27 0.36 Kilometres

WSP

TITLE:

CONSTRUCTION TRAFFIC ROUTES

FIGURE No:

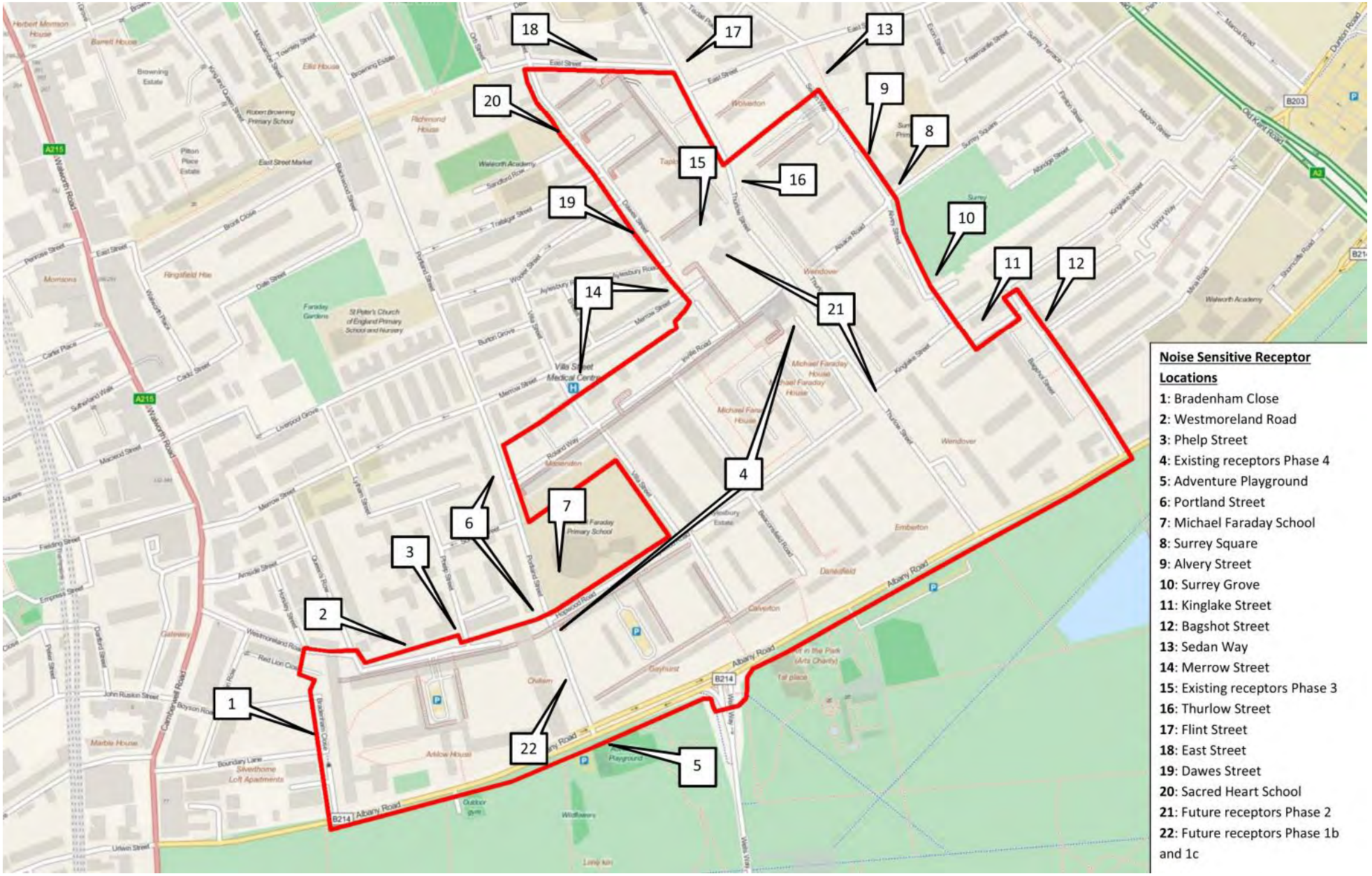
FIGURE 11.2

File: Q:\WSP_UK\WSP_D\Hertford\50600304 Aylesbury Estate Southwark\Aylesbury Estate Construction Traffic.mxd Drawn By: ukpxp057 Date Modified: 29/07/2014

