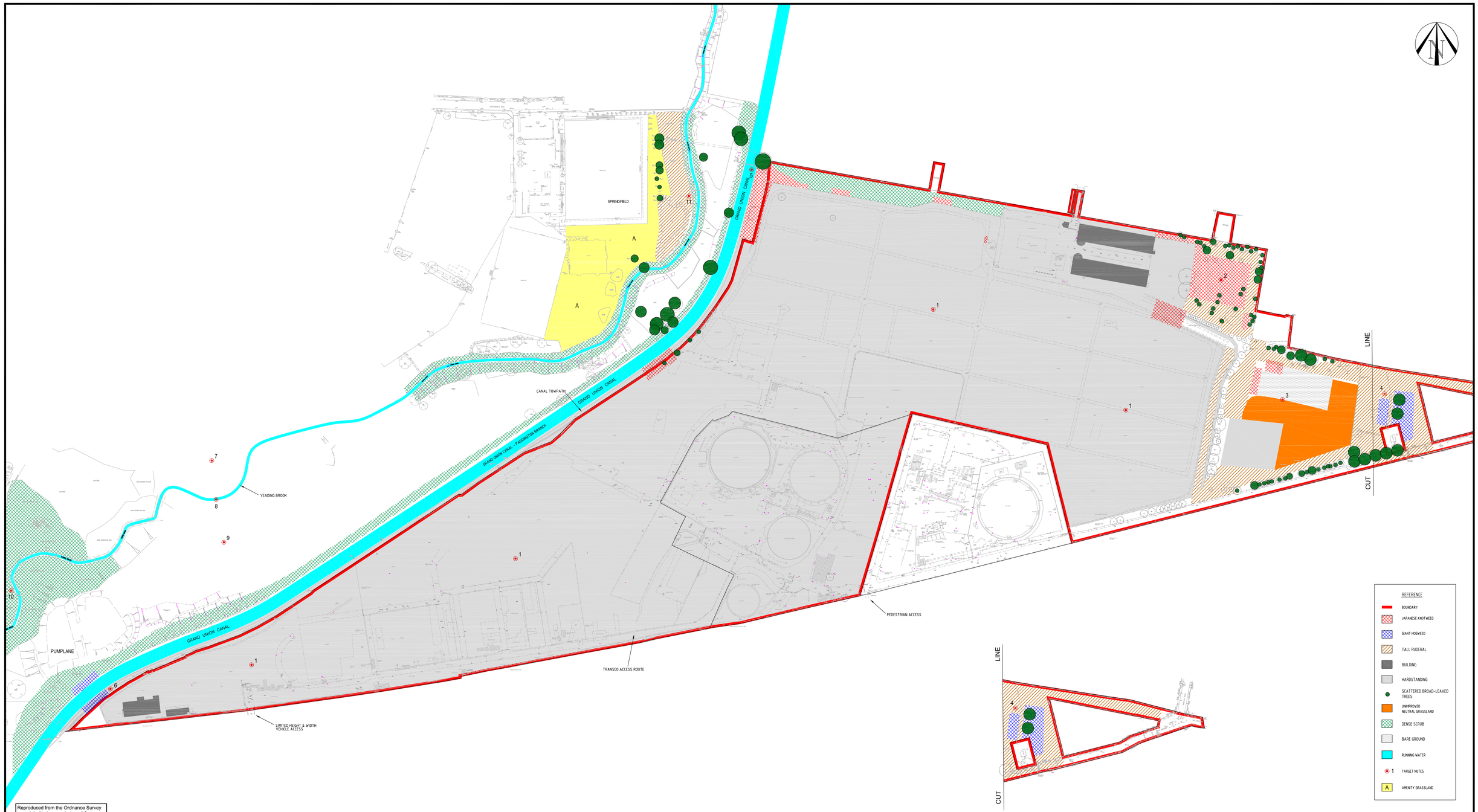

0 100m 200m

Rev	Description	By	Chk	App	Date

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Project: X
SOUTHALL GASWORKS

Client:
NATIONAL GRID PROPERTY LTD

Drawing Title:
PHASE 1 HABITAT SURVEY

Client Drawing No.

Scale at A1	Drawn By	Date	Checked By	Date	Approved By	Date
1 : 2000	P. J. T.	JUL. 2007	V. A.	JUL. 2007	G. C.	JUL. 2007

Office	Type	Project No.	Drawing No.	Revision
40	ENV	E00357	FIGURE 14.1A	

Figure 14.1b : Phase 1 habitat survey target notes.

Target note	Description
1	Hardstanding with occasional metal fencing. There are scattered waste ground plants growing around the edges including frequent ragwort *Senecio jacobaea*, buddleja *Buddleja davidii,* hedge mustard *Sisymbrium officinale*, bramble *Rubus fruticosus* agg., mugwort *Artemisia vulgaris*, ribwort plantain *Plantago lanceolata*, cleavers *Galium aparine*, perforate St. John's-wort *Hypericum perforatum*, goat willow *Salix caprea*, great mullein *Verbascum thapsus*, broadleaved willowherb *Epilobium montanum*, silver birch *Betula pendula*, perennial rye-grass *Lolium perenne*, Yorkshire fog *Holcus lanatus* and wall barley *Hordeum murinum*.
2	Japanese Knotweed *Fallopia japonica* – Very large dense stand interspersed with silver birch, and ephemeral tall ruderal around the perimeter dominated by mugwort and hedge mustard. Surrounded by hybrid black poplar *Populus x canadensis*.
3	Area dominated by poor semi-improved grassland surrounded by tall ruderal with areas of hardstanding and bare soil. Grassland – Dominated by false oat-grass *Arrhenatherum elatius* with common bent *Agrostis capillaris* and perennial sow-thistle *Sonchus arvensis*. Tall Ruderal – Wild mignonette *Reseda lutea*, common nettle *Urtica dioica*, rosebay willowherb *Chamerion angustifolium*, bramble, fat-hen *Chenopodium album* agg., mugwort *Artemisia vulgaris*, hedge mustard, great willowherb *Epilobium hirsutum*, hogweed *Heracleum sphondylium* and teasel *Dipsacus fullonum*.
4	Giant Hogweed *Heracleum mantegazzianum* stands are scattered over this area.
5	Grand Union Canal Bank (Springfield link road End) – False oat-grass, greater willow herb, common nettle and bramble are dominant, with goat willow *Salix caprea*, grey willow *Salix cinerea*, cock's-foot *Dactylis glomerata*, Yorkshire fog, gypsywort *Lycopus europaeus* and creeping buttercup *Ranunculus repens*. A large, mature hybrid black poplar has moderate bat roost potential due to a number of cracks in the trunk and branches.
6	Grand Union Canal (Pump Lane End) - To the western most point of the canal adjacent to the site, the general bankside flora is similar to target note 5, however, there are patches of giant hogweed on both banks with common reed *Phragmites australis* locally abundant.
7	Broadleaved woodland and scrub – Dominated by hawthorn *Cretaegus monogyna* and blackthorn *Prunus spinosa* with abundant wild plum *Prunus domestica*, bramble, common nettle and hogweed.
8	Yeading Brooke Banksides – Indian Balsam *Impatiens glandulifera* is locally dominant, with creeping thistle *Cirsium arvense*, willow, bramble, reed canary-grass *Phalaris arundinacea* and broadleaved willowherb. No macrophytes within stream.
9	Inaccessible area extensively affected by poor quality waste deposition. Giant hogweed is abundant throughout.
10	Pump Lane link road Site – Predominantly dense continuous scrub of hawthorn, blackthorn and wild plumb with some areas of tall ruderal dominated by brambles, nettles and giant hogweed. The concrete lined drainage channel here is heavily canalised with no aquatic macro fauna and is overshadowed by the scrub mentioned above.
11	Springfield link road Site – Predominantly tall ruderal of false oat-grass, common nettle, mugwort, broad-leaved dock, cow parsley and hedge bindweed. Behind this and adjacent to Yeading Brook is a line of scrub consisting of hawthorn and blackthorn. This is adjacent to an area of amenity grassland which is heavily managed as a cricket ground. Area has negligible reptile potential due to the level of management and lack of structural diversity.

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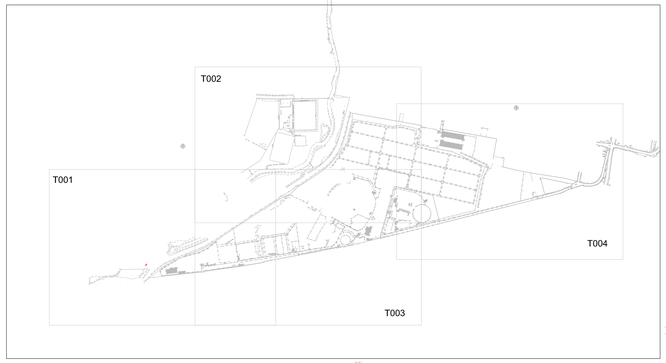

0 50m 100m

173 Italian alder 4m
174 Italian alder 3m
175 Italian alder 4m
176 Italian alder 5m
177 Italian alder 1.5m
178 Italian alder 5m
179 Italian alder 4m
G58 Hawthorn, apple, elder
180 silver birch 3m
166 Italian alder 4m
165 Italian alder 2.5m
164 Italian alder 2.5m
172 Italian alder 4m
171 Italian alder 3m
170 Italian alder
169 7m Pyrus calleryana
168 6m Italian alder
167 5m Italian alder 4m
163 grey poplar 10m
162 grey poplar 10m
161 grey poplar 11m
160 grey poplar 10m
159 golden honey locust 3m
158 grey poplar 10.5
157 grey poplar 10.5m
156 goat willow 4.5m
155 golden honey locust 4m
154 grey poplar 13m
153 grey poplar 12m
G65 Blackthorn
211 ash 12m
181 crack willow 12m
214 ash 16
213 ash 16m
212 ash 16m
1 hybrid black poplar 24m
G1 Hybrid black poplar; sycamore; goat willow; hawthorn
G2 Goat willow
G64 Silver birch, goat willow, blackthorn, elder, crack willow, hawthorn
210 pedunculate oak 12m
2 pedunculate oak 8m
151 crack willow 10m
152 crack willow 10m
G57 Blackthorn
G56 Blackthorn
G3 Goat willow; hawthorn; sweedish whitebeam; buddleia; oak
207 pedunculate oak 12m
208 pedunculate oak 15m
203 pedunculate oak 10m
209 pedunculate oak 15m
3 pedunculate oak 8m
4 Lombardy poplar 12
5 Lombardy poplar 16m
6 Lombardy poplar 7m
7 Lombardy poplar 15m
8 Lombardy poplar 17m
9 Lombardy poplar 20m
10 Lombardy poplar 7m
11 Lombardy poplar 19m
12 Lombardy poplar 21m
13 Lombardy poplar 16m
14 Lombardy poplar 22m
15 Lombardy poplar 23m
16 Lombardy poplar 8m
17 Lombardy poplar 2.5m
18 Lombardy poplar 20m
19 Lombardy poplar 22m
202 silver birch 10m
204 pedunculate oak 12m
205 sycamore 9m
206 white willow 14m
146 crack willow 12m
147 crack willow 6m
148 pedunculate oak 6m
149 crack willow 12m
150 crack willow 12m
G54 Crack willow
G55 Blackthorn
144 hornbeam 7m
143 hawthorn 4m
142 pedunculate oak 5m
141 pedunculate oak 13m
145 crack willow 12m
191 sycamore 14m
190 crack willow 14m
187 pedunculate oak 14m
186 pedunculate oak 10m
188 pedunculate oak 14m
189 pedunculate oak 10m
192 pedunculate oak 11m
194 ash 15m
193 ash 12m
G63 Hawthorn, pedndunculate oak, elder
G62 Hawthorn, pendunculate oak
G61 Pendunculate oak, silver birch, hawthorn, elder, goat willow
195 pedunculate oak 12m
182 sycamore 14m
G59 Goat willow
196 sycamore 9m
197 sycamore 13m
199 sycamore 13m
198 sycamore 13m
201 pedunculate oak 15m
200 pedunculate oak 11m
185 sycamore 11m
184 sycamore 13m
183 sycamore 13m
G60 Goat willow, sycamore, hawthorn, elder
G4 Hawthorn; oak; ash; sycamore; buddleia; dog rose
G5 Ash
20 goat willow 9m
G6 English elm; oak
G7 Ash; goat willow
G19 Buddle

KEY

- Category A trees and shrubs – High quality and value
- Category B trees and shrubs – Moderate quality and value
- Category C trees and shrubs – Low quality and value
- Category R trees and shrubs – Require felling because of condition
- Groups of trees and shrubs – Quality and value category as colour
- Root Protection Area (Categories A–C only)
- Root Protection Area (Groups of trees and shrubs)
- Ref. no. Species Height — Tree Labels

Rev	Description	By	Chk	App	Date

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Project:
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SOUTHALL

Drawing Title:
TREE CONSTRAINTS PLAN
NORTHERN AREA

Scale at A0	Drawn By	Date	Checked By	Date	Approved By	Date
1:750 @ A0	CR	JULY 07	GM	JULY 07	PH	JULY 07

Project No.	Office	Type	Drawing No.	Revision
E00357	4104	ENV	FIGURE 14.2A	

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N

142 pedunculate oak 5m
141 pedunculate oak 13m
145 crack willow 12m
191 sycamore 14m
190 crack willow 14m
189 pedunculate oak 10m
186 pedunculate oak 10m
188 pedunculate oak 14m
187 pedunculate oak 14m
192 pedunculate oak 11m
194 ash 10m
193 ash 12m
G62 Hawthorn, penduculate oak
G61 Penduculate oak, silver birch, hawthorn, elder, goat willow
G83 Hawthorn, pednduculate oak, elder
195 pedunculate oak 12m
182 sycamore 14m
G59 Goat willow
184 sycamore 13m
183 sycamore 13m
198 sycamore 13m
201 pedunculate oak 15m
200 pedunculate oak 11m
185 sycamore 11m
G60 Goat willow, sycamore, hawthorn, elder
G4 Hawthorn; oak; ash; sycamore; buddleia; dog rose
G5 Ash
20 goat willow 9m
G6 English elm; oak
G7 Ash; goat willow
19 Lombardy poplar 22m
18 Lombardy poplar 20m
17 Lombardy poplar 2.5m
16 23m Lombardy poplar 8m
15 Lombardy poplar 22m
14 16m Lombardy poplar 22m
13 Lombardy poplar 21m
12 Lombardy poplar 19m
11 Lombardy poplar 7m
10 Lombardy poplar 20m
9 17m Lombardy poplar
8 Lombardy poplar 15m
G20 Silver birch; buddleia
G19 Buddleia; silver birch
G16 Buddleia
G18 Buddleia; hawthorn; sycamore
23 common lime 16m
24 sycamore 12m
G17 Buddleia; sycamore; goat willow; silver birch
G15 Buddleia
G14 Buddleia

thorn, peduculate oak, crack willow, blackthorn
G52 Buddleia
140 sycamore 7m
G8 Goat willow; hawthorn; silver birch; ash; grey willow
elder; grey willow; oak

T001
T002
T003
T004

KEY

- Category A trees and shrubs – High quality and value
- Category B trees and shrubs – Moderate quality and value
- Category C trees and shrubs – Low quality and value
- Category R trees and shrubs – Require felling because of condition
- Groups of trees and shrubs – Quality and value category as colour
- Root Protection Area (Categories A–C only)
- Root Protection Area (Groups of trees and shrubs)
- Ref. no. Species Height — Tree Labels

0 50m 100m

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SOUTHALL GASWORKS
SOUTHALL

Drawing Title:
TREE CONSTRAINTS PLAN
SOUTHERN AREA

Scale at A0	Drawn By	Date	Checked By	Date	Approved By	Date
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Project No.	Office	Type	Drawing No.	Revision
E00357	4104	ENV	FIGURE 14.2B	