Noise Sensitive Receptors

Not to scale

Figure 12.1



PROJECT: Aylesbury Estate Regeneration

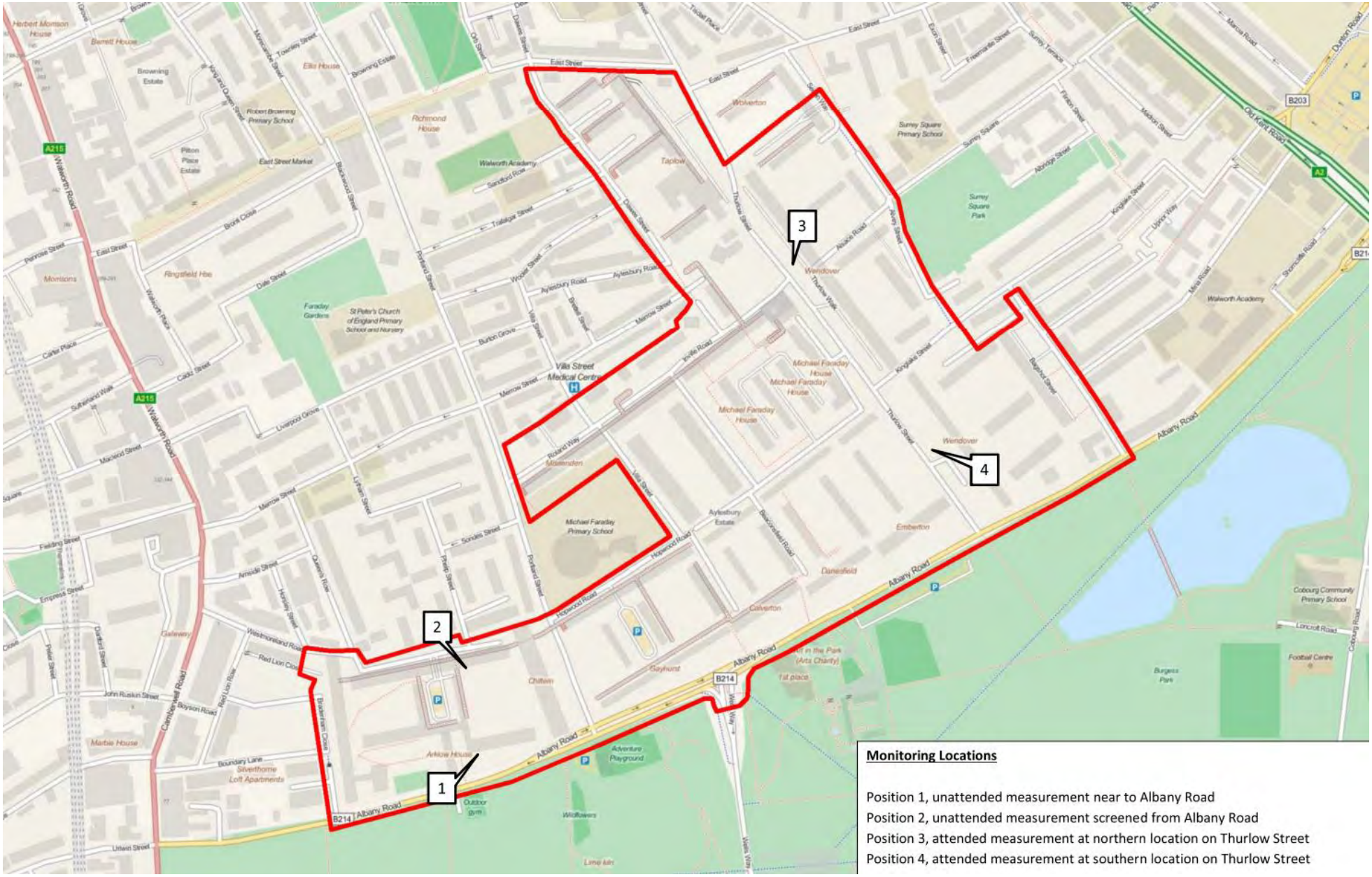
PROJECT No: 62003762

Client: Notting Hill Housing Trust

Noise Monitoring Locations

Not to Scale

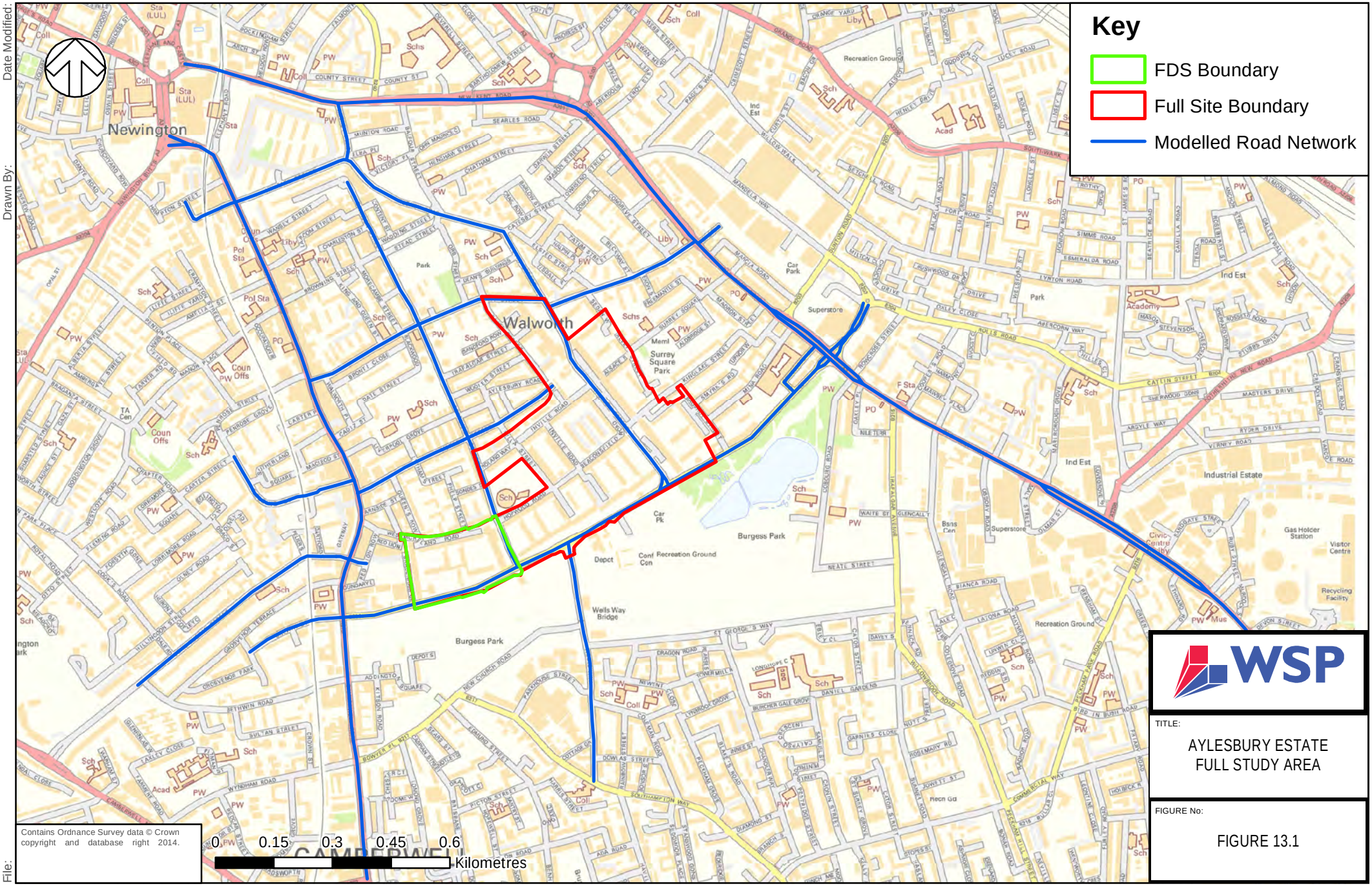
Figure 12.2



PROJECT: Aylesbury Estate Regeneration

PROJECT No: 62003762

Client: Notting Hill Housing Trust


Key
FDS Boundary
Full Site Boundary
Modelled Road Network
Newington
Walworth
Burgess Park
Surrey Square Park
Wells Way Bridge
Industrial Estate
Recreation Ground
Superstore
Academy
Civic Centre
Gas Holder Station
Visitor Centre
Recycling Facility
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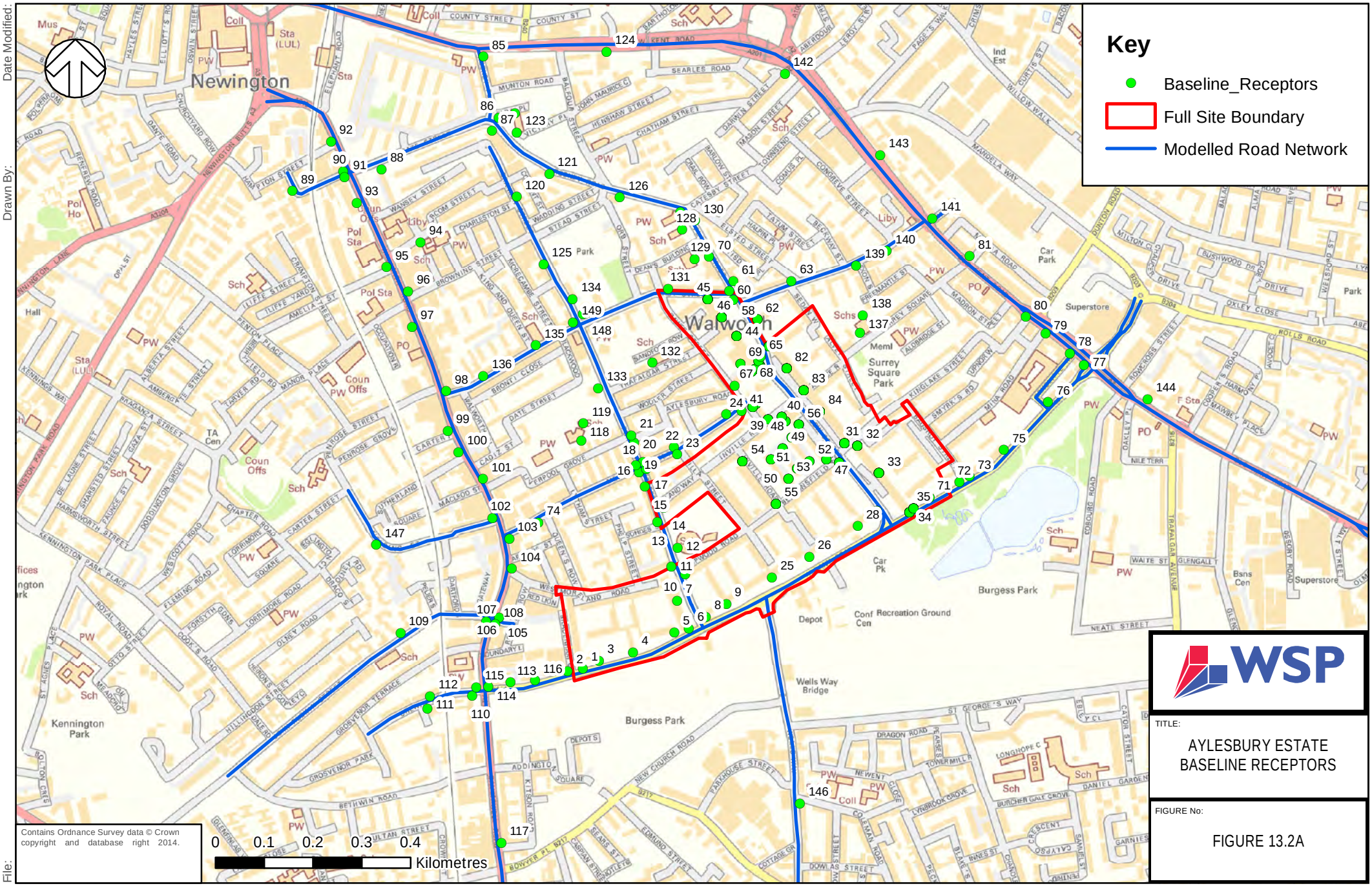
0
0.15
0.3
0.45
0.6
Kilometres
Date Modified:
Drawn By:
File:
WSP
TITLE:
AYLESBURY ESTATE
FULL STUDY AREA
FIGURE No:
FIGURE 13.1