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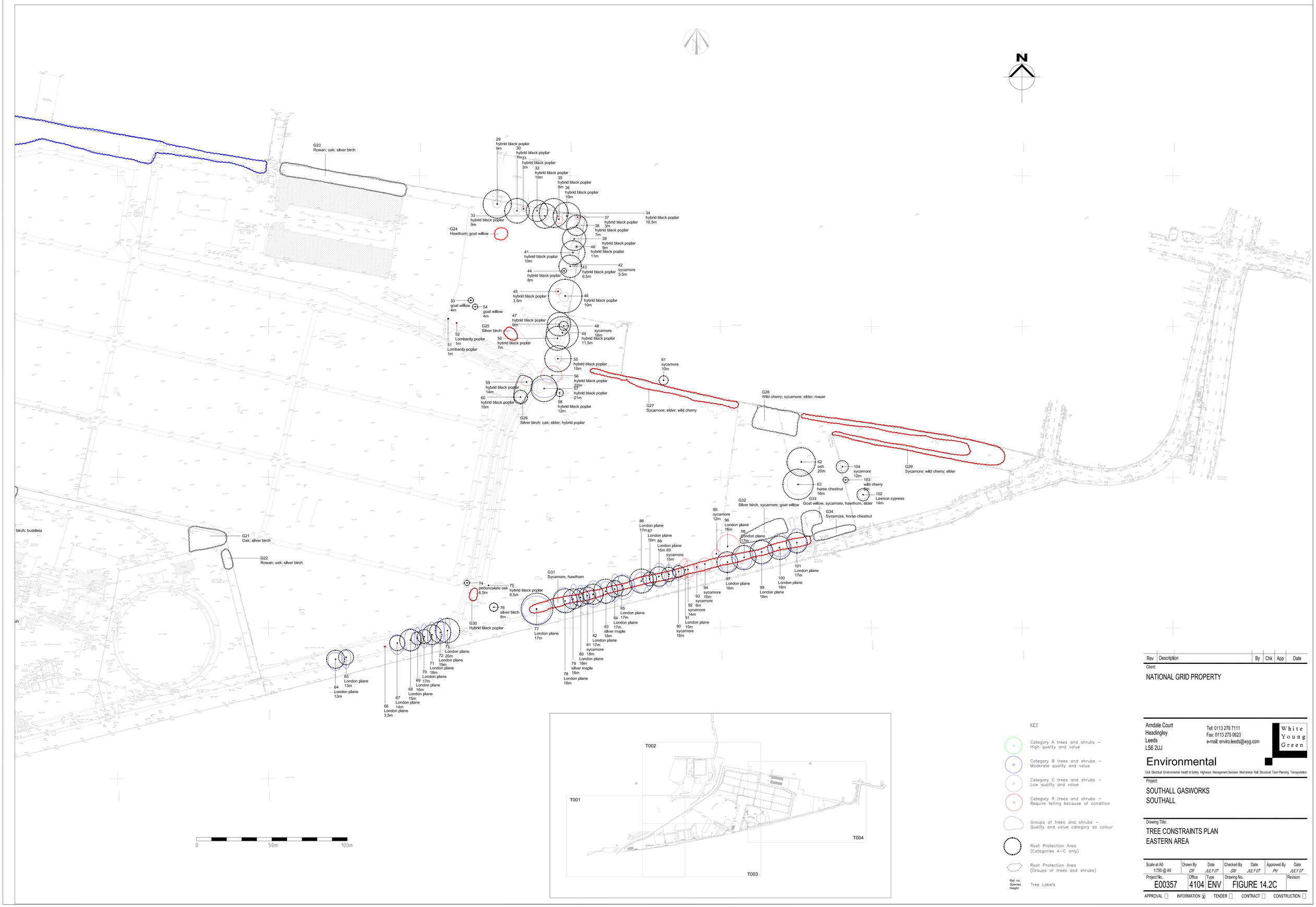

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Project:

SOUTHALL GASWORKS
SOUTHALL

Drawing Title:

TREE CONSTRAINTS PLAN
EASTERN AREA

Scale at A0	Drawn By	Date	Checked By	Date	Approved By	Date
1:750 @ A0	CR	JULY 07	GM	JULY 07	PH	JULY 07

Project No.	Office	Type	Drawing No.	Revision
E00357	4104	ENV	FIGURE 14.2C	

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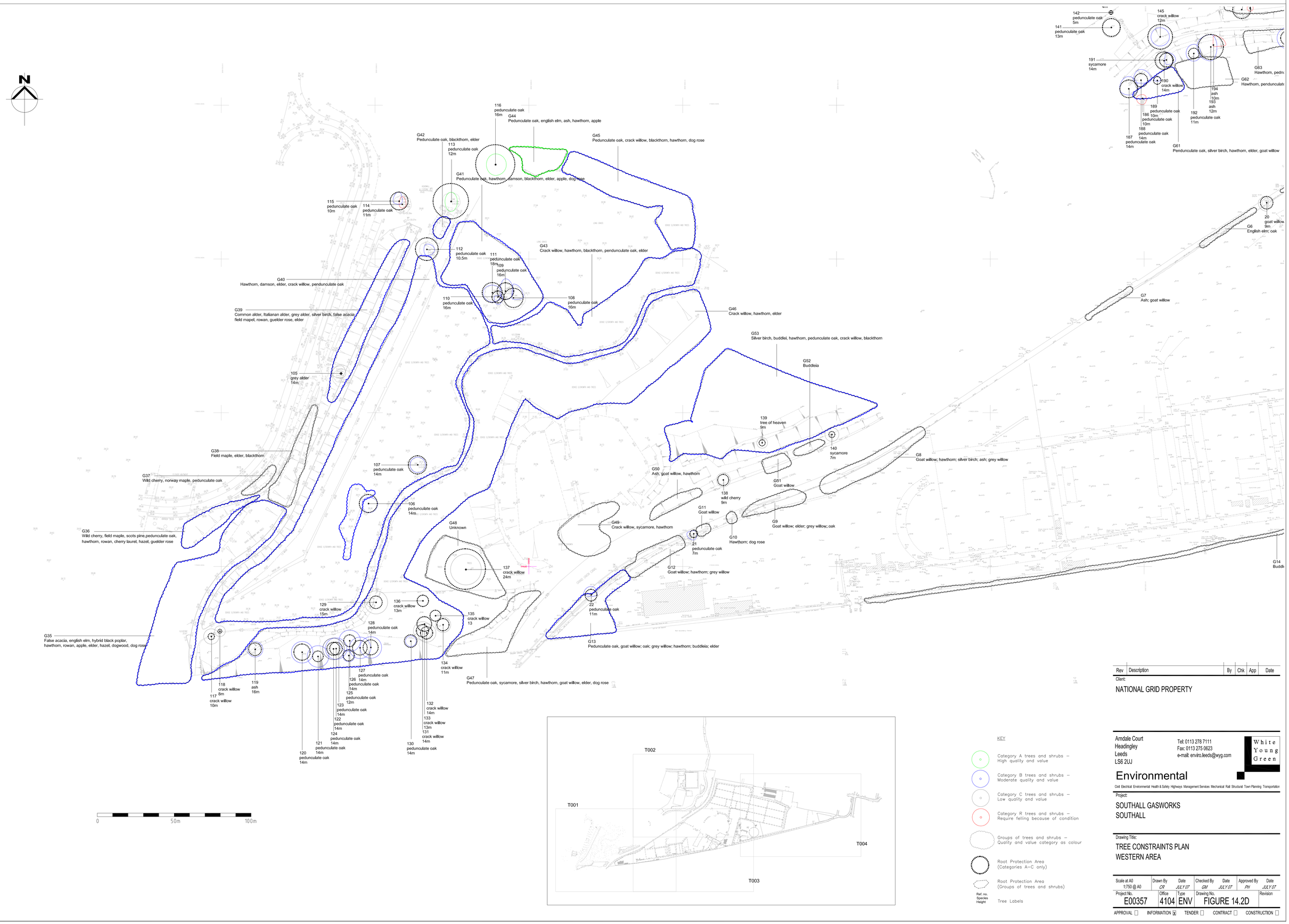

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Project:

SOUTHALL GASWORKS
SOUTHALL

Drawing Title:

TREE CONSTRAINTS PLAN
WESTERN AREA

Scale at A0	Drawn By	Date	Checked By	Date	Approved By	Date
1:750 @ A0	CR	JULY 07	GM	JULY 07	PH	JULY 07

Project No.	Office	Type	Drawing No.	Revision
E00357	4104	ENV	FIGURE 14.2D	

APPROVAL ☐ INFORMATION ☒ TENDER ☐ CONTRACT ☐ CONSTRUCTION ☐

15 ARCHAEOLOGY

15.1 Introduction

15.1.1 This chapter presents the findings of an archaeological desk-based assessment carried out by the Museum of London Archaeological Services (MoLAS) in June 2008. It assesses the known archaeological resource on the Site and in it's vicinity in the area surrounding the Site, and it assesses the likely effects of the proposed Scheme on this potential archaeological resource.

15.2 Planning Policy Context

National Planning Policy

15.2.1 The importance of archaeology is recognised in legislation at the national level through protection afforded by the Ancient Monuments and Archaeological Areas Act 1979 [(15.1)] and the Town and Country Planning Act (Listed Buildings and Conservation Areas) 1990 [(15.2)].

15.2.2 Planning Policy Guidance 16 (PPG16) [(15.3)] Archaeology and Planning, addresses archaeological matters. PPG 16 aims to ensure that the archaeological sensitivity of a site is fully taken into account in relation to development proposals. It also suggests that early consultation should take place to identify the archaeological sensitivity of sites. The underlying principle is that archaeological remains represent a non-renewable resource and that the conservation of nationally important archaeological remains (preservation in-situ) should be the primary goal. PPG16 requires:

- Protection of nationally important un-scheduled ancient monuments;
- The provision of information to enable informed decisions to be made; and
- Provision for the excavation and investigation of sites not being preserved in-situ.

Regional Planning Policy

15.2.3 The London Plan (February 2008, consolidated with alterations since 2004) [(15.4)] addresses archaeology in Policy 4B.15. "*The Mayor, in partnership with English Heritage, the Museum of London and boroughs, will support the identification, protection, interpretation and presentation of London's archaeological resources. Boroughs in consultation with English Heritage and other relevant statutory organisations should include appropriate policies in their Development Plan Documents for protecting scheduled ancient monuments and archaeological assets within their area*".

Local Planning Policy

LB Ealing's New Plan for the Environment [(15.5)]

15.2.4 The London Borough of Ealing's Revised Unitary Development Plan (UDP) ('New Plan for the Environment') was adopted in 1994 and safeguarded in part in September 2007. The policies set out in this document determine the position of archaeology as a material consideration in the planning process and incorporate recommendations from PPG 16. The principal policies and statements on archaeology are as follows:

15.2.5 Section 4.9 Ancient Monuments and Archaeological Interest Areas which outlines that the protection of Scheduled Ancient Monuments and their settings is required by law and any development affecting such an ancient monument requires an impact evaluation, including an archaeological assessment where appropriate. It also states that it is the Council's intention to also protect archaeological sites, and any proposal must provide adequate opportunities for archaeological investigation prior to development and must be carried out in accordance with the British Archaeologists and Developers Liaison Code of Practice.

15.2.6 Policy 4.9 also states that where a development would adversely affect Archaeological Interest Areas or archaeological remains, the applicant will normally be required to modify designs to avoid adverse effects, design suitable land use and management strategies to safeguard any important remains, with the option to seek an agreement covering access and interpretation arrangements, preserve in-situ: where this is not feasible, appropriate provision for excavation.

LB Hillingdon's UDP [15.6]

15.2.7 The Hillingdon UDP (adopted in September 1998 and safeguarded in part in September 2007) [15.5] states in Policy BE1 that:

"Only in exceptional circumstances will the Local Planning Authority allow development to take place if it would disturb remains of importance within the archaeological priority areas".

15.2.8 Policy BE2 states that *"Scheduled Ancient Monuments and their surroundings will be preserved"* and Policy BE3 – *"The Local Planning Authority will ensure, whenever practicable that sites of archaeological interest are investigated and recorded either before new building, redevelopment, site works, golf course or gravel extraction are started, or during excavation and construction. Development which would destroy important archaeological remains will not be permitted".*

15.3 Methodology

15.3.1 This chapter presents an assessment of impact significance based on the findings of the following four reports:

- An Archaeological Desk Based Assessment undertaken by MoLAS in March 2008 (see Appendix 15.1). The assessment has been undertaken in accordance with the standards specified by the Institute of Field Archaeologists (IFA 2001) [15.7] and the Association of Local Government Archaeological Officers and constitutes the Baseline Assessment;

- The Ground Conditions Report (2000) produced by White Young Green (WYG) which presents a summary of ground conditions based on investigations undertaken by WYG and third parties and consultations with Statutory Authorities (Appendix 12.1). This report has enabled identification of areas of archaeological interest and also area of truncation across the Site.

- The Remediation Strategy (2008) produced by WYG which provides an overview of the complex and varied ground conditions and their proposed remediation to facilitate development (Appendix 12.2); and

- An Archaeological Mitigation Strategy prepared by RPS in August 2008 and reviewed by GLAAS in September 2008 as detailed in Section 15.7: Mitigation of this chapter.

Baseline Methodology

15.3.2 The existing archaeological resource has been identified with the use of documentary and cartographic sources including the findings of archaeological investigations within a 1500m radius of the Site which includes chance finds recovered during the construction of the gasworks.

15.3.3 Information was collected from the primary repositories of archaeological information within Greater London. These comprise the Greater London Sites and Monuments Record (GLSMR) and the London Archaeological Archive and Resource Centre (LAARC). The GLSMR is managed by English Heritage and includes information from past investigations, local knowledge, find spots, and documentary and cartographic sources. LAARC includes a public archive of past investigations and is managed by the Museum of London.

15.3.4 Additional sources were consulted for the baseline assessment, these are outlined in the Archaeological Desk Based Assessment in Appendix 15.1.

15.3.5 A degree of uncertainty is attached to the baseline data sources used in any desk based assessed. These include:

- the SMR can be limited because it depends on random opportunities for research, fieldwork and discovery. There can often be a lack of dating evidence for sites; and

- documentary sources are rare before the medieval period, and many historic documents are inherently biased. Older primary sources often fail to accurately locate sites and interpretation can be subjective.

15.3.6 The limitations of an impact assessment of the proposed Scheme may also include:

- a lack of clarity surrounding the extent of some sites. This makes it difficult to provide a precise assessment of potential impact;

- the possibility that unknown sites will be encountered; and / or

- the subjectivity of those categorising the site, which may be reflected in the relative importance grading allocated to a site and therefore the assessment of impact.

Value of Resource

15.3.7 The potential for the presence of the archaeological resource has been identified and the sensitivity of each resource has been identified, based on relevant policy, legislative designations and rarity, allowing for professional judgement where resources are not covered by any policy or legislation. The criteria used to determine the value/sensitivity of resources or sites are outlined in Table 15.1.

Table 15.1 Criteria used to Determine Value of Archaeological Resource

Value of Resource	Criteria Used to Determine Value/Sensitivity
National	The highest status of site e.g. Scheduled Monuments, Listed Buildings Grade I and II, well-preserved historic landscapes; registered Historic Battlefields.
Regional	The bulk of sites with reasonable evidence of occupation, ritual, industry etc., reasonably well preserved historic landscapes; registered Historic Pars and Gardens.
Local	Sites with some evidence of human activity, but in a fragmentary or poor state, buildings of local importance, dispersed elements of historic landscapes.
Negligible	Resources with no value or interest.

15.4 Baseline Conditions

Ground Conditions of the Site

Geology

15.4.1 Site investigations carried out by WYGE and those of third parties since 1989 have been used to determine the geology of the Site. Made ground of an approximate thickness of 2.8m was found to be present across the Site to a maximum depth of 3.5m. A deeper layer of Made Ground is also known to exist around the historical subsurface structures associated with the former gasworks site.

15.4.2 The Site does not lie within an alluvial foodplain, but in an area consisting of Langley Silt (commonly known as Brickearth) which is considered to have been deposited between 250,000 – 30,000 years ago as mapped by the British Geological Survey (BGS 1993, sheet 254). The Brickearth is underlain by gravels (WYG indicate that these are Taplow Gravels, however MoLAS and BGS indicate these maybe Lynch Hill Gravels). London Clay is recorded throughout the area beneath these Pleistocene deposits.

15.4.3 Within the Site Investigations by White Young Green (2002) the material deposits in the south-western part of the Site, along the Yeading Brook, overlying the Lynch Hill Gravel is often referred to as 'alluvium'. It is possible that the grey-green clay deposits are alluvial, but, if they exist, they are not mapped by the British Geological Survey. Alternatively these deposits may be a form of Brickearth stained by contamination (this would fit as this area is the most heavily contaminated

across the Site). Due to the uncertainty surrounding these deposits alluvium has been referred to where mentioned in the desk based assessment.

15.4.4 Archaeological artefacts of Palaeolithic and Mesolithic date can be present in the Lynch Hill Gravel and at the base, or within the basal part, of the Langley Silt. Later prehistoric features and Roman, Saxon and medieval features are more likely to be found cut into the surface of the Langley Silt.