Key
Baseline_Receptors
Full Site Boundary
Modelled Road Network
Newington
Walworth
Burgess Park
Kennington Park
Surrey Square Park
Wells Way Bridge
Contains Ordnance Survey data © Crown copyright and database right 2014.
0 0.1 0.2 0.3 0.4
Kilometres
Date Modified:
Drawn By:
File:
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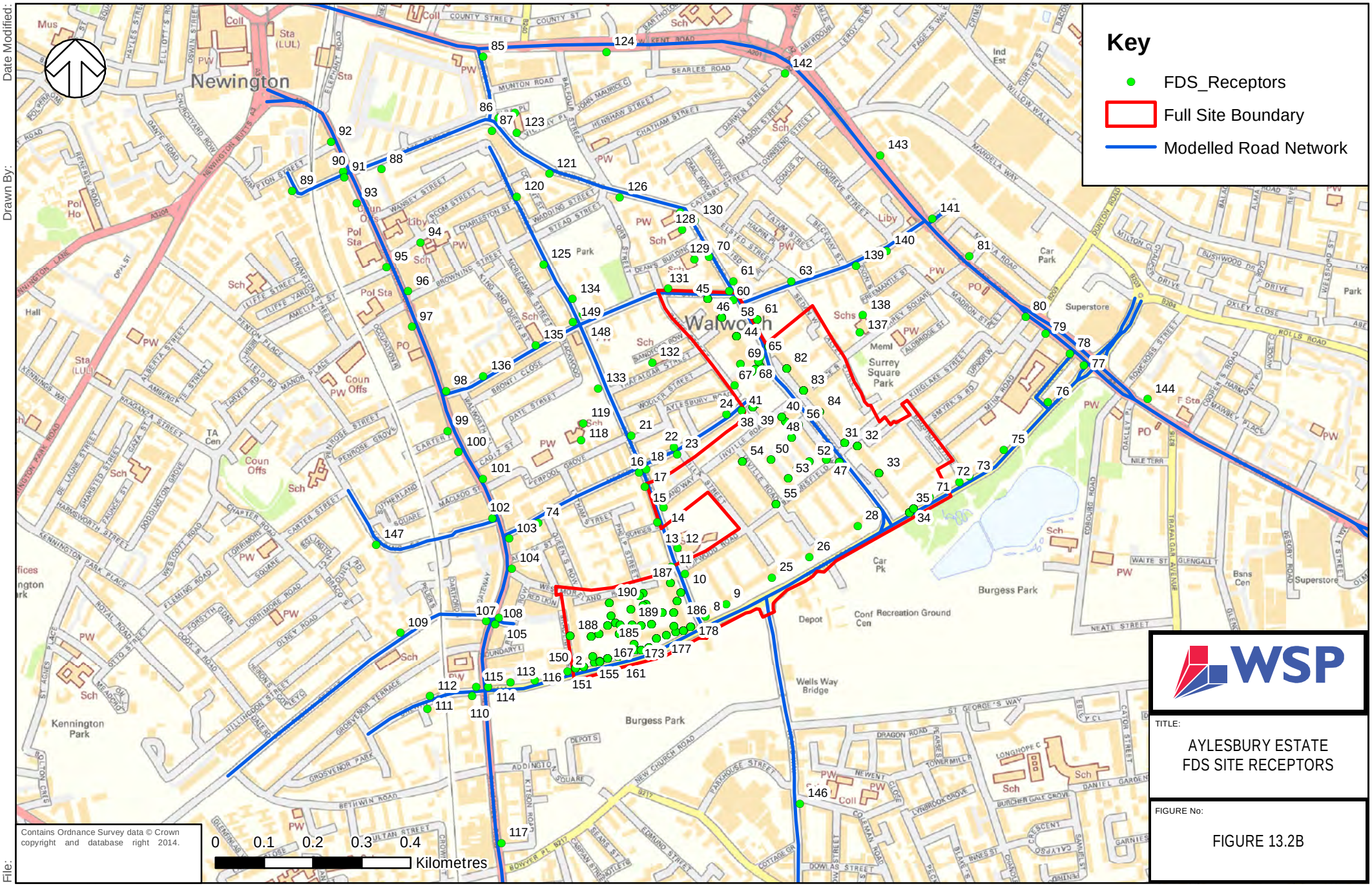
TITLE:
AYLESBURY ESTATE
BASELINE RECEPTORS
FIGURE No:
FIGURE 13.2A


Key
FDS_Receptors
Full Site Boundary
Modelled Road Network
Newington
Walworth
Kennington Park
Burgess Park
Surrey Square Park
Wells Way Bridge
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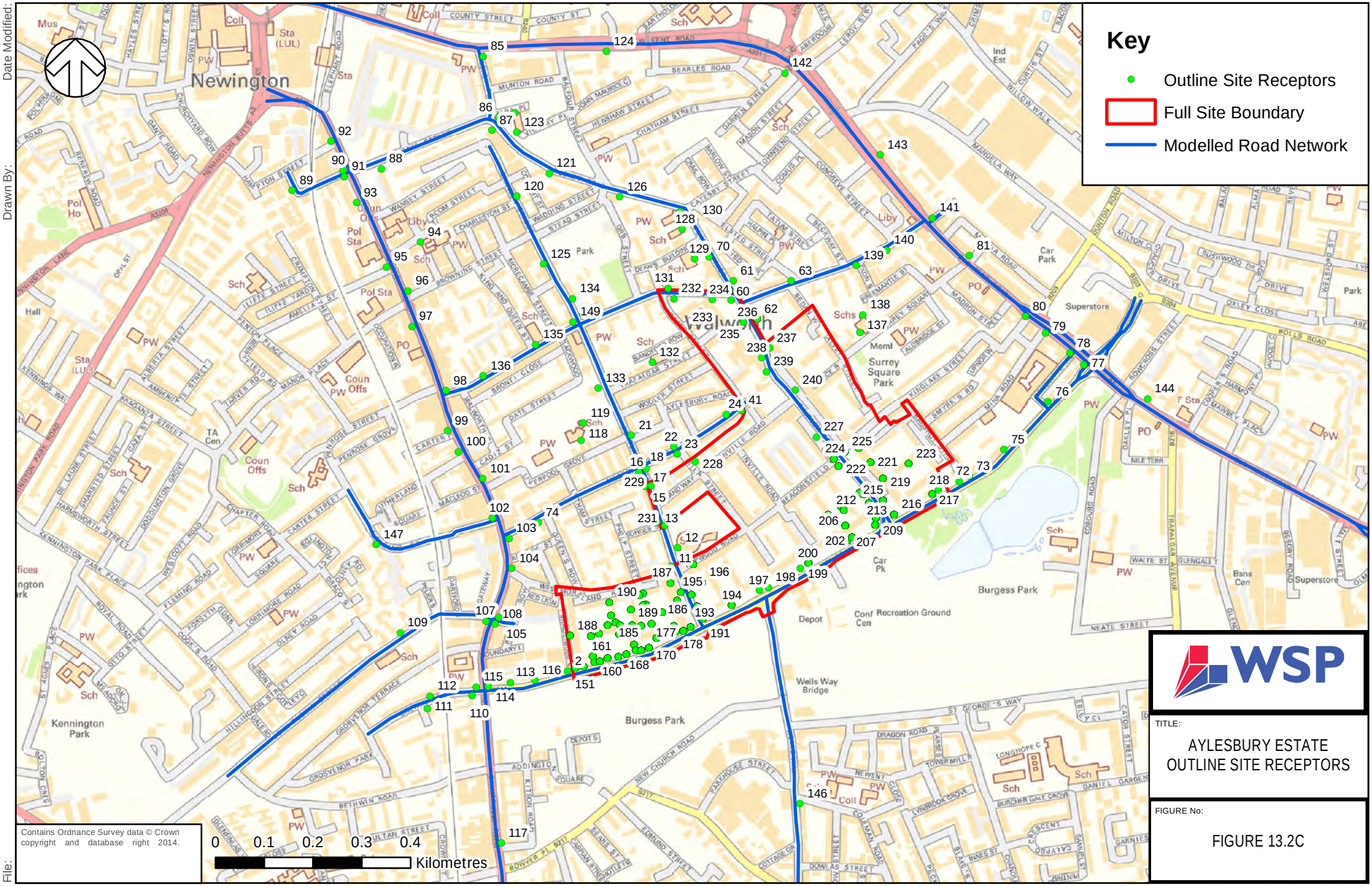
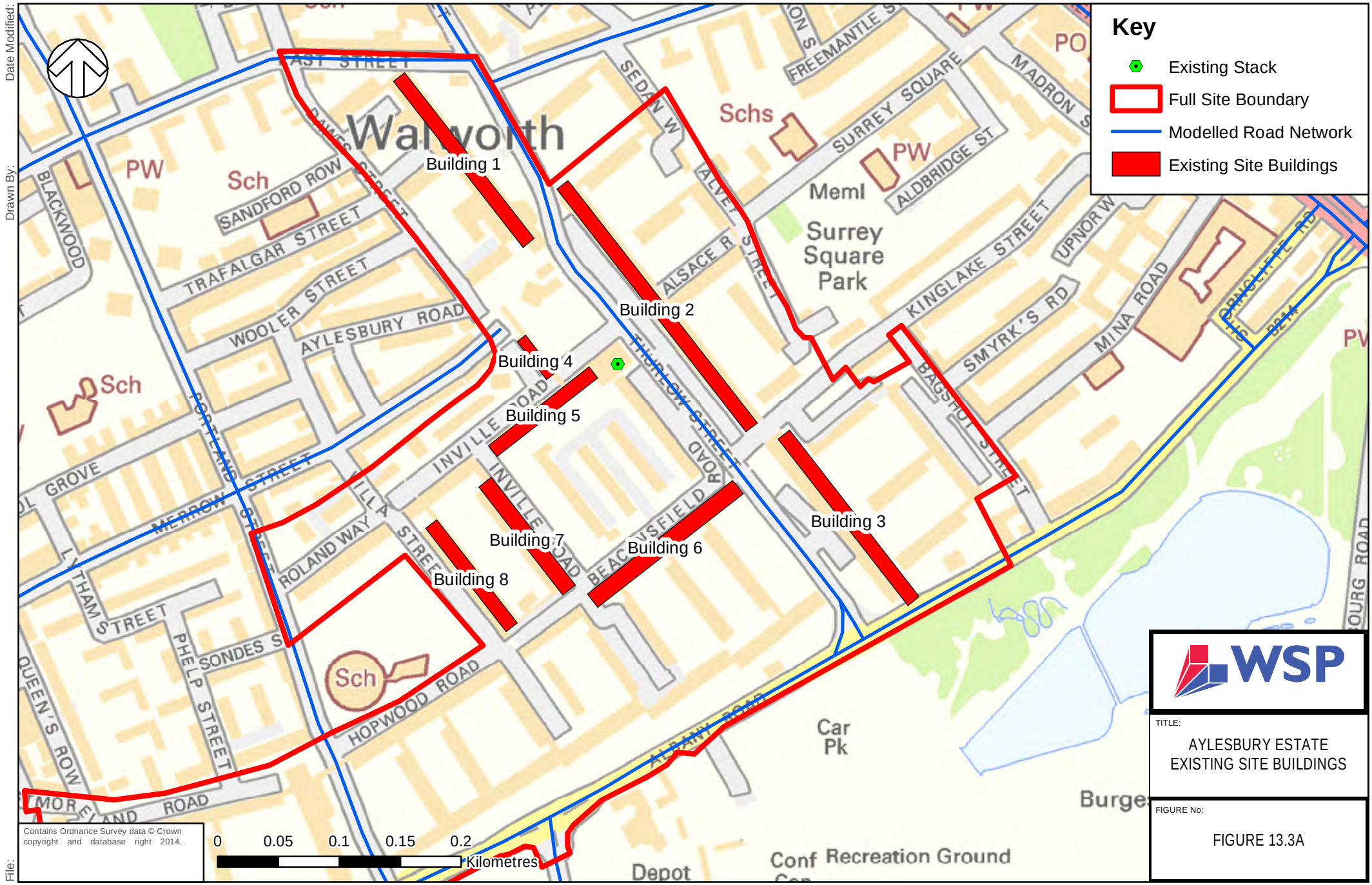
0 0.1 0.2 0.3 0.4
Kilometres
WSP
TITLE:
AYLESBURY ESTATE
FDS SITE RECEPTORS
FIGURE No:
FIGURE 13.2B
Date Modified:
Drawn By:
File:


Key
Outline Site Receptors
Full Site Boundary
Modelled Road Network
Newington
Walworth
Surrey Square Park
Burgess Park
Kennington Park
Wells Way Bridge
Contains Ordnance Survey data © Crown copyright and database right 2014.
0 0.1 0.2 0.3 0.4
Kilometres
Date Modified:
Drawn By:
File:
WSP
TITLE:
AYLESBURY ESTATE
OUTLINE SITE RECEPTORS
FIGURE No:
FIGURE 13.2C