15.4.5 Table 15.1 presents the geology of the Site, as presented in the Ground Conditions Report (WYGE, 2000).

Table 15.2 Ground Condition of the Site

Geology	Description
Made Ground	Third party sources indicate made ground present across the majority of the Site to a maximum depth of 3.5m. This comprises generally and dominantly of rubble, with bricks, rags, glass, paper and coke/coal residues.
Brickearth	Third party sources indicate the Brickearth comprises of firm orange/brown clayey silt, organic in parts. This is not present across the entire Site with its absence expected to be the result of quarrying excavation for brick manufacture last century.
Gravels	Third party sources indicate that the gravel generally comprises of medium dense flint gravels and sand. The indicative thickness of Taplow Gravel varies from less than 3.0m to a maximum identified thickness of 6.9m.
London Clay	The London Clay is present across the site and comprises of a stiff dark brown silty clay with blue/grey mottling becoming a dark blue/grey clay with depth. Selenite crystals and concretions are also found in the less weathered parts of the formation. Local well records indicate that the clay is present to a thickness of some 50m. WYGE identified silty sandy Clay, London Clay, in all locations. The London Clay is underlain by the Reading Beds below which is the Upper Chalk.

Source: Ground Conditions Report (including summary of previous site investigations) (WYGE, 2000)

Topography

15.4.6 The Site is generally flat with the existing street level at 31 m AOD. The Site slopes to the north west towards the Grand Union Canal to 30m AOD. The area around the gasometers is also raised compared with the surrounding Hard Standing. The Yeading Brook is located 30m to the north west of the Site.

Recorded Archaeological History of the Main Site

15.4.7 The Site contains no Scheduled Monuments, Registered Parks or Gardens. It is not located within a Local Planning Authority Archaeological Interest Area/Archaeological Priority Area. This section has been based on the finding of the Desk Based Archaeological Assessment carried out by MoLAS (2008).

Prehistoric period (c 500,000 BC–AD 43)

Lower Palaeolithic (Regional to National Value)

15.4.8 It is considered that around this time, this part of England saw continuous occupation due to climate warming. Subsequent erosion and truncation has removed many of these land surfaces and most Palaeolithic finds are typically located outside of the context in which they were originally deposited, often discovered during gravel extraction.

15.4.9 In the case of the West Southall Site, Wymer (1968) recorded finds of ‘handaxes and elephant bones’ in the north eastern area of the Main Site, although the exact location of the discovery of these finds is not certain and may be outside of the Site. The SMR notes that Brown (1896) recorded Lower Palaeolithic handaxes during excavations for gasholders, however his original article only refers to teeth and bones being found.

15.4.10 In total Roe (1968) reports that 21 handaxes and six flakes were recovered from the gasworks.

15.4.11 The GLSMR notes that the flint tools found may possibly represent a ‘Kill Site’. However, in common with other antiquarian references, the interpretation of these finds is difficult, as specific locations are

not given. Whilst brickfields in Southall are referred to, no specific reference to the Southall gasworks is given, therefore there cannot be any certainty that these artefacts were found on the Applicant Site.

15.4.12 The previous recovery of Palaeolithic faunal remains within circa 1.5km of the site boundary indicates that the Main Site and Eastern Access may have some potential for the discovery of in-situ remains within the Gravels, however parts of the Main Site have been subject to extensive disturbance.

Upper Palaeolithic/Mesolithic and later prehistoric date (Regional Value)

15.4.13 The Mesolithic hunter-gather communities of the postglacial period (c 10,000–4,000 BC) inhabited a still largely wooded environment. Evidence of human activity is largely characterised by finds of flint tools and waste rather than structural remains. A Mesolithic axe and flint borer were retrieved within the study area.

15.4.14 The Neolithic (c 4000–2000 BC), Bronze Age (c 2,000–600 BC) and Iron Age (c 600 BC–AD 43) are traditionally seen as the time of technological change. With the establishment of farming and settled communities, forest clearance occurred for the cultivation of crops and the construction of communal monuments, resulting in the increasing population putting pressure on available resources throughout each period.

15.4.15 Clear evidence for later-prehistoric occupation in the study area was found during the 2005–6 excavations undertaken at Western International Market, c 700m south-east of the Main Site (right on the edge of the study area). The investigations revealed a group of Middle Bronze Age cremation burials as well as an intense concentration of postholes, dated by finds to the Late Bronze Age to Middle Iron Age periods. The earliest feature was a ring ditch (the ploughed-out remains of a round barrow), probably of Late Neolithic or Early Bronze Age date, which was located directly to the north of the concentration of cremation burials.

15.4.16 A Late Bronze Age founders' hoard was found to the north of the Main Site and, although its exact location is unknown, it was associated with excavations in the brickfields and may have come from the Main Site itself. Further prehistoric finds comprising one small fragment of pottery, three broken flint flakes, and 15 pieces of burnt flint were identified c 650m north of the Main Site in 1998.

15.4.17 A probable field system c 600m west of the Main Site has been identified from aerial photographs.

15.4.18 The Main Site and Eastern Access have a some potential for settlement activity and field systems due to the findings above and their topography and geology. However, parts of the Main Site have been subject to extensive truncation.

Roman period (AD 43–410) (Local to Regional Value)

15.4.19 Although extensive Roman field systems have been discovered c 5km to the south-west of the Site, there are no known sites and finds dated to this period within the Main Site, The Site therefore has a low potential for containing Roman artefacts.

Early medieval period (AD 410–1066) (Local to Regional Value)

15.4.20 The withdrawal of the Roman army from England in the early 5th century AD led to an extended period of socio-economic decline for England, however during the 9th and 10th century, the local parochial system began to replace the earlier Saxon Minster system, with formal areas of land centred on nucleated settlements served by a parish church. Southall Manor, Norwood Manor and Hayes were bequeathed to Wulfred of Canterbury in the year 830.

15.4.21 Recent excavations in 2005 and 2006 at Western International Market, c 700m south-east of the Main Site revealed a substantial ditch aligned northeast–southwest dated to the Early Anglo-Saxon period (c 5th–6th centuries AD). A sunken-featured building of Anglo-Saxon date and an area of possible industrial activity were excavated to the south of the Anglo-Saxon ditch. This evidence is likely to relate to Cranford Manor, since the motte for the manor of Cranford is just south of the study area and c 200m south of the 2005–6 excavation.

15.4.22 Although evidence has been found to the south of the Site, there is low potential for archaeological remains for the early medieval activity on the Main Site or Eastern Access.

Later medieval period (AD 1066–1485) (Local Value)

15.4.23 In 1212, William of Southall (de Suhalle) held a knight's fee in Southall of the Archbishop of Canterbury. This was probably the origin of the manor of Southall where the Main Site was located.

15.4.24 Norwood, Southall, and Northcott were settled by the 14th century and probably much earlier and there was also a moated manor house at Dormer's Wells, c 775m to the north-east of the study area.

15.4.25 The position of the settlements is likely to have been the same as in the post-medieval period: Southall in the mid-17th century appears to have clustered around the area later known as Southall Green, centring on King Street and the Green, c 350m south of the Main Site, where the later manor house is located.

15.4.26 The area of proposed development lay in rural land during the Medieval period and fell within Southall's common fields, known later as North Field, South Field and Middle Field (see below). As communally used land, they are unlikely to have been built on. A farm and a few cottages are known from documentary sources c 1200m south of the Main Site.

15.4.27 As there is no conclusive evidence for archaeological remains dated to this period it is considered that there is a low potential of finds of this period.

Post-medieval period (AD 1485–present) (Local to Regional Value)

15.4.28 The Site has some potential for Post Medieval Archaeological finds. Industrial activity identified on the Main Site includes the brickfields, chemical works, gasworks and the associated canal docks. Sub-surface footings of earlier structures are likely to be present within the Main Site, where the 19th-century structures are still extant. The Eastern Access may contain the remains of a farm and 19th century terraced housing.

15.4.29 Table 15.3 presents the findings from a number of data sources and maps of post medieval activity on the site and within the study area.

Table 15.3 Post Medieval Activity

Year	Data sources	Post Medieval Baseline
Main Site		
1587		The Southall manor house approximately 370m south of the Main Site, was built by Francis Awister in 1587
1596 and 1598	Survey carried out for Roger, Lord North, the Lord of the Manor of Norwood	Survey mentions four open fields around Southall: South Field, North Field, East Field, and Middle Field. All but East Field lay between the Yeading Brook and Southall Green
1754	Rocque's map (See Figure 15.1)	This map shows the Site straddling three of the fields with no buildings: Southfield, Middlefield, and Northfield. The village of Southall Green consisted of a few houses.
1821	Norwood Precinct Valuation map (see Figure 15.1)	Although the Paddington Canal is now shown on the map. The map shows that the North Field and Middle Field were now owned by a private individual (Thomas Parker), while the South Field was a Tithe allotment or common land.
1796	Weinreb and Hibbert (1993)	The Grand Junction Canal was completed.
1801		The Grand Union Canal Paddington branch opened
1841		The Great Western Railway was constructed along the southern boundary of the Main Site.
1865	OS map	This map shows brickfields within the central, northern and eastern parts of the Main Site. Oil works are also shown in the north western part of the Main Site consisting of paraffin oil works built in the former Middlefield. The paraffin oil works were located next to the canal, with a dock leading off the canal to the north presumably to serve the works. To the east is a brickfield with four clay mills, for mixing and tempering clay, and there is a pond to the south. To the

Year	Data sources	Post Medieval Baseline
		south of the Great Western Railway there is a brick works, which may have used the clay from the Main Site.
1884		The oil works described above became the Aldersgate Chemical Works.
1895	OS Map	This map shows the gasworks built by the Brentford Gas Company in 1868, comprising four gas holders and two new docks (in the central and southern areas), all of which fall within the Main Site. In the south-east of the Main Site, the pumping station of the South Western Suburban Water Works had been constructed. The Grade II Listed Southall Water lies immediately outside the site and is a significant local feature. The map also shows that in the area to the north-east of the Main Site, residential streets had been constructed including Randolph Road and Beasconsfield Road. To the south, the Great Western Railway had been widened and Southall Station to the east had been enlarged. South of the railway, Southall Green continued to expand with a mix of residential streets and industrial works. The brickworks noted on the 1865 map had disappeared as had the clay mills on the Main Site.
1914	OS Map	To the east of the gasworks, a football pitch is shown and further east a cricket ground. Allotments are shown north of the Main Site. South of the railway has further developed with more residential streets and industrial units. To the north-east of the Main Site, Southall has expanded and includes several streets of terraced housing
1935	OS Map	According to this map, the gasworks have expanded to include the entire south-west corner of the Main Site, the areas of the former Aldersgate Chemical works and to the east of White Street where the large existing blue gasometer was constructed.
1965	OS Map	Additional railway tracks extend into the western part of the Main Site. New buildings have been constructed on the northern part of the Main Site
		The gasworks ceased to operate in the early 1970s, although buildings, other than the gasometers, were still standing in 1980. Since then the entire Main Site, excluding the green field to the east, has been levelled and consolidated. The Main Site has been levelled and the docks infilled.
Springfield Road Footbridge		
1965	OS map	Industrial buildings are shown in the vicinity of the western end of the proposed road.
Minet Country Park Footbridge		
	Historic maps	The proposed footbridge and access road are shown as open fields on either side of Yeading Brook. The south-eastern end of the access road crosses the Grand Union Canal
Pump Lane Link Road		
	Historic maps	The Pump Lane Link road are is shown to be located within open fields cut by the Yeading Brook and the Grand Union Canal. The 19th-century and 20th-century Ordnance Survey maps indicate land in the area of the Pump Lane Link Road has remained open to the present day
Eastern Access		
1746 and 1821	Rocque's map and Norwood Precinct Valuation map (see Figure 15.1)	the Eastern Access is shown located in fields adjacent to the west side of South Road
1865	OS map	The OS map shows the southern half of the Eastern Access occupied by a collection of buildings, probably a farm.
1895	OS map	The collection of buildings has been replaced by terraced houses along South Road, Randolph Road, The Crescent and Beaconsfield Road. These roads continued to be lined with terraced housing up to the present day.

Recorded Archaeological History of the Eastern Access

15.4.30 This area remained largely undeveloped until the late 19th century when residential terraces were developed. It is not known if these residential dwellings had basement levels. Basements would potentially have removed the brickearth and caused localised truncation of any archaeological remains within their footprint.

Recorded Archaeological History of the Footbridges

15.4.31 These areas have some potential to contain archaeological remains dated to the prehistoric period. The resources of the alluvial floodplain are likely to have attracted occupation from both early and later prehistoric groups.

15.4.32 These areas have a low potential to contain archaeological remains of later periods. There is no evidence for Roman or later activity in these areas and it is likely that such activity would have been focussed upon the higher land of the Main Site. Historic maps of the post-medieval period indicate that these areas were located within open fields cut by the Yeading Brook and the Grand Union Canal.

15.4.33 The construction of the railway, canal and drainage west of the Yeading Brook would have required some ground levelling and disturbance of nearby areas for construction. This may have caused some localised truncation of any archaeological remains within the alluvium/brickearth.

15.4.34 The Minet Island area was used for tipping and was partially excavated to produce the canal embankment, which would have removed any archaeological remains.

Recorded Archaeological History of the Pump Lane Bridge

15.4.35 The Pump Lane Bridge area has a low potential to contain archaeological remains dated to the prehistoric period. The area to the west of the Yeading Brook is cut by the Canal and is known to have undergone excavation to provide material for the embankment of the Canal. The area to the east of the Yeading Brook contains the excavated material used for the flood relief channel, and only a small area of the Pump Lane Bridge is therefore likely to retain brickearth and prehistoric archaeological remains.

15.4.36 The Pump Lane Bridge area has a low potential to contain archaeological remains of later periods. There is no evidence for Roman or later activity in this area and it is likely that such activity would have been focussed upon the higher land of the Main Site. Historic maps of the post-medieval period indicate that this area was located within open fields cut by the Yeading Brook and the Canal, therefore any archaeological remains from later periods would also have been removed or truncated by the creation of the Canal and the flood relief channel.

15.5 Assessment of Archaeological Potential

15.5.1 This assessment of archaeological potential has been based upon the above baseline section together with the Ground Conditions Report (2000) and the Remediation Strategy (2008) both produced by WYG.

Effects of Past and Existing Land use

15.5.2 The Main Site lay undeveloped until the 19th century and has since undergone considerable building development and quarrying.

15.5.3 Foundations of the gasworks in the south-west part of the Site along with the construction of associated three canal docks, service runs, and other deep installations may have extended into the gravels. Any archaeological remains within the brickearth/alluvium may have been removed to the full extent of the feature or construction. However, it is possible that the underlying gravels within the areas of truncation still survive. Where constructions are shallower, archaeological remains within the brickearth, alluvium and underlying gravels may survive beneath localised truncation.

15.5.4 The Aldersgate Chemical Works and associated buildings occupied a substantial plot as did the Norwood Works. The depth of the foundations of these works is unknown but all foundations would have truncated any archaeological remains, however they may survive. Where constructions are shallower, archaeological remains within the brickearth, alluvium and underlying gravels may survive beneath localised truncation.

15.5.5 Truncation will also have arisen from other industrial infrastructure such as the docks, railways and access roads.

15.5.6 The brickearth/alluvium has been removed from extensive areas of the Site. This will have removed any archaeological deposits dating from the Upper Palaeolithic/Mesolithic onwards.

15.5.7 The baseline assessment and has been taken into consideration when identifying the archaeological potential of the Site, this is presented in Table 15.5.

Table 15.5 Archaeological Potential

Archaeological Resource	Site Area	Evaluation Target/Identified Potential
Lower Palaeolithic *(Regional to National Value)*	A	Medium potential.
	B	Medium potential.
	C1	Medium potential but extensive truncation of the brickearth shown in this area may have truncated gravels below.
	C2	Medium potential but almost complete truncation of the brickearth shown in this area may have truncated gravels
	C3	Medium potential but extensive truncation of brickearth may have also impacted gravel
	D1	Medium potential but almost complete truncation of the brickearth shown in this area may have truncated gravels below.
	D2	Medium potential but almost complete truncation of the brickearth shown in this area may have truncated gravels below.
	D3	Medium potential but almost complete truncation of the brickearth shown in this area may have truncated gravels below.
	D4	Medium potential but almost complete truncation of the brickearth shown in this area may have truncated gravels below.
	D5	Medium potential
	D6	Medium potential
	D7	Medium potential
	Eastern Access	Medium Potential
	Footbridges	Medium Potential
	Springfield Road	Medium Potential
	Pump Lane	Low Potential
Later Prehistoric *(Regional Value)*	A	Medium potential
	B	Medium potential
	C1	Medium potential but extensive truncation of the brickearth shown in this area
	C2	Medium potential but extensive truncation of the brickearth shown in this area.
	C3	Medium potential but extensive truncation of the brickearth shown in this area.
	D1	Medium potential but almost complete truncation of the brickearth shown in this area.
	D2	Medium potential but almost complete truncation of the brickearth shown in this area.
	D3	Medium potential but almost complete truncation of the brickearth shown in this area
	D4	medium potential but almost complete truncation of the brickearth shown in this area
	D5	Medium potential.
	D6	Medium potential.
	D7	medium potential
	Eastern Access	Medium Potential
	Footbridges	Medium Potential
	Springfield Road	Medium Potential
	Pump Lane	Low Potential
Post-medieval	A	Medium to high potential

Archaeological Resource	Site Area	Evaluation Target/Identified Potential
(Local to Regional Value)	B	Medium to high potential.
	C1	Medium to high potential.
	C2	Indicated as medium to high potential in Baseline Assessment bit no features shown on 1865, 1895 or 1914 Ordnance Survey map.
	C3	Medium to high potential. Structures shown to west of Area on 1865 and 1895 Ordnance Survey maps.
	D1	Medium to high potential.
	D2	Medium to high potential.
	D3	Medium to high potential.
	D4	Medium to high potential.
	D5	Medium to high potential.
	D6	Medium to high potential.
	D7	Medium to high potential.
	Eastern Access	Medium - high Potential
	Footbridges	Low Potential
	Springfield Road	Low Potential
	Pump Lane	Low Potential

15.5.8 A number of major operational gas pipelines underlie the Site leading to the National Grid Gas (NGG) operational site. These pipelines together with a decommissioned waste drainage easement pose as constraints to the remediation, construction and archaeological mitigation for the proposed development. These site constraints are presented on the plan in Figure 15.2.

15.6 Development Effects

Remediation

15.6.1 Significant levels of contamination are present across the Main Site in areas previously occupied by the gasworks and chemical works and contaminants such as Benzene, Arsenic, Cadmium and Mercury are considered to be present. These ground conditions represent a potential risk to the groundwater and subsequently to nearby surface water bodies, as well as to any development, and require remediation to mitigate the risk.

15.6.2 The level of potential contamination for each zone of remediation is shown in Figure 12.5 in Chapter 12: Ground Conditions and Table 15.4 Below:

Table 15.4 Level of Contamination across the Site

Zone	Area (Ha)	Perimeter (m)	Level of Contamination
A	3.074	900	Negligible
B	2.836	740	Minor
C1	2.923	740	Moderate
C2	1.623	590	Minor
C3	2.952	760	Minor
D1	1.698	630	Major
D2	2.144	650	Major
D3	2.496	860	Major
D4	2.191	620	Major
D5	2.938	720	Major
D6	2.151	840	Major
D7	1.399	710	Major

15.6.3 Potential effects on the archaeological potential of the Site may result from the proposed remediation of the Site due to the removal of the Made Ground (White Young Green 2008, 12–31) and possibly some of the brickearth deposits. However the level of effect will vary depending on the level of remediation works planned for each specific zone.

Construction

15.6.4 A number of basements are proposed as part of the Scheme. The locations and levels of these proposed basements are indicated on Figure 15.3. The majority of the basements would be constructed along the western and northern edges of the Main Site. Their depths vary between 1.5 and 3m below ground level (bgl) (allowing 0.50m for the basement slab) the formation level for the basements would vary between 1 and 4m bgl.

15.6.5 Currently there are no details regarding the foundations of the buildings, however it is anticipated that piling would be used for much of the construction.

15.7 Mitigation

15.7.1 Development will take place in phases over a number of years (approximately 15 years), with the possibility of a number of differing developers and a number of differing archaeological sub-contractors being involved. This is likely (subject to the results of the archaeological evaluation) to mean that any mitigation works will be undertaken in phases, commensurate with the phased development programme.

15.7.2 Archaeological evaluation will primarily be intended to target Prehistoric (Lower Palaeolithic within the gravels and Upper Palaeolithic/later prehistoric in the Langley Silt/brickearth deposits) and Post-Medieval archaeological remains. The methods proposed for archaeological evaluation are generally consistent with the following two options:

- Geoarchaeological Boreholes - Geoarchaeology is the application of earth science principles and techniques to the understanding of the archaeological record. In essence this is the analysis of sediments in order to understand site formations and changes in landscapes over time. A core is taken for the purposes of retrieving sediments for geoarchaeological analysis. The cores are taken in the same way as site investigation boreholes (rotary or cable percussion drills) and can be carried out solely for geoarchaeological purposes, or in conjuction with geotechnical works.

- Trial Trench Evaluation – Archaeological trial trenches are (usually) machine cut trenches carried out in advance of development in order to assess the archaeological potential of a development site.

15.7.3 Evaluation may lead to the requirement for excavation prior to commencement of construction for the proposed development.

15.7.4 The Remediation Strategy for this outline application is sub-divided into 12 zones (see Figure 15.2) therefore, for the purposes of this assessment the Main Site has also been subdivided into these 12 separate areas of remediation.

Archaeological Evaluation

15.7.5 Table 15.5 details the suggested archaeological evaluation for the proposed Scheme.

Table 15.5 Archaeological Mitigation Suggested for West Southall

Location	Archaeological Resource	Mitigation/Evaluation
Main Site Area A	Lower Palaeolithic	The top of the gravel in Area A is between 0.50m and 2.10m beneath the current ground surface. The WYG Ground Conditions Report (Appendix 12.1) indicates that there may be truncation of these gravels from the location of "brickfield" shown on the 1865 OS map therefore a geo-archaeological borehole survey in the centre of Area A may be necessary to assess potential of survival of land surfaces/deposits associated with Lower Palaeolithic potential.
	Later Prehistoric	Alluvium/brickearth is considered to be between 0.20m and 2.0m beneath current ground surface. The Ground Conditions Report indicates that there may be truncation of the "alluvium" from the Brick Field shown on the 1865 OS map. Evaluation trenching set out on a grid basis may be required for Later Prehistoric remains to the depth of the potential impact.
	Post-medieval	The MoLAS Archaeological Desk Based Assessment (Appendix 15.1) indicates circa 0.20m and 2.00m of Made Ground which could potentially contain post-medieval archaeological deposits. Evaluation trenching may be required targeting the industrial features shown on the 1865 OS map to the depth of the potential impact.
	Lower Palaeolithic	The desk based assessment indicates that the top of the gravel is between 1.10m and 3.50m beneath the current ground surface. The Ground Conditions Report suggests that there may be extensive truncation of the gravel from the location of Brick Field shown on the 1865 OS map and Gravel Pit shown on the 1914 OS map. A geo-archaeological borehole survey may be necessary along the south edge of Area B (taking into consideration the presence of the gas pipeline easement) to assess the potential of survival of land surfaces/deposits associated with this period.
Main Site Area B	Later Prehistoric	The top of the alluvium/brickearth is considered to be between 1.0m and 2.0m beneath the current ground surface however, the Ground Conditions Report indicates that there may be extensive truncation of the "alluvium" from the Brick Field shown on the 1865 OS map. Evaluation trenching set out on a grid basis is may be required to the depth of the potential impact.
	Post-medieval	The Archaeological Desk Based Assessment (Appendix 15.1) indicates a medium to high potential for Post Medieval remains, however as there are no Post-medieval features shown on 1865, 1895 or 1914 Ordnance Survey map, evaluating by way of evaluation trenching may be required.
	Lower Palaeolithic	The MoLAS Archaeological Desk Based Assessment (Appendix 15.1) indicates that top of the gravel is between 1.30m and 4.0m beneath current ground surface. However, extensive truncation of the brickearth shown in this area may also have truncated gravels below (WYG, 2000). A geo-archaeological borehole survey may be necessary in the north of Area C1 for evaluation purposes.
Main Site Area C1	Later Prehistoric	The Ground Conditions Report suggests extensive truncation of the brickearth in this area. Evaluation trenching targeted on surviving areas of brickearth (subject to NGG Pipeline constraints) may be required to the depth of the potential impact.
	Post-medieval remains	Evaluation trenching to depth of impact is proposed for Post-medieval remains targeting the industrial features shown on the 1865, 1895 and 1914 Ordnance Survey maps.
		The Ground Conditions Report indicates that there is almost complete truncation of the brickearth shown in this area, which may have truncated the gravels below. Therefore, no evaluation is suggested for Lower Palaeolithic and Later Prehistoric remains. No evaluation is suggested for Post-medieval remains as no features are shown on 1865, 1895 or 1914 OS maps.
Main Site Area C2	Lower Palaeolithic	No evaluation is suggested in this area as the Ground Conditions Report indicates that there is almost complete truncation of the brickearth and possibly of the gravel.
Main Site Area C3	Later Prehistoric	The top of the alluvium/brickearth is 1.75 beneath current ground surface however extensive truncation of the brickearth has occurred in this area. Due to the location of the NGG gas pipeline easement to the north of the area evaluation trenching may be necessary to the south of C3 only for evaluation purposes.
	Post-medieval	Evaluation trenching may also be required for the Post Medieval remains for which there is a medium to high potential as Area C3 is the possible site of the 1868 Brick Works and structures are shown to the west of the area on the 1865 and 1895 OS maps.
	Lower Palaeolithic and Later	No mitigation is considered to be required for the Lower Palaeolithic and Later Prehistoric remains due to the absence of alluvium or brickearth in this area.

Location	Archaeological Resource	Mitigation/Evaluation
	Prehistoric	
Main Site Area D1	Post-medieval	There is a medium to high potential for Post-medieval remains in Area D1 as there is a reservoir shown on 1914 OS and ponds, reservoirs and purifiers shown in drawings within WYG's Remediation Strategy (Appendix 12.1). However, due to the levels of contamination in this area any necessary archaeological evaluation will be linked in with the detailed remediation strategy.
	Lower Palaeolithic and Later Prehistoric	No mitigation is considered to be required within D2 for Lower Palaeolithic and Later Prehistoric remains due to the entire absence of brickearth/alluvium in this area.
Main Site Area D2	Post-medieval	The 1856 OS map shows a dock and oil works, the 1895 OS shows Aldersgate Chemical Works and drawings in the WYG Remediation Strategy (Appendix 12.2) indicate storage and infrastructure associated with gasworks in area D2. Again the levels of contaminated land in this area are considered to be high, therefore any necessary archaeological evaluation will be linked in to the detailed remediation strategy.
	Lower Palaeolithic and Later Prehistoric	No mitigation is required for the Lower Palaeolithic and Later Prehistoric archaeological remains due to the absence of brickearth/alluvium in this area.
Main Site Area D3	Post-medieval	The Aldersgate Chemical Works is present in Area D3 on the 1895 OS map. The drawings in the Remediation Strategy (Appendix 12.2) also indicate Tank/Purifiers present on the Area from 1895 to 1964 and a dock to be operational around 1951. However, due to levels of ground contamination any necessary archaeological evaluation will be linked to the detailed remediation strategy.
Main Site Area D4	Lower Palaeolithic or Later Prehistoric	No evaluation is suggested in area D4 for Lower Palaeolithic or Later Prehistoric remains as there is almost an entire absence of alluvium or brickearth.
	Post-medieval	The baseline assessment indicates circa 0.60 to 2.80m of Made Ground. The 1895 OS map shows the gasworks located in this area and drawings in the Remediation Strategy (Appendix 12.2) indicate a former pond and retorts with associated Coal/Coke located in the Area until the 1960s. Due to the past industrial uses on this part of the Site this area is considered highly contaminated and therefore any necessary archaeological evaluation required will be linked in to the detailed remediation strategy.
Main Site Area D5	General	The 1914 OS map indicates railway sidings and drawings in the Remediation Strategy (Appendix 12.2) indicate tool sheds/machine shops, Benzene manufacture and storage in Area D5. However, due to the presence of numerous structures and the high risk of contaminated samples in Area D5 a geo-archaeological borehole survey would be difficult to complete. It is therefore proposed that any necessary archaeological evaluation would be linked in with the detailed remediation strategy.
Main Site Area D6	General	Numerous structures are also located in Area D6, therefore a geo-archaeological borehole survey would also be difficult to complete in this area. Due to the highly contaminated nature of this area it is proposed that any necessary evaluation is tied in with the detailed remediation strategy.
Main Site Area D7	Lower Palaeolithic	The top of the gravel is considered to be between 1.60m and 3.4m below ground surface. A geo-archaeological borehole survey may be required in D7 to assess the potential of survival of land surfaces/deposits subject to further information on contamination.
	Later Prehistoric	The top of the "alluvium" is between 0.20m and 2.90m below ground surface. Any evaluation trenching deemed necessary is proposed to the depth of the impact subject to the constraint of the NGG easement and further information on contamination.
	Post-medieval	OS Maps and the WYG drawings indicate residential properties constructed for workers on the west beside White Street. Evaluation trenching to depth of the impact may be required subject to the constraints of the NGG easement and further information on contamination. Taking into account the identified archaeological potential it is not proposed to undertake any evaluation works in this area.
Pump Lane	All	Taking into account the depth of Made Ground and proposed construction methodology, it is not proposed to undertake any evaluation

Location	Archaeological Resource	Mitigation/Evaluation
Bridge		works in these areas.
Springfield Road and Minet Country Park Footbridges	All	Taking into account the constraint of the gas pipeline running through the area and the truncation likely to have been caused, no mitigation is proposed in this area.
Eastern Access	All	Taking into account the constraint of the gas pipeline running through the area and the truncation likely to have been caused, no mitigation is proposed in this area.

15.8 Likely Significant Effects

15.8.1 The principal impacts to any currently unknown archaeology that might exist here would comprise truncation from building and infrastructure construction and from damage caused by the remediation of contaminated land and landscaping.

Effects on Known Archaeology

15.8.2 The current level of archaeological information suggests that there will be no significant (indirect or direct) impacts from the development upon Scheduled Monuments, or known archaeological sites. The impact and effect upon known archaeology is therefore neutral.

Effects on Unknown Archaeology

15.8.3 At the present time there are no known archaeological sites, features or finds at the Application Site as recorded Palaeolithic material will have been removed during the construction of the gasworks etc. The Site has been subject to extensive previous disturbance via construction and extraction.

15.8.4 There have been no archaeological surveys undertaken at this particular Site to determine potential presence/absence of archaeology and therefore this judgement has not been tested.

15.8.5 In the absence of further survey work, an indication of likely effect upon buried archaeology is all that can be advanced. The effect at this Site is likely to be no more than minor adverse or neutral. This is on the basis that it is considered unlikely that nationally important remains will be found at the Site and any sites or finds of regional or local value would be either preserved in situ within open space (via design) or preserved by record (excavated).

References

15.1 HMSO (1979) Ancient Monuments and Archaeological Areas Act

15.2 HMSO (1990) Town and Country Planning Act (Listed buildings and Conservation Areas)

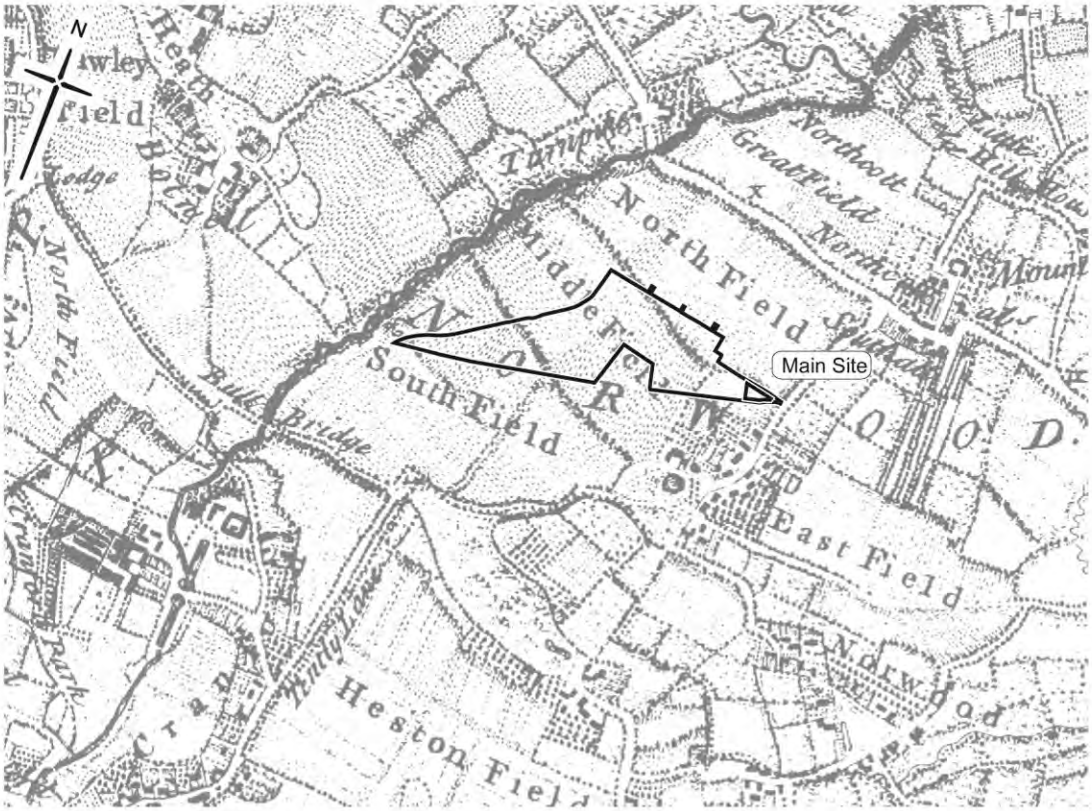
15.3 Department for Communities and Local Government (1990) Planning Policy Guidance 16 (PPG16) Archaeology and Planning.

15.4 Greater London Authority (2008) The London Plan: February 2008, consolidated with alterations since 2004)

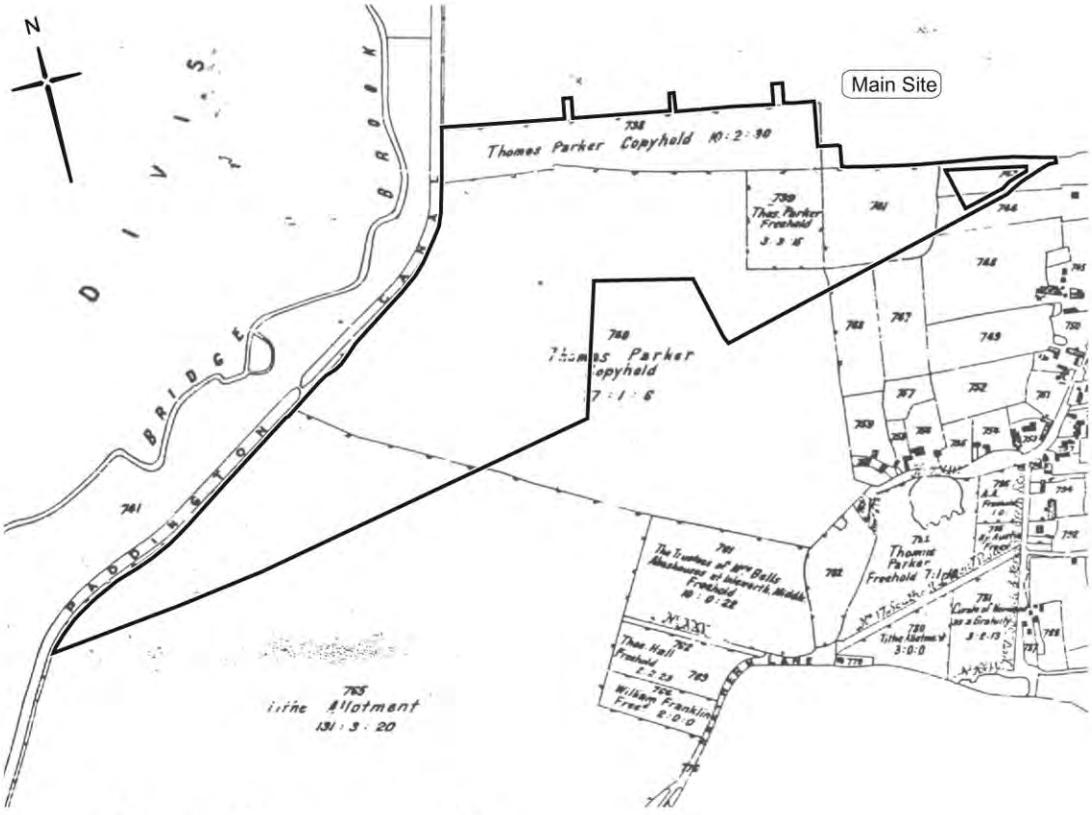
15.5 London Borough of Ealing (1998) A New Plan for the Environment: Ealing's Unitary Development Plan.

15.6 London Borough of Hillingdon (1998) Unitary Development Plan.

15.7 Institute of Field Archaeologists (2001) Standards and Guidance for Archaeological Desk Based Assessment. (October 1994, revised September 2001)



Rocque's map of 1754



Norwood Precinct Valuation map of 1821

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Project: West Southall

Title: Historic Maps of the Site

Figure No: Figure 15.1

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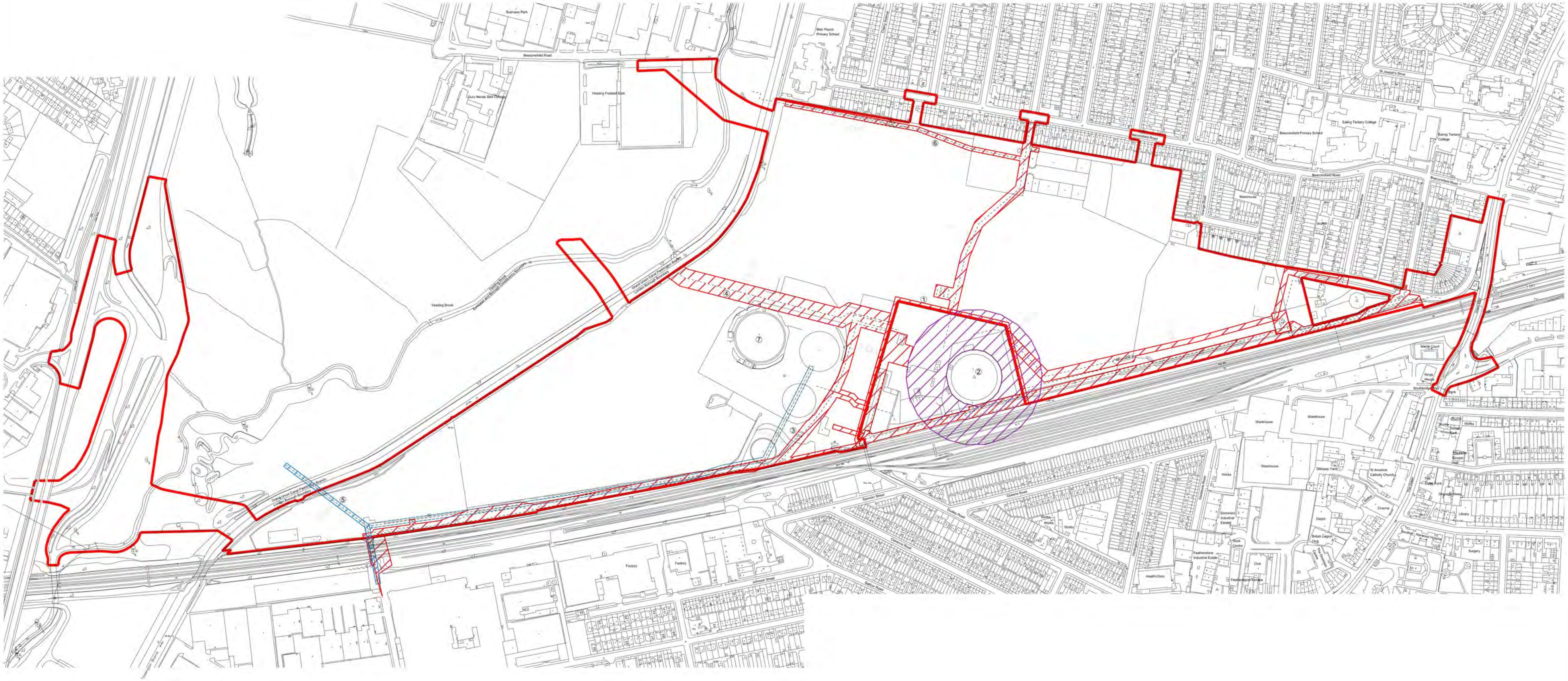

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Figure No: Figure 15.2

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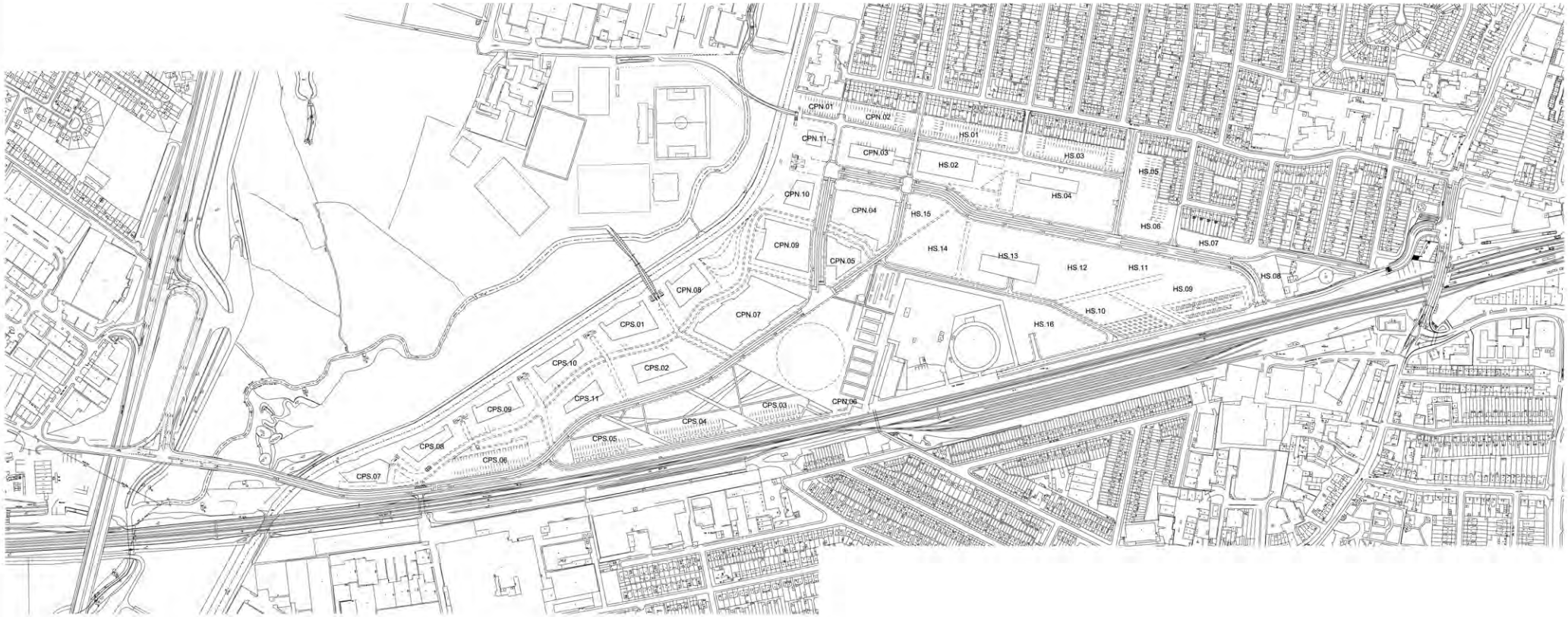

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Project: West Southall

Title: Basement Plan

Figure No: Figure 15.3

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16 BUILT HERITAGE

16.1 Introduction

16.1.1 This chapter presents the findings of a desk-based assessment Heritage Assessment carried out by RPS in January 2008. It assesses built heritage resource in the area surrounding the Site, and it evaluates the likely effects of the proposed Scheme on the built heritage resource.

16.2 Planning Policy Context

National Planning Policy

16.2.1 The importance of built heritage archaeology is recognised in legislation at the national level through protection afforded by the Ancient Monuments and Archaeological Areas Act 1979 (16.1) and the Town and Country Planning Act (Listed buildings and Conservation Areas) 1990 (16.2).

16.2.2 Planning Policy Guidance 15 (PPG15) (16.3) Planning and the Built Environment addresses built heritage matters. PPG 16 aims to ensure that the archaeological sensitivity of a site is fully taken into account in relation to development proposals. It also suggests that early consultation should take place to identify the archaeological sensitivity of sites. The underlying principle is that archaeological remains represent a non-renewable resource and that their conservation (preservation in-situ) should be the primary goal. PPG16 requires:

- Protection of Scheduled Ancient Monuments;
- Protection of the settings of these sites;
- Protection of nationally important un-scheduled ancient monuments;
- In appropriate circumstances, a search of adequate information (from field evaluation) to enable informed decisions; and
- Provision for the evacuation and investigation of sites not important enough to merit in-situ preservation.

16.2.3 Section 66 (1) of the Planning (Listed Buildings and Conservation Areas) Act 1990 requires the local planning authority to have special regard to the desirability of preserving the setting of any listed building. PPG 15 (para 2.16) points out that:

"the setting is often an essential part of the building's character, especially if a garden or grounds have been laid out to complement its design or function. Also, the economic viability as well as the character of historic buildings may suffer and they can be robbed of much of their interest, and of the contribution they make to townscape or the countryside, if they become isolated from their surroundings, eg by new traffic routes, car parks, or other development."

Regional Planning Policy

16.2.4 The London Plan (February 2008, consolidated with alterations since 2004) (16.4) addresses archaeology in Policy 4B.15. "*The Mayor, in partnership with English Heritage, the Museum of London and boroughs, will support the identification, protection, interpretation and presentation of London's archaeological resources. Boroughs in consultation with English Heritage and other relevant statutory organisations should include appropriate policies in their DPDs for protecting scheduled ancient monuments and archaeological assets within their area*".

Local Planning Policy

Ealing

16.2.5 The London Borough of Ealing's Revised Unitary Development Plan (UDP) ('New Plan for the Environment') was adopted in 2004 [16.5]. The policies set out in this document determine the position of archaeology as a material consideration in the planning process and incorporate recommendations from the Department of the Environment's Planning Policy Guidance Note 16 (PPG 16). The principal policies and statements on archaeology are as follows:

16.2.6 Policy 4.6 of LB Ealing's UDP addresses Statutory Listed Buildings. LB Ealing undertake to protect and enhance the character of Statutory Listed Buildings within the Borough.

16.2.7 Policy 4.7 of LB Ealing's UDP addresses 'Locally Listed Buildings with Façade Value and Incidental Features'. The Council undertake to protect and enhance the character of locally listed buildings, and groups of buildings with façade value. The UDP also states that the Proposals for demolition and alterations will be discouraged unless alternative use of the building is not viable or the planning benefits for the community outweigh the loss resulting from demolition.

16.2.8 This 'locally listed' designation is used for buildings that do not meet the criteria for inclusion on the Statutory List of Buildings of Architectural or Historical Interest, but which contribute to the local scene or have local historical associations, or for the retention of incidental features in the urban environment that create the particular local character and landscape of the Borough.

16.3 Methodology

16.3.1 This chapter is based on the findings of a Built Heritage Assessment undertaken in January 2008, which was based on a field visit and the examination of a number of historical sources including:

- John Carey's Map (1786).
- Ordinance Survey (OS) Maps (1878 – 1935).
- A History of the County of Middlesex (1971) [16.1].
- The English Terraced House (1983) [16.2].
- A History of Greater Ealing (1971) [16.3].
- The Victorian Society Book of the Victorian House (2002) [16.4].

16.3.2 The degree or magnitude of effects has been assessed according to the scale set out below:

16.3.3 The sensitivity of each resource has been identified, based on relevant policy, legislative designations and rarity at the appropriate scale allowing for professional judgement where resources are not covered by any policy or legislation. The criteria used to determine the value/sensitivity of resources or sites are outlined in Table 16.1.

Table 16.1 Value of Built Heritage Resource

Value of Resource	Criteria Used to Determine Value
National	Resources of national or international importance. Usually Scheduled monuments; World Heritage Sites, Grade I (buildings of exceptional interest) and Grade II* (important buildings of more than special interest) Listed Buildings.
Regional	Resources of regional or county importance. Usually Conservation Areas, Grade II Listed Buildings (buildings of special interest, warranting every effort to preserve them), English Heritage Registered Park and Garden.
Local	Resources of district or local importance. Usually non-listed buildings of local significance. Sites too badly damaged to justify inclusion into a higher grade.
Negligible	Resources with no value or interest.

Significance Criteria

16.3.4 The significance of the effects of the proposed Scheme has been determined based upon the findings of the Built Heritage assessment the magnitude of the effect and the value of the resources identified. Table 16.2 has been used to determine the level of significance attributed to the effects.

Table 16.2 Table of Significance

Significance	Criteria
Substantial Beneficial	Effects of the Scheme of greater than local scale The proposals would: • Provide potential, through removal of damaging or discordant existing impacts (direct or indirect) on regionally or nationally important heritage resources, for significant or extensive restoration or enhancement of characteristic features or their setting. • Remove existing visual intrusion, such that the integrity, understanding and sense of place of a highly valued area, a group of sites or features of national or regional importance is re-established.
Moderate Beneficial	Effects of the Scheme that may be judged to be important at a local scale The proposals would: • enhance existing historic landscape/townscape character through beneficial landscaping and/or good design. • restore or enhance the form, scale, pattern or sense of place of the heritage resource through good design. • remove or reduce existing impacts affecting nationally important heritage resources or their setting/context.
Minor Beneficial	Effects of low importance in the decision-making process The proposals remove or reduce existing impacts (direct and indirect) affecting locally or regionally important heritage resources or their setting/context.
Negligible	Effects that are of such low importance that they are not considered material in the planning process The proposals have no appreciable effects, either positive or negative, on any known or potential cultural heritage assets.
Minor Adverse	Effects of low importance in the decision-making process The proposals would: • result in loss of or damage to minor or locally important heritage resource. • Compromise or degrade the setting or context of locally or regionally important heritage resources.
Moderate Adverse	Effects of the Scheme that may be judged to be important at a local/regional scale. The proposals would: • result in damage to local/regionally important heritage resource. • Severely compromise or degrade the setting or context of local/regionally important heritage resource. • Compromise or degrade the setting or context of nationally significant resource.
Substantial Adverse	Effects of the Scheme of greater than local scale. The proposals would: • result in damage to nationally important heritage resource. • result in severe damage to, or loss of regionally important heritage resource. • Severely compromise or degrade the setting or context of nationally important heritage resource.

16.4 Baseline Conditions

16.4.1 The Site is located in the historic parish of Norwood Green, along the boundary with Hayes parish. It lay within Middlesex prior to being absorbed into the administration of LB Ealing. The Site is not located within a Conservation Area, and there are no conservation areas adjoining it (see Figure 16.1).

16.4.2 By the fourteenth century the area comprised open agricultural lands with some enclosed land around scattered hamlets of 20 houses or fewer. In the late seventeenth and eighteenth centuries the local clay and gravel deposits started to be exploited for use as building materials.

Figure 16.1 John Carey's Map 1786

16.4.3 As transport and communications improved in the middle of the nineteenth century industry developed. In 1796 the Grand Junction Canal (now called the Grand Union Canal) was built along a route approximately 1km to the south of the Site and in 1801 the Paddington Branch of the Canal was opened to the north west of the Site. In 1839 the Great Western Railway opened a station at Southall on the new railway line running from London to Slough and the West Country. The railway link and the Canal improved the movement of building material in and out of west London and clay extraction and brick-making activity increased considerably. Chapter 15: Archaeology assesses the effects of the proposed development on the archaeological resource of the Site, in reference to the brick fields.

16.4.4 The villages of Southall and Southall Green remained separate settlements until 1895-6 when significant development commenced associated with intensive industrialisation. The first gasworks in the vicinity of the Site was located to the west of the Site, this was opened in 1865 with a chemical works adjoining to the east. These were replaced in the 1880s by the new gasworks on the Site. In the late nineteenth century a pumping station of the South West Suburban Water Works was built adjoining the gasworks, and a margarine factory was built to the south of the railway in 1893.

16.4.5 All of the dwellings and features discussed below are shown on the Plan in Figure 16.2.

The Gasholders

16.4.5 The larger of the two gasholders associated with the new gasworks (gasholder No. 3) was built in 1883 or 1884, when the new gasworks was first built. The smaller (No. 5) was erected during the rebuilding of the gasworks in 1929–30, which followed the amalgamation of the owners, the Brentford Gas Co., with the Gas Light and Coke Co.

16.4.6 The older of the two gasholders, No. 3, is a column-guided design (Figure 16.3) of 1883 or 4, with box lattice standards of trapezium plan, which turn the corners so that the girders in between have straight ends. It is nearly 100 feet (30.48m) high, with only two tiers of girders, which gave a distinctive elongated appearance to the panels when the gasholder was in use. The holder had a capacity of 2.3 million cubic feet (65,129m^3). The author of this design has not been identified. Its neighbour to the west, No. 5, which dates from 1929, is a piston (waterless) gasholder of the MAN design. It has a much larger capacity, of 7.1 million cubic feet (20,1050 m^3). Both gasholders are redundant.

Figure 16.3 The box-lattice standards of No. 3 in front of the 'blue tower' fixed gasholder (be retained).

The Water Tower

16.4.7 The Water Tower, shown in Figure 16.4, stands north of the railway line and marks the eastern end of The Straight at its junction with the Crescent.

Figure 16.4 The Grade II Listed Water Tower (photograph taken from the south western corner of the site looking west)

16.4.8 The Water Tower stands north of the railway line and marks the eastern end of The Straight at its junction with the Crescent. It stands on a separate parcel of land outside the Application boundary, but is enclosed within the eastern end of the Site.

16.4.9 The Water Tower was built around 1900. It is a red-brick, four-stage hexagonal tower with two windows on each face and three on the top floor with drip moulds over. The building has vestigial corner turrets, a stair turret on one face, machicolations and battlemented parapets. It was converted in private flats in the late twentieth century. Pevsner describes it was 'a forbidding castellated octagonal' building which was 'ingeniously converted into six storeys of flats in 1979–83 by F Vickery and E. Moffet. (Cherry & Pevsner 1991, 196) [(16.5)].

16.4.10 The Water Tower was added to the Statutory List of Buildings of Special Architectural or Historic Interest, in the Grade II category (Appendix 1). It is defined as a landmark by LB Ealing in their New Plan for the Environment.

16.4.11 The Water Tower remains outside the red line boundary for the proposed Scheme and therefore will not be subject to redevelopment. Its immediate setting is a triangle of flat ground, approximately 50% of which is hard surfaced for car access and parking. The curtilage encompasses 2.5m high boundary walls, two two-storey cottages and associated outbuildings. The steel security gates at the entrance, bear witness to the original need to keep the public out.

The Crescent

16.4.12 The Crescent lies on level ground to the north of the railway line, a little to the west of Southall Station. It dates from around 1890 and consists of 14 two-storey dwellings of a standard late-Victorian type.

16.4.13 The Crescent, shown in Figure 16.5, is designated in LB Ealing's New Plan for the Environment (UDP) (2004) as a 'Building of Façade or Group Value', however, it is not included on the Statutory List of Buildings of Architectural or Historic Interest.

16.4.14 The Crescent was part of a small development consisting of only three streets: Crescent Road (subsequently changed to The Crescent), Randolph Road and the east end of Beaconsfield Road. It is in the form of a quadrant with a convex street frontage, bounded to the west by the gardens of Nos. 1-11 Randolph Road and to the north by a garage at No. 18 the Crescent. The houses form a continuous terrace, with small front gardens and longer back gardens, which become narrower towards the rear boundary.

Figure 16.5 The Crescent (Photograph taken from the railway bridge looking north west)

16.4.15 The curved layout was dictated by the obtuse angle of the junction between the road and the railway line. Thus the shape of the terrace is coincidental, derived from the angle of the pre-existing road and railway. Its form is achieved by a succession of straight frontages, not by curving the front walls.

16.4.16 The garage at the north end of the terrace is present on the maps by 1958. The site of the public open space to the north end of The Crescent was formerly occupied by a terrace of early Victorian houses, which were demolished in 1959.

16.4.17 When the properties in The Crescent were built they would have had a uniform appearance. The front elevations were of pale yellow stock brick construction, with red brick used to frame the first-floor window openings and in three courses forming a contrasting band between the first and second storeys. This attractive use of contrasting bricks is difficult to discern now, but a row of contemporary houses nearby, Nos. 14–22 Beaconsfield Road, gives an idea of the original intention, with the colours reversed.

16.4.18 Each house has undergone several major changes to its external appearance. The changes are detailed fully in the Built Heritage Assessment at Appendix 16.1.

16.4.19 There have been so many of these incremental and inconsistent changes that the terrace now exhibits a patchwork appearance from which it is very difficult to understand the original appearance of the houses. The visual uniformity of the terrace has been lost and its historic character has been damaged. Even in its original, unaltered state, however, it was never a significant piece of architecture. The Crescent represents a standard form of suburban speculative housing, of a type built by the thousand in the late nineteenth century, and which survives in large numbers throughout the country. Such houses were not usually designed by known architects, but were built according to standardised designs in builders' pattern books.

16.4.20 The contribution made by the terrace to the townscape is limited and coincidental. It occupies a prominent corner in views from the railway line, but this is not intentional: it does not represent a planned termination to a view along a street or a feature in a considered townscape composition; rather, it is identical to the neighbouring streets of speculative housing, except that it curves where they are straight.

Randolph Road, Beaconsfield Road and Grange Road

16.4.21 30 Grange Road, 1, 3, 5, 7, 9 and 11 Randolph Road and 137-143 Beaconsfield Road are not of any special historic or architectural interest and they are not included in the Statutory List of Buildings of Architectural or Historic Interest, designated by LB Ealing as a 'Building of Façade or Group Value', or subject to any other constraints restricting demolition. Like many Victorian and Edwardian properties in this neighbourhood, these properties have suffered different combinations of painted render, replacement windows and doors, and loss of decorative detail to the front walls and elevations. Because their original brickwork is still exposed, Nos. 137, 139 and 141 Beaconsfield Road preserve rather more of their original appearance.

16.4.22 Detailed proposals for the subsequent use and restoration of these sites will be submitted for approval prior to demolition.

16.4.23 The Garage is an industrial building of brick with a sheet metal roof. It is of no historic or architectural interest.

16.5 Assessment of Effects

Gasholders

16.5.1 Gasholders 3 and 5 require demolition to allow for the proposed development. In the location of the gasholders in the heart of the Site will be a large Central Park and urban retreat arranged around a primary circular space, the village green and cricket pitch.

16.5.2 A variety of open spaces will be developed, of varying scale and character, to provide for a wide range of recreational activities for the local community. These spaces will include a cricket pitch, hard surface sports grounds, a wetlands area, ornamental garden and community gardens.

16.5.3 Part of the land acquired from the demolition of the gasholders will also be used for a new road linking the proposed Scheme and the A312 to the west, and for a proportion of the new housing along the north western boundary (adjacent to the Canal).

16.5.4 The two gasholders proposed for demolition to enable development of the Central Park are not included in the Statutory List of Buildings of Architectural or Historic Interest, or designated by LB Ealing as Buildings of Façade or Group Value. However, they have been included in a survey of gasholders carried out by English Heritage in the late 1980s, under the Monuments Protection Programme.

16.5.5 The report derived from this survey has not been published, and is not available to be consulted. However, English Heritage has confirmed that in their view neither of the gasholders merits efforts for protection.

16.5.6 The gasholders do not form part of the setting of the listed building. They are located approximately 530m to the west of the Water Tower, and the fixed gasholder to the east, which will not be included as part of the proposed Scheme, effectively blocks views between the two features. Therefore the removal of the two gasholders will have a negligible effect on the setting of the Water Tower.

16.5.7 The removal of the decommissioned gasholders is an essential element of the proposed Scheme.

16.5.8 Overall, the effects are considered to be **beneficial** and of **moderate** significance.

Water Tower

16.5.9 The Water Tower is a feature within LB Ealing's 'views of local interest' as outlined in the New Plan for the Environment (UDP). View 25 comprises "Southall Railway Bridge, west toward the former Water Tower on The Straight". The effect of the proposed development on this view is discussed in Chapter 11: Landscape and Visual Assessment and shown in Comparative view B in Figure 11.5b).

16.5.10 Although the new roadway proposed to enable access to and egress from the eastern corner of the proposed Scheme will continue to separate the Water Tower from the nearest housing, a degree of separation is appropriate to distinguish the listed building with its industrial origins from the modest domestic scale of the nearby streets of terraced housing, the historical record shows that the Water Tower has always been isolated by road and railway from its surroundings.

16.5.11 With reference to the design of new buildings intended to stand alongside historic buildings, PPG15 states, at paragraph 2.14 "…*in general it is better that old buildings are not set apart, but are woven into the fabric of the living and working community. This can be done, provided that the new buildings are carefully designed to respect their setting, follow fundamental architectural principles of scale, height, massing and alignment, and use appropriate materials*." At present, the buildings surrounding the Water Tower cannot be described as being in harmony with the listed building or with one another, and the spaces between the Tower and the neighbouring buildings are of poor quality.

16.5.12 The proposed roads for the eastern part of the Scheme will improve the quality of the spaces immediately north and south of the Water Tower. Adjoining the western boundary will be the proposed 'High Street' containing retail shops, cafés, bars and restaurants. This will be low (equivalent to 2/3 storeys) at the boundary, so as not to compete with the Water Tower, and will rise towards the west, making a visual link with larger-scale buildings of the 'Town Square' part of the proposed development. The boundary with the Water Tower will be more clearly delineated, and the listed building will be anchored into the overall Scheme whilst maintaining its historical distinction.

16.5.13 Provided that the design is in accordance with the Design and Access Statement (which accompanies this Application) the proposed new roads will not further isolate the Water Tower. The proposed new roadway will be landscaped, with soft planting, including glass verges and tree planting and provide it with an attractively framed approach from the 'Eastern Gateway', the 'Town Square' and as a focal point in views from several points within the Scheme.

16.5.14 Overall the effects are considered to be **beneficial** and of **moderate** significance.

Demolition of Properties to allow for Accesses

16.5.15 The Proposals for the Eastern Access that will link the proposed Scheme to South Road comprise a landscaped corridor between Gateway Place, South Road and the station, which would safely encourage pedestrian and cycle movement. The reconfigured road would create an effective junction for vehicles joining South Road and a welcoming public realm through which pedestrians using the station and buses will pass.

16.5.16 The acquisition and demolition of The Crescent, the garage at No. 18 and Nos. 1, 3, 5, 7, 9 and 11 Randolph Road is required to achieve the safest and most attractive layout for the new access road, which will provide the principal eastern access into the proposed development. This may be achieved either through direct negotiation with the existing owners or through a Compulsory Purchase Order (CPO) which would be the subject of separate proceedings to the determination of the Planning Application.

16.5.17 The terrace is 'locally listed', having been added to the London Borough of Ealing's schedule as a 'Building of Façade or Group Value'. It has not been possible to establish the date on which it was so designated, only that the List has not been reviewed recently. The 'group/façade value' selection criterion occurs in the Urban Design/Townscape category of the Council's criteria for the selection of locally listed buildings (Appendix 2).

16.5.18 The façade has been altered to the extent that its architectural and historic interest has been reduced almost to nothing. A better impression of the original appearance of such late-Victorian working-class housing can be gained from Nos. 14–22 Beaconsfield Road although the latter is not locally listed.

6.5.19 Section 66 (1) of the Planning (Listed Buildings and Conservation Areas) Act 1990 requires the local planning authority to have special regard to the desirability of preserving the setting of any listed building. PPG 15 (para 2.16) points out that "*the setting is often an essential part of the building's character, especially if a garden or grounds have been laid out to complement its design or function. Also, the economic viability as well as the character of historic buildings may suffer and they can be*

robbed of much of their interest, and of the contribution they make to townscape or the countryside, if they become isolated from their surroundings, e.g. by new traffic routes, car parks, or other development."

16.5.20 The Crescent stands some 200m east of the Grade II-listed water tower, framing the right-hand side of the eastern approach to the water tower from North Road. However, in its present state it detracts from, rather than enhances, the approach to the Water Tower. Its removal is therefore not considered to damage the historic context of the listed building.

16.5.21 None of the other houses proposed for demolition in connection with the West Southall Site is protected by any either Statutory or local heritage designation.

16.5.22 Secondary vehicular access to the proposed Scheme will be provided through various points on Beaconsfield Road. The removal of Nos. 137–143 Beaconsfield Road will link the West Southall Site to Beaconsfield Road and the streets of terraced housing to the north, between Beaconsfield Road and The Broadway (the A4020). In addition, pedestrian access to the West Southall Site will be provided in at the site of No. 30 Grange Road. These secondary entrances will increase the permeability of the Scheme and enhance its integration into the existing neighbourhood. Local residents will be able to access the supermarket and other retail facilities on foot, thereby reducing the use of cars for short local journeys.

16.5.23 Overall the effects are considered to be **beneficial** and of **moderate** significance.

16.6 Mitigation

Gasholder

16.6.1 It is recommended that the older, column-guided gasholder (No. 3) be recorded in detail prior to demolition, in accordance with English Heritage advice, and that the record be lodged in the appropriate local library or archive.

Water Tower

16.6.2 The Water Tower plays an important role in the design of a new, dynamic area of residential, community and commercial development. The listed building, which has previously been set apart somewhat from its surroundings, will be 'woven into the fabric' of the Scheme yet retaining its distinctive identity. The Proposals therefore meet, and even exceed, the criteria set out in PPG15 and no further mitigation is required.

Demolition of Properties to allow for Accesses

16.6.3 The area in which the Crescent is presently sited is proposed to be entitled the 'Eastern Gateway', this access will form the main point of arrival to the eastern end of the proposed Scheme. The public realm in this area is proposed to include a range of landscape elements including signage, feature lighting, public art, a variety of horizontal and vertical surface materials and bold landscape planting which will all contribute to defining the space and creating a memorable entrance event.

16.6.4 The integration of the roadway, crossing points and tree-lined pedestrian footpaths will be designed to allow for fluid pedestrian and vehicle movement as well as providing an identity to the area.

16.7 Residual Effects

16.7.1 Provided that the design follows closely that outlined within the DAS the residual effects will be **beneficial** and of **moderate** significance.

References

16.1 T.F.T. Baker et al., (1971) A History of the County of Middlesex: Volume 4 (Victoria County History) Available at www.british-history.ac.uk/report.aspx?compid=22400. Accessed 14 December 2007.

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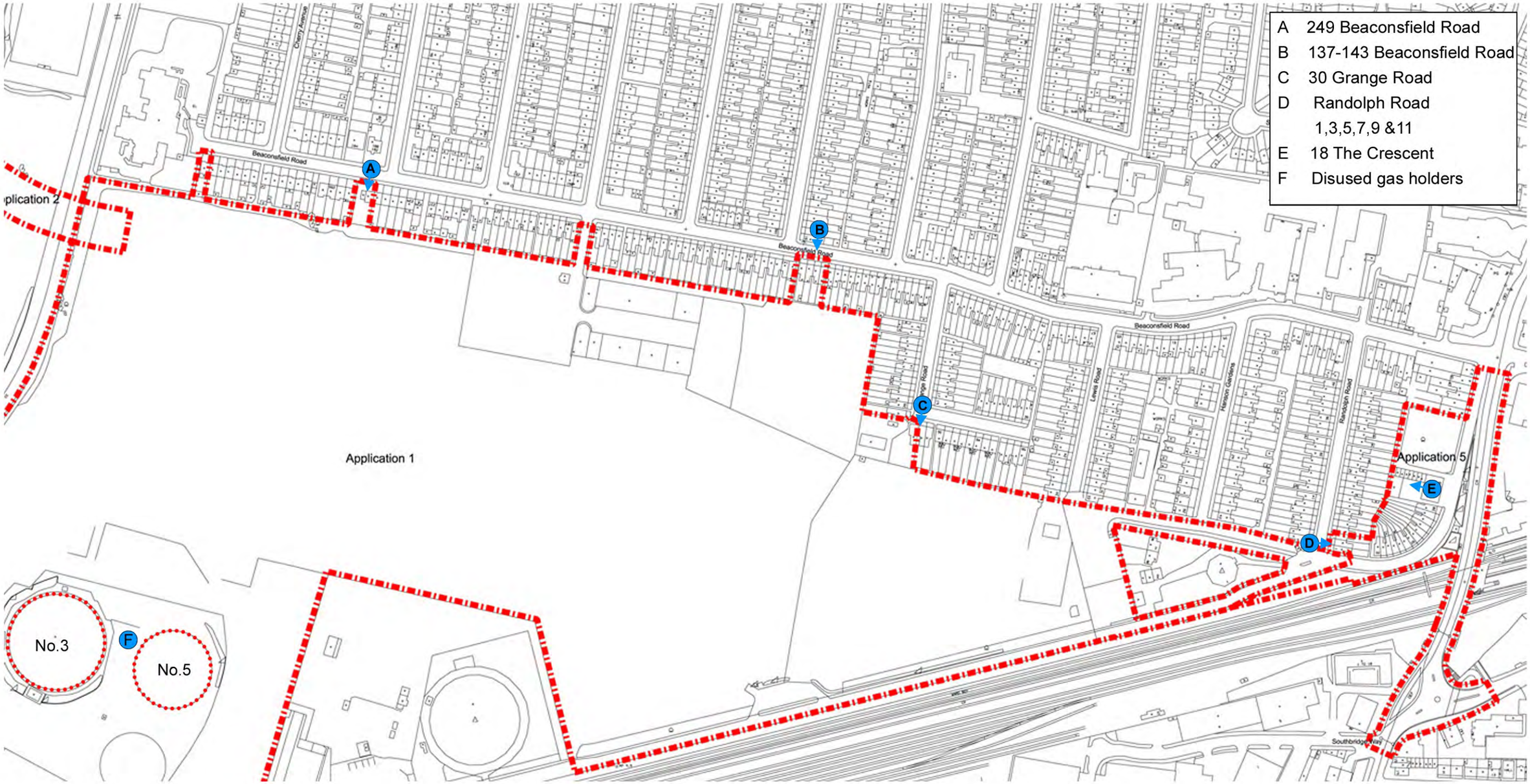
16.4 Wedd, K (2002) The Victorian Society Book of the Victorian House, London: Aurum Press.

16.5 Cherry and Pevsner (1991) Buildings of England London. Volume 3 North West, 196.



RPS					Project: Southall
					Title: Location plan of dwellings to be demolished, water tower and gasholders
Date:	23.09.08	Scale:	NTS	Rev:	Figure No: Figure 16.2
Job No:	JLD0211	Drawn:	MB	Checked: CC	

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17 MICROCLIMATE

17.1 Introduction

17.1.1 This Chapter assesses the likely significant effects of the proposed Scheme on the overshadowing and wind environment on the Site. An assessment has also been undertaken of the proposed developments effects in terms of overshadowing on the proposed open amenity spaces around the Site.

17.1.2 By its very nature, microclimate refers to local conditions. Therefore, the extent of the study area for West Southall solar shading study has been limited to the Planning Application Area and immediately adjacent public realm and sensitive receptors including residential properties to the north and east, and the Grand Union Canal and towpath to the west. The shading effect of proposed access route bridges upon the Canal and Yeading Brook will also be considered.

17.1.3 The interaction of wind with the built environment has the potential to generate uncomfortable and strong winds, which could inhibit walking, in pedestrian areas. The chapter assesses the potential for nuisance wind conditions to occur around the Scheme and quantifies the wind microclimate in terms of the Lawson Comfort Criteria which have been used for many years for building developments in the UK. The sections on wind and the supporting technical report (see Appendix 17.2) have been prepared by RWDI Anemos Limited, a specialist wind engineering consultancy.

17.1.4 The relationship between, and influence of, the Scheme on the microclimate of the Site has been considered throughout the evolution of the proposals and mitigation measures of potential adverse effects on microclimate receptors have been built into the Scheme proposals as part of the design process. This is referred to in Chapters 3: Site and Proposed Scheme and 4: Alternatives and Design Evolution of this ES.

17.2 Planning and Legislative Context

Solar Shading

National Planning Policy

17.2.1 Planning Poliy 17 (PPG17) (17.1) sets out Government policy with regard to Planning for Open Space, Sport and Recreation. Whilst PPG17 does not make specific reference to the effects of solar shading, paragraph 17 sets out specific issues that Local Authorities should take account of in order to safeguard the function and amenity of open spaces and attendant nature conservation interest.

Regional Planning Policy

17.2.2 The London Plan (2008) Consolidated with Alterations since 2004 (17.2) sets out the Mayor's Spatial Development Strategy for Greater London. Southall and Hillingdon are classed as 'Outer London' boroughs. Policy 4B.10 addresses large-scale buildings in terms of design and impact. The policy notes that such buildings should be of the highest quality design and that in particular should show sensitivity to their impact on microclimate, including sun and overshadowing and further, that particular attention should be had to the amenity in residential environments to privacy, amenity and overshadowing.

17.2.3 Paragraph 4.124 of the written statement discusses the impact of tall buildings on waterways, and notes that design of such structures should adhere to those set out in the Plan regarding the designated Blue Ribbon Network, which includes the Grand Union Canal and Yeading Brook.

Local Planning Policy

17.2.4 LB Ealing's new Plan for the Environment [17.3] places emphasis on the promotion of good urban design through planning in its strategic policy 1.4 in order to facilitate good environmental performance. Table 3C sets out criteria relating to development in and adjoining public and community spaces, seeking in particular at point (vii) the preservation and enhancement of existing open space character by "*avoiding shadow, blocking views with high-rise buildings or creating wind flow problems*."

17.2.5 Section 4 of the Ealing UDP sets out the Council's objectives with regard to urban design, which states at 4.1 (2) "*The Council will only approve development that respects current standards safety, natural light, health, privacy; and freedom from traffic nuisance, disturbance or visual intrusion in relation to neighbouring land uses*" In the explanatory text that accompanies 4.1, it notes that all proposals are expected to allow sufficient daylight and sunlight into buildings and land, and that the Council will apply the recommendations of BR209 [17.4].

17.2.6 Similarly, Table 4B sets out policy regarding high buildings or structures and notes at point 5 (iv) that the design of such buildings should take account of, amongst other things, the shading effects on surrounding land.

17.2.7 This theme is continued in the UDP Chapter 5 Housing, where at 5.5 it notes that residential development should provide good living conditions and that in particular it should ensure adequate sunlight and daylight levels are achieved. The accompanying written statement notes that satisfactory layout should prevent overlooking and overshadowing.

17.2.8 Compared to the Ealing UDP, fewer references are made in the Hillingdon UDP [17.5] with respect to sunlight levels and overshadowing. However, part 5, Built Environment sets out policy BE19 which requires new development to complement or improve the amenity and character of an area. Paragraph 5.23 of the written statement notes that "The Local Planning Authority will pay full regard to the effects of a proposal, whether it be for a new building or extensions of an existing one, on the sunlight and daylight reaching London Borough of Hillingdon Unitary Development Plan neighbouring properties, and will have regard to the recommendations of 'Site Layout Planning for Daylight and Sunlight' (Building Research Establishment, 1991)" (BR209) [17.4], particularly in relation to proposals of substantial width, height and depth close to site boundaries.

17.2.9 Policy BE20 notes that proposed buildings should be laid out to ensure adequate daylight and sunlight penetration into and between them.

Wind

17.2.10 There are no national or regional planning policies directly relating to wind in terms of microclimate, comfort and safety issues. Best practice has traditionally required the design team to seek expert guidance on potential wind microclimate issues and how to assess these potential effects. However, the Lawson Comfort Criteria, described in detail in the next section, are a recognised benchmark used to quantify the wind conditions in the built environment for over thirty years.

17.2.11 In the Greater London Authority's (GLA) document 'London's Skylines, Views and High Buildings', Spatial Design Strategy Technical Report 19, August 2002, [17.6] there are references to the potential for tall buildings to generate adverse climatic effects and downdraughts. There is also a comment that it is desirable for the Scheme to make a positive contribution to the pedestrian wind environment.

17.3 Methodology & Significance Criteria

Solar Shading

17.3.1 The environment of the ground plane at which public realm occurs is influenced and controlled by the absence or occurrence of buildings and significant structures that cast shadows over surrounding areas. As much of the proposed public realm would be newly created, then no 'existing situation' prevails against which the 'proposed situation' can be compared. In such instances, the solar shading assessment considers the quality of the proposed public realm with regard to user comfort and evaluates its suitability for proposed uses in terms of exposure to direct sunlight or the extent of solar shading.

17.3.2 The assessment of changes between the baseline year (2009/10) and the Principal Assessment Year (2024/25) in respect of solar shading has been undertaken through desk studies and computer modelling. The predicted solar shading patterns have been analysed based upon the Illustrative Master Plan, which represents one way in which the proposed development could be built within the constraints set by the Parameter Plans in Figures 3.4a-p. This approach has allowed a 3D computer model to be created based on the maximum storey heights proposed.

17.3.3 Guidance on assessment of solar shading effects on external spaces is described in BRE Report BR209 [(17.4)]. Much of BR209 concentrates on the quality of natural daylight in buildings, however, it also provides advice on the planning of the external environment and on the sun lighting of gardens and amenity areas. BR209 recommends the Spring Equinox (21st March) as a good date for assessment as this date provides a good indicator of whether an area will be permanently in shade throughout the year, or whether it will receive some sunlight all summer.

17.3.4 For the purposes of the assessment, 0oE – 51.5oN is taken as the latitude for the Site, in accordance with BR209. Average seasonal sunlight hours per day as recorded at Greenwich for the 30-year period between 1971 and 2000 [(17.7)] are Winter 2.39; Spring 5.64; Summer 5.76 and Autumn 2.26.

17.3.5 Shade patterns have been generated to assess the availability of direct sunlight on March 21st for the proposed principal public realm and adjacent sensitive areas, to determine the significance of effect in terms of BR209 criteria. Shade patterns have also been produced to illustrate the proposed year-round usage of the proposed development and represent a maximum and minimum in terms of solar shading; changing patterns of sunlight and shade are represented as 'snap-shots' at two-hourly intervals throughout each day for the following:

- March 21st – The Spring (and Autumn) Equinox, which represents a median possible daily exposure to daylight hours and sun angle (at 21st March and September 22nd or 23rd, day and night are of equal length);

- June 21st – Summer Solstice, which represents the maximum sunlight in terms of daylight hours and highest sun angle (the sun reaches the annual zenith casting the shortest shadow length); and

- December 21st – Winter Solstice, which represents the minimum sunlight in terms of daylight hours and lowest, sun angle (the sun reaches its annual nadir casting the longest shadow length).

17.3.6 A series of transparent 'sunlight-on-ground' overlay sheets accompanied the publication of BR209, to enable the manual prediction and assessment of specific building and site layouts. However, computer modelling techniques have evolved rapidly since 1991, and readily enable generation of patterns for any given time, date or latitude based on a three-dimensional computer model; such techniques have therefore been adopted for this assessment.

17.3.7 A 3D computer model of the Site at the Principal Assessment Year has been developed using the Parameter Plans. The images have been generated for Greenwich Mean Time (GMT) using AutoCad, lit and rendered in 3D Studio Max. To present the 'worst-case', the model takes no account of the size of spaces and routes that would provide breaks within the proposed development; in some cases such breaks would allow additional sunlight to penetrate to ground level.

It should be noted that the areas shown in shadow would still receive daylight, even though they would not receive direct sunlight.

17.3.8 The approximate centre of the area or space has been assumed as the receptor location throughout the assessment.

17.3.9 The Scheme assumed during the assessment has been the build out of the maximum building heights being implemented in each area, thus casting the maximum shading in terms of length/duration at any given time of year. For the purposes of modelling, the proposed routes/breaks within the proposed development have been ignored. In reality the modelled buildings would be broken up by a number of new intermediate streets, and this would deliver greater solar access over and above that set out in the assessment. Furthermore, the assessment makes no allowance for set backs or other architectural devices that may reduce solar shading at ground level.

17.3.10 The following scenarios were assessed:

- Stage 1 (2009-2014) includes phases 1-4 on Figure 6.1. Stage 1 includes the construction and remediation of the Pump Lane Link Road access and construction of the Eastern access will commence in this stage. Remediation of the northern part of the site will be carried out and retail and residential development comprising approximately 810 dwellings within the eastern and northern areas of the Site will be constructed.

- Stage 2 (2015-2019) includes phases 5-9 on Figure 6.1. This stage would see the completion of the school complex and the hotel in the centre of the Site. Improvements to South Road Railway Bridge would also be conducted early in this stage. The remainder of Stage 2 comprises residential development comprising approximately 1815 dwellings within the central and western part of the Site, and the construction of Minet Park Bridge. The central park and public realm along the Canal frontage, between the two pedestrian bridges would also be implemented.

- Stage 3 (2020-2025) includes phases 10-13 on Figure 6.1. Stage 3 would conclude the overall Development with the construction of approximately 875 residential dwelling along the southern boundary and south western corner of the Site together with the new public realm along the Grand Union Canal frontage.

- Principal Assessment Year is the year at which the Scheme will be operational, this has been assumed to be 2025.

Significance

17.3.11 In assessing solar shading effects, the following criteria have been taken into account in determining the significance of effect:

- Importance/Value – Greater weight has been assigned to existing buildings and public realm receptors adjacent to the Site boundary that may experience solar shading as a result of the Scheme. Greater weight has also been assigned to principal public realm areas proposed within the Site, as opposed to transitional or incidental public realm such as thoroughfares etc. Importance/value is categorised as Negligible, Low, Medium or High;

- Sensitivity to change – Principally related to use or activity and time spent within the space – activities may include brisk walking, strolling, children's play, sitting for short periods and sitting for long periods. For example, a commuter walking briskly through a space is likely to be less sensitive to the degree of solar shade than a worker sitting for a short period during a lunch break. Sensitivity is categorised as Negligible, Low, Medium or High;

- Magnitude/scale of effect – This relates to the extent that a public realm receptor is shaded throughout daylight hours at the Spring Equinox, 21st March. An adverse effect of large magnitude would occur where there is no solar access to a principal public realm receptor location on that date, or conversely, a beneficial effect of large magnitude would be where excellent solar access is gained for much of the day in March. Magnitude/scale is considered in terms of Negligible, Small, Medium or Large; and

- Nature and duration of effect – Ranging from permanent adverse (shade) through to permanent beneficial (sunlight). Effects can either be negative (adverse) or positive (beneficial); direct, indirect, secondary, cumulative and be either permanent or temporary (short, medium or long term).

17.3.12 The duration of effects has been considered in terms of whether it is permanent or temporary. Temporary effects may in turn be described as short-term (less than 12 months), medium-term (1 to 5 years) or long-term (more than 5 years) and tend to be related to the duration of construction works.

The potential solar shading effects are expressed in accordance with the following terminology as set out in Table 17.1; they apply to both adverse and beneficial effects.

Table 17.1 Solar Shading Effects - Significance Criteria

	Magnitude of Effect			
Sensitivity/value of receptor	Large	Medium	Low	Negligible
High	Substantial	Substantial	Moderate	Minor
Medium	Substantial	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

Wind

17.3.13 This assessment is desk-based and draws upon the expertise and previous experience RWDI Anemos Limited has gained from other developments in the London, the UK and across the world. The basic methodology for assessing pedestrian level wind environment may be outlined as follows:

- Consider the overall Meteorological conditions for the Application Site;

- Consider the way in which surface roughness around the Application Site will affect the overall meteorological conditions;

- Assess the likely effects of the building massing in relation to the prevailing wind directions and those winds where the massing might accelerate the wind; and

- Estimate the likely wind conditions around the Application Site in terms of established comfort criteria (after Lawson) to 'grade' conditions

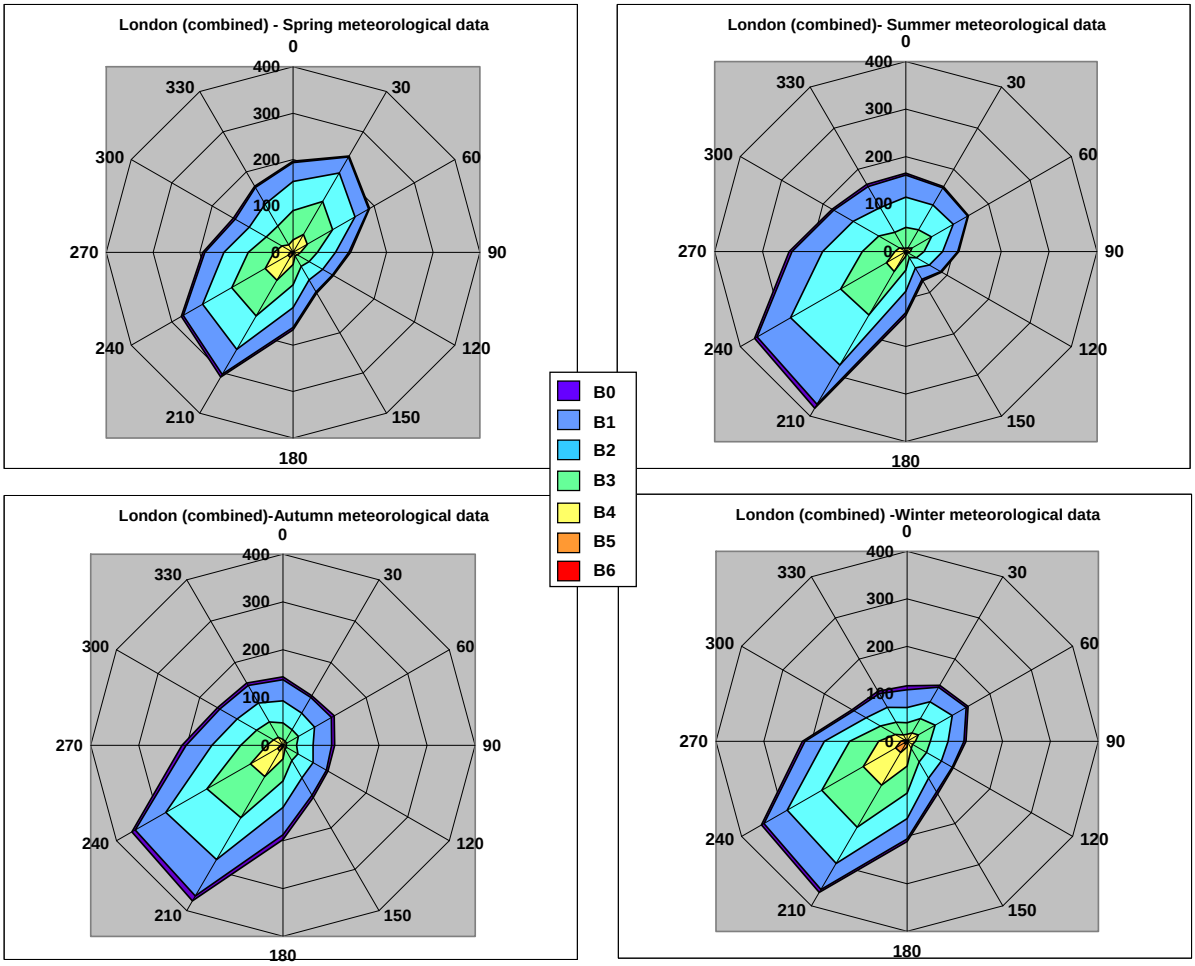
17.3.14 The above factors and the experience and knowledge of specialist wind engineering consultants in the interaction of wind with the built environment forms the basis of the assessment.

Meteorological Data

17.3.15 The meteorological data is obtained from the long-term wind statistics for London, supplied by the UK Meteorological Office, as frequency tables of numbers of hours for which the wind is within specified ranges on the Beaufort Scale. The data is fitted to a Weibull distribution to smooth the data and adjusted to meteorological standard conditions of 10m above, flat, level, countryside terrain.

17.3.16 The meteorological data is presented for the winter and summer seasons representing the windiest and least windy seasons and defined as Winter (December, January, February) and Summer (June, July, August), as shown on Figure 17.1. The significance of the above is that winds are lighter in the summertime and consequently the impact of wind is generally less at this time of year.

Figure 17.1 London Meteorological Data



Comfort Criteria

17.3.17 The assessment of wind conditions requires a 'standard' against which the conditions can be compared. This assessment references the Lawson criteria which have been established for around thirty years and have been widely used on building developments across the United Kingdom during this period.

17.3.18 The criteria are defined in Table 17.2 for five pedestrian activities, sitting, standing/entrances, leisure walking, business walking and roadway/car-park, in ascending order of activity level. For each

activity a wind speed and frequency threshold is defined beyond which conditions are described as unacceptable for the stated activity. If the threshold is not crossed then conditions are described as tolerable, or in lay terms suitable, for the stated activity. The wind speed makes use of the Beaufort Scale (Table 17.3), for example B3 means Beaufort Force 3, which has the advantage of presenting the wind conditions in terms of the effect of the wind on our surroundings, and which is therefore more meaningful. 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.

Table 17.2 Lawson Comfort Criteria

Pedestrian Activity	Threshold for Tolerable Conditions
Roads and Car Parks	B5 > 6%
Business Walking	B5 > 2%
Leisure Walking	B4 > 4%
Standing / Entrances	B3 > 6%
Sitting	B3 > 1%

Table 17.3 The Beaufort Land Scale

Beaufort Force	Hourly-Average Wind Speed (m/s)	Description of Wind	Noticeable Wind Effect
0	< 0.45	Calm	Smoke rises vertically
1	0.45 - 1.55	Light Air	Direction shown by smoke drift but not by vanes
2	1.55 - 3.35	Gentle Breeze	Wind felt on face; leaves rustle; wind vane moves
3	3.35 - 5.60	Light Breeze	Leaves & twigs in motion; wind extends a flag
4	5.60 - 8.25	Moderate Breeze	Raises dust and loose paper; small branches move
5	8.25 – 10.95	Fresh Breeze	Small trees, in leaf, sway
6	10.95 - 14.10	Strong Breeze	Large branches begin to move; telephone wires whistle
7	14.10 - 17.20	Near Gale	Whole trees in motion
8	17.20 - 20.80	Gale	Twigs break off; personal progress impeded
9	20.80 - 24.35	Strong Gale	Slight structural damage; chimney pots removed
10	24.35 - 28.40	Storm	Trees uprooted; considerable structural damage
11	28.40 - 32.40	Violent Storm	Damage is widespread; unusual in the U.K.
12	> 32.40	Hurricane	Countryside is devastated; only occurs in tropical countries

17.3.19 The criteria represent the ‘mechanical effects’ of wind on pedestrians and do not consider other factors such as cooling. It is therefore assumed that pedestrians will be suitably dressed for the season. The criteria are also derived for open air conditions and we advise caution in the interpretation of the Lawson criteria if an area is under cover as the cover may change users’ expectations of shelter.

17.3.20 There is also a lower limit safety criterion defined in the Lawson Comfort Criteria where wind speeds greater than Beaufort Force 6 are increasingly likely to cause difficulty in walking and could ultimately lead to pedestrians being blown over. Experience has shown that wind conditions suitable for business walking and car park/roadway usage are generally associated with more significant occurrence of wind speeds greater than Beaufort Force 6.

17.3.21 The main focus of the assessment is the windiest conditions expected for any season (usually winter). The qualifier, or 'better’ is sometimes used to describe the wind conditions and this implies that during the summertime the microclimate assessment is generally one category lower than the windiest condition, for example areas suitable for leisure walking at the windiest times of year become suitable for pedestrian standing in the summer.

Significance Criteria

17.3.22 In order to quantify the significance of likely effects, the Lawson comfort criteria are again used, and compared with the intended pedestrian use of an area. For example, if the measured wind conditions are the same as required for the expected pedestrian use then the effect is negligible. If the measured wind conditions are windier than desired then this is an adverse effect; if the measured conditions are calmer than desired then this is a beneficial effect. In this chapter the sensitivity of the receptor to wind effects is already included in the different activity levels defined by the Lawson Comfort Criteria. The magnitude of the effect is defined as Negligible if the wind microclimate is suitable for the intended pedestrian activity. If the wind conditions are 1 category windier or calmer than required then this is described as a Minor effect, 2 categories windier is a Moderate effect whereas, 3 categories windier is a Substantial effect. Adverse effects would usually require mitigation because the wind conditions are stronger than desired for the intended use of an area.

17.3.23 For example, on a pedestrian thoroughfare the required conditions are tolerable for leisure walking. If after development the conditions were suitable for business walking then this is a minor adverse effect. However, if the measured conditions were tolerable for standing then this is a minor beneficial impact. The comparison of the measured wind conditions with the intended use of an area takes into account the change of use which usually accompanies development Examples of this process are presented in Table 17.4.

Table 17.4 Examples of Significance Criteria

Desired Conditions	Measured Conditions	Effect
Standing/Entrance	Roadway	Substantial Adverse
Standing/Entrance	Business Walking	Moderate Adverse
Standing/Entrance	Leisure Walking	Minor Adverse
Standing/Entrance	Standing/Entrance	Negligible
Standing/Entrance	Sitting	Minor Beneficial

17.4 Baseline Conditions

Built Form and Development Pattern

17.4.1 Baseline conditions are those that will prevail at the commencement of development, assumed to be 2010. Generally these will be the same as those prevailing at the current time (2007), except the removal of the two gasholders will influence localised shadow patterns. The remaining 90m gasholder provides the dominant built form to the north of the railway. Buildings of generally two storeys occur along Beaconsfield Road to the north and also to the east, with occasional taller buildings occurring, notably the former Water Tower off The Straight. Buildings of predominantly 2 to 3 storeys occur to the south of the railway.

17.4.2 Temporary compounds and offices comprising generally single storey structures associated with Purple Parking, occupy the southern area of the Site. Two post-war warehouse/workshop buildings (approximately 2 storeys) lie adjacent to the northern site boundary.

Public Realm and Open Land

17.4.3 Roads and thoroughfares include Beaconsfield Road and The Straight, which are publicly accessible (the latter providing pedestrian access only). Incidental open land, which comprises the West Southall Site, is closed to the public and comprises a surface level car park serving Heathrow Airport (Purple Parking).

17.4.4 The Yeading Brook and the Canal corridor, including Minet Country Park comprises a significant open space with grassland and trees/scrub to the west of the Site. No direct access is available between the Site and the Canal towpath, or between the towpath and Minet Country Park.

17.4.5 The remainder of the Site and its environs are characterised by hard, paved urban areas and tall (c.2-3m high) solid fences and walls to most of the boundaries, particularly along the Canal frontage.

Solar Environment

17.4.6 The existing solar environment is affected by the availability, orientation and location of open spaces and by the nature and massing of obstructions such as buildings and walls. The principal open space within the vicinity of the Site includes both the publicly accessible Minet Country Park and the Canal and towpath, and also private open land comprising the Site.

17.4.7 The openness and relatively low boundary structures means that much of the Site presently enjoys good solar access throughout the day, all year round. The retained gasholder casts a shadow throughout the day and whilst this is not static and changes with sun position cast, it can extend across much of the Site and onto nearby housing from late morning/noon onwards particularly during winter months. Similarly, the former Water Tower to the east casts a shadow over the eastern part of the Site and neighbouring housing.

17.4.8 Fencing and walling along the western edge of the Site boundary casts shadow for much of the morning onto the towpath, throughout the year. From late morning/noon, good solar access is enjoyed along the Canal (towpath and canal) again throughout the year. However, the southern part of the canal and towpath that runs along the northern edge of the railway is shaded until late morning by the railway bridge.

17.4.9 The Canal (comprising the water body and towpath) and Minet Country Park are considered to be of high importance/value due to the recreational function that they serve; users of these spaces would be more sensitive to significant changes in solar shading patterns. Similarly the Canal is valued for its nature conservation interest, which is sensitive to significant changes in overshadowing. With the exception of the Canal and the Country Park, the vacant nature of much of the land within the Planning Application Area at 2007 means that it would not be sensitive to changes in solar shading.

Wind Environment

17.4.10 The baseline on which the wind assessment is based will assume wind conditions on an idealised open site, taking account of the long term meteorological data for London and the adjustment of this data to the Site. The baseline conditions for the Site therefore indicate that the wind conditions would be classified as suitable for standing/entrance use during the windiest season. This is a typical result for urban sites in the south of England.

17.5 Assessment of Effects

Solar Shading

17.5.1 The solar shading assessment has been based upon the Parameter Plans reproduced in Figures 3.4a–p and has taking into consideration the indicative Phasing Plan shown in Figure 6.1) as detailed in Chapter 6: Construction and Phasing. Appendix 17.1 presents the assessment of solar shading impacts upon existing and proposed public realm within and adjacent to the Site. The degree of solar shade cast by the maximum height development is illustrated on Figures 17.2 (March and September Equinox), 17.3 (Summer Solstice) and 17.4 (Winter Solstice), respectively.

17.5.2 Appendix 17.1 presents the assessment of solar shading impacts upon public realm within and adjacent to the Site.

Curtilage of Existing Properties to the North

17.5.3 Properties to the north of the Site would be affected largely by Stage 1 of development, the far western corner being affected by Stage 2, and there would be no effect from Stage 3.

17.5.4 During Stage 1 the proposed Scheme would be restricted to a maximum of three to six storeys (24m ASD) along the northern edge of the Site. This design approach outlined in the Design and Access Statement (DAS) (a separate document submitted with this planning application) maintains excellent solar access to existing predominantly residential properties to the north of the Site throughout the day for spring, summer and autumn, however, solar