Key
Existing Stack
Full Site Boundary
Modelled Road Network
Existing Site Buildings
Building 1
Building 2
Building 3
Building 4
Building 5
Building 6
Building 7
Building 8
Walworth
Surrey Square Park
Recreation Ground
Depot
Car Pk
Sch
Schs
PW
Meml
Conf
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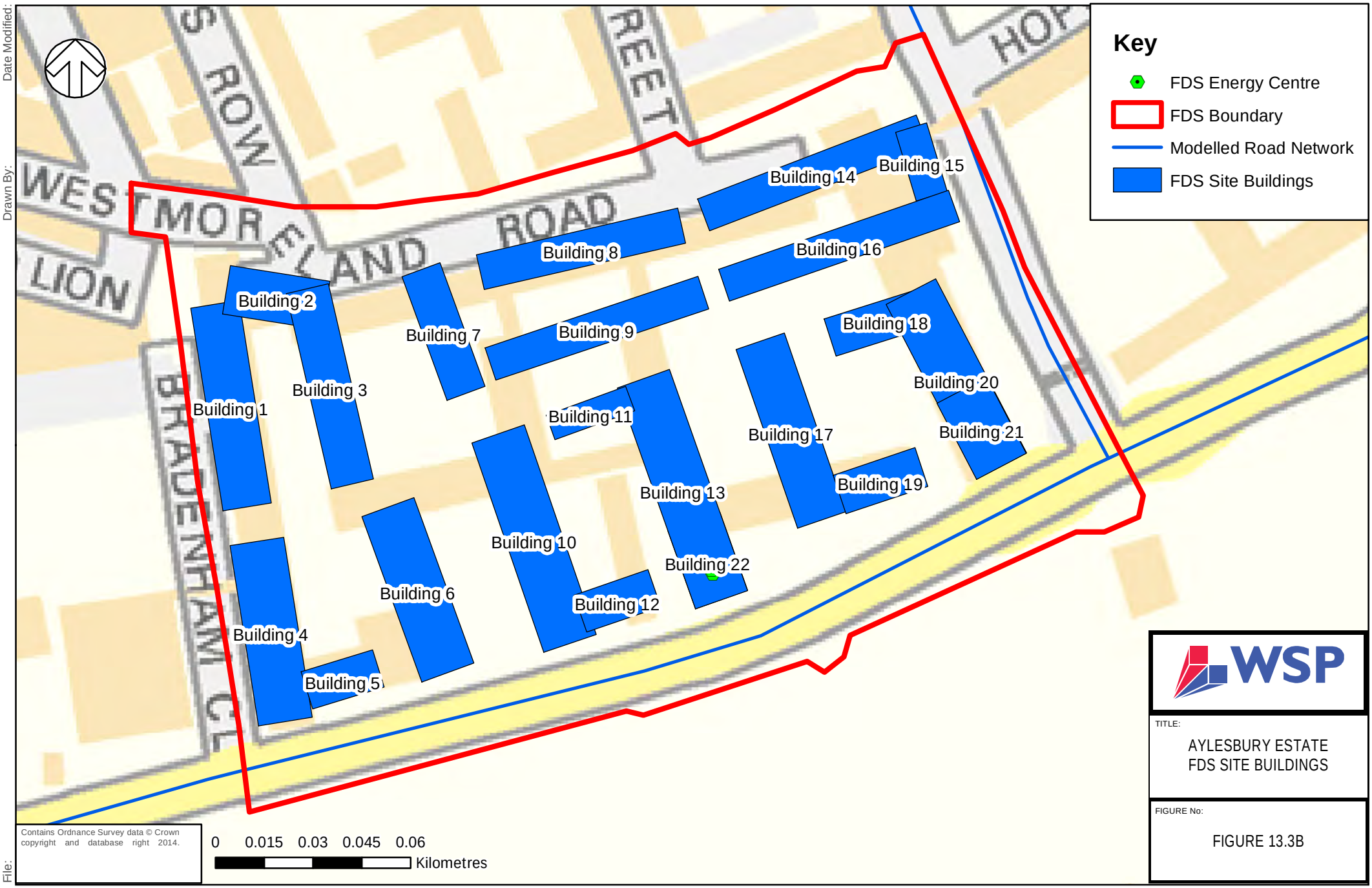
0 0.05 0.1 0.15 0.2
Kilometres
WSP
TITLE:
AYLESBURY ESTATE
EXISTING SITE BUILDINGS
FIGURE No:
FIGURE 13.3A
Date Modified:
Drawn By:
File:


Key
FDS Energy Centre
FDS Boundary
Modelled Road Network
FDS Site Buildings
Building 1
Building 2
Building 3
Building 4
Building 5
Building 6
Building 7
Building 8
Building 9
Building 10
Building 11
Building 12
Building 13
Building 14
Building 15
Building 16
Building 17
Building 18
Building 19
Building 20
Building 21
Building 22
WESTMORLAND ROAD
BRADENHAM CL
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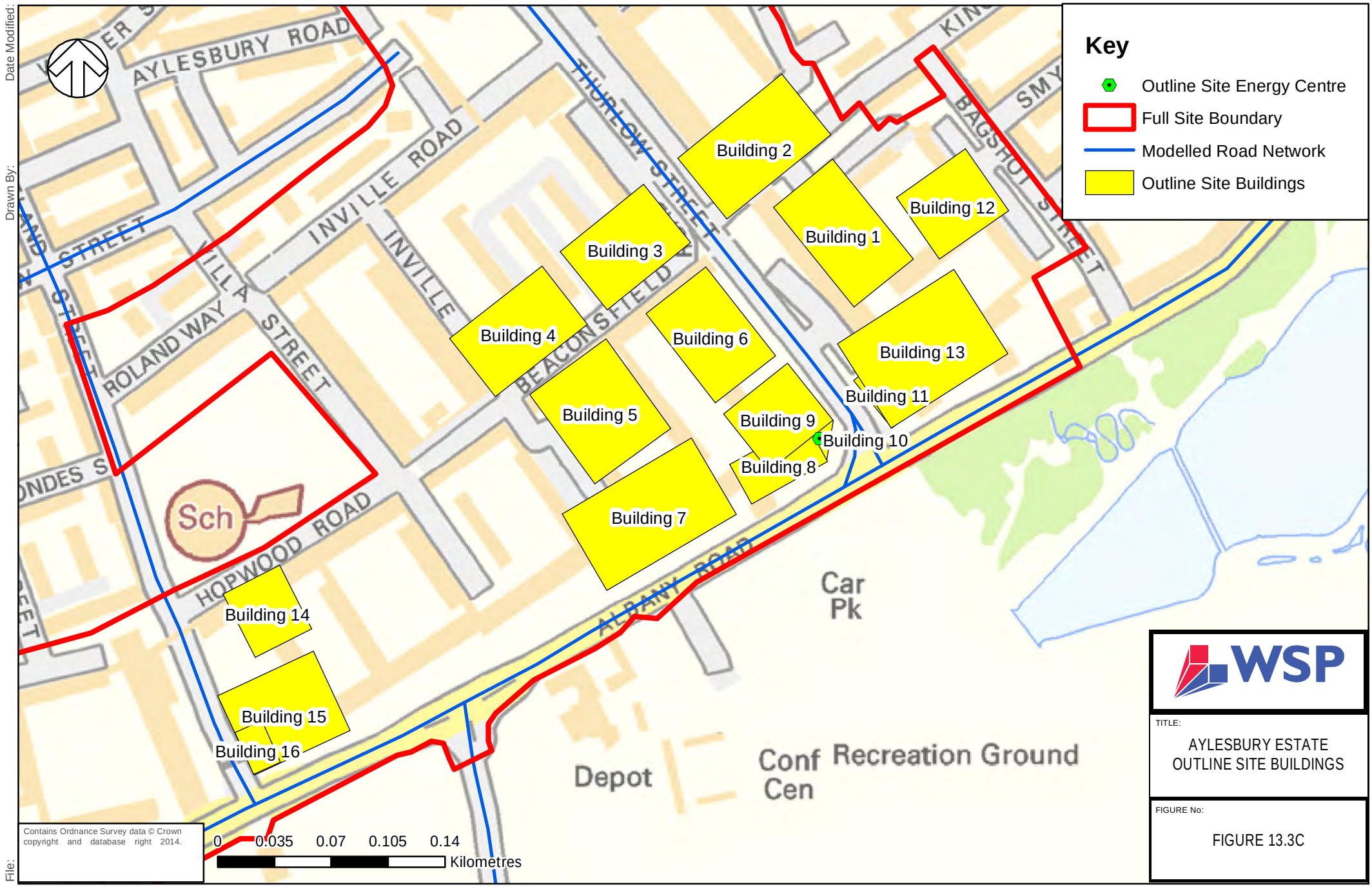
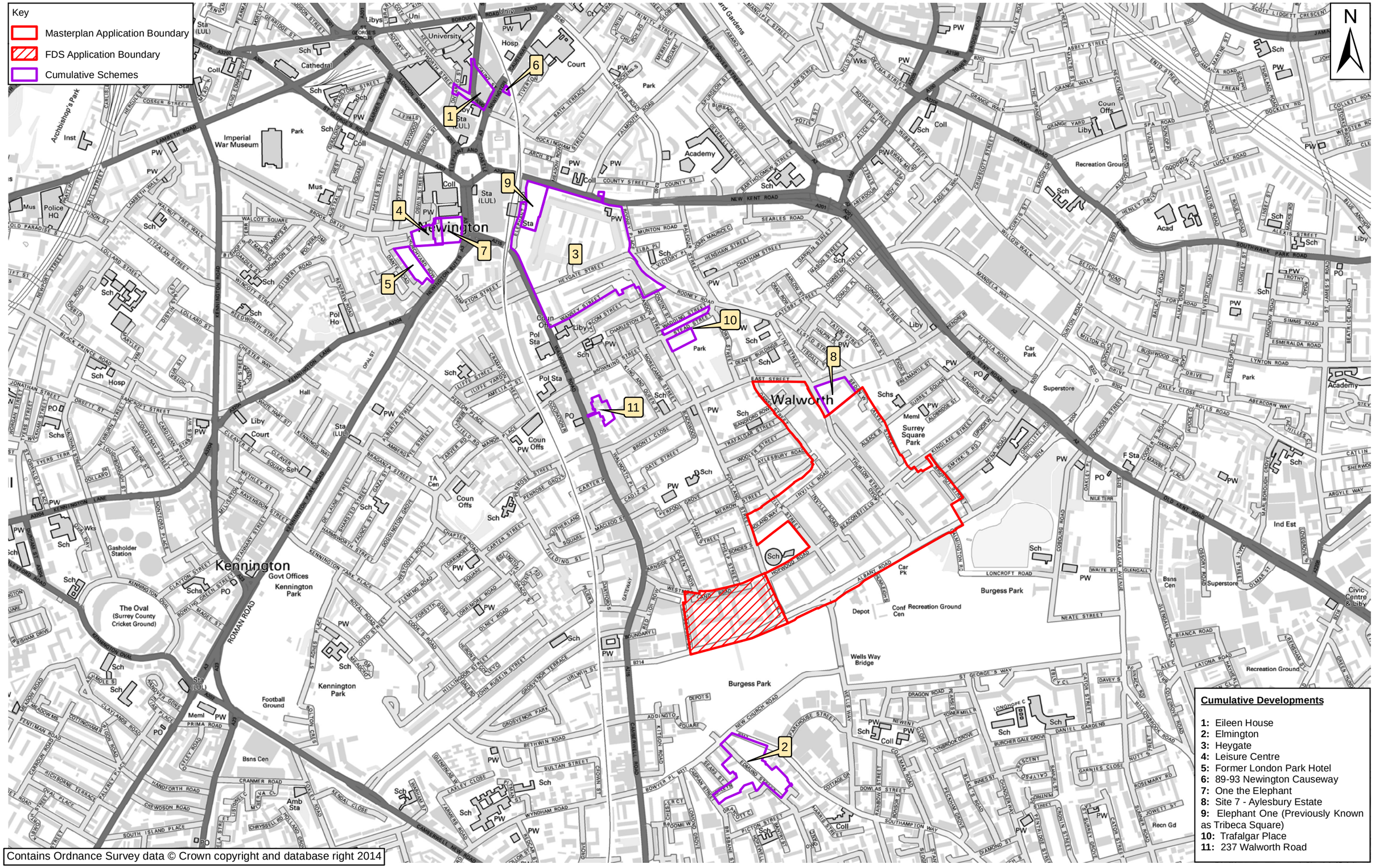
0 0.015 0.03 0.045 0.06
Kilometres
WSP
TITLE:
AYLESBURY ESTATE
FDS SITE BUILDINGS
FIGURE No:
FIGURE 13.3B
Date Modified:
Drawn By:
File:


Key
Outline Site Energy Centre
Full Site Boundary
Modelled Road Network
Outline Site Buildings
Building 1
Building 2
Building 3
Building 4
Building 5
Building 6
Building 7
Building 8
Building 9
Building 10
Building 11
Building 12
Building 13
Building 14
Building 15
Building 16
AYLESBURY ROAD
INVILLE ROAD
ROLAND WAY
HOPWOOD ROAD
ALBANY ROAD
BEACONSFIELD
THURLOW STREET
BAGSHOT STREET
Sch
Car Pk
Depot
Conf Cen
Recreation Ground
0 0.035 0.07 0.105 0.14
Kilometres
Contains Ordnance Survey data © Crown copyright and database right 2014.
Date Modified:
Drawn By:
File:
WSP
TITLE:
AYLESBURY ESTATE
OUTLINE SITE BUILDINGS
FIGURE No:
FIGURE 13.3C

Location of Cumulative Schemes

Scale @ A3 : 10,000

Figure 17.1



PROJECT: Aylesbury Estate, Southwark

PROJECT No: 62003762

Client: Notting Hill Housing Trust

Drawn: GH
Checked: CP
Approved: TS
Revision: A
Date: September 2014

WSP

List of Abbreviations

AAAP	The Aylesbury Area Action Plan
ADSL	Asymmetric Digital Subscriber Line
AOD	Above Ordnance Datum
APEC	Air Pollution Exposure Criteria
AQAP	Air Quality Action Plan
AQIA	Air Quality Information Archive
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
BAP	Biodiversity Action Plan
BCO	Building Control Officer
BGS	British Geological Survey
BRE	Building Research Establishment
BS	British Standards
CEMP	Construction Environmental Management Plan
CHP	Combined Heat and Power
CLO	Contaminated Land Officer
CRTN	Calculation of Road Traffic Noise
dB	Decibel
Defra	Department for the Environment, Food and Rural Affairs
DETR	Department for the Environment, Transport and the Regions
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DoE	Department of the Environment
EA	Environment Agency
EC	European Commission
EIA	Environmental Impact Assessment
EMI	Electromagnetic Interference
ES	Environmental Statement
EU	European Union
eVDV	Estimated Vibration Dose Value
FRA	Flood Risk Assessment
HGV	Heavy Goods Vehicle
IEMA	Institute of Environmental Management and Assessment
IOA	Institute of Acoustics
LAQM	Local Air Quality Management
LBAP	Local Biodiversity Action Plan
LBS	London Borough of Southwark
LDF	Local Development Framework
LNR	Local Nature Reserve
LPA	Local Planning Authority
NEC	Noise Exposure Category
NGR	National Grid Reference
NO_2	Nitrogen dioxide
OS	Ordnance Survey

OTA	Over The Air
PM10	Particulate Matter
PP	Percentage point
PPG	Planning Policy Guidance
PPG	Planning Policy Guidance
PPS	Planning Policy Statement
PRA	Preliminary Risk Assessment
PROW	Public Rights of Way
QUARG	Quality of Urban Air Review Group
SDSL	Symmetric Digital Subscriber Line
SMR	Sites and Monuments Record
SNCI	Site of Nature Conservation Importance
SPA	Special Protection Area
SPD	Supplementary Planning Document
SPG	Supplementary Planning Guidance
SPZ	Source Protection Zone
SUDS	Sustainable Urban Drainage Systems
TA	Transport Assessment
TN	Target Note
TV	Television
UDP	Unitary Development Plan
UXO	Unexploded Ordnance
VDV	Vibration Dose Value
VR	Visual Receptor
WCA	Wildlife and Countryside Act
WHO	World Health Organisation
WWW	World Wide Web

Glossary of Terms

The following sets out a summary and definition of the key terms used throughout the document.

The Applicant – Notting Hill Housing Trust.

AAAP – The Aylesbury Area Action Plan Supplementary Planning Document adopted by the London Borough of Southwark in 2010.

LBS – London Borough of Southwark Council

The Estate – This refers to the whole Aylesbury Estate as existing and defined by the AAAP. It includes the two application sites and also the previously consented Sites 1a (Built out and completed) and 7 (Currently under construction).

First Development Site (FDS Application) – The detailed planning application.

Masterplan Application – The outline planning application.

Comprehensive Development – The combined development proposed by the FDS Application and the Masterplan Application.

Site - The adjoining parcels of land (FDS Application site and Masterplan Application site) which are the subject of the two separate applications.

Site Wide Development Option: For the purposes of the EIA and each of the technical ES Chapters (Chapters 6 – 16), this option relates to the assessment of the combination of both the Masterplan Application site and the FDS Application site (Comprehensive Development).

FDS Development Option - For the purposes of the EIA and each of the technical ES Chapters (Chapters 6 – 16), this option relates to the assessment of the FDS Application site in isolation.

Plot – The defined parcel of development within the FDS Application site and Masterplan Application site. A Plot is made up of a number of sub-plots.

Sub-plot – The defined parcel of development within the FDS Application site and Masterplan Application site. A number of Sub-plots make up a Plot.

Block - The defined parcel of development within the FDS Application site and Masterplan Application site. A number of Blocks make up a Sub-plot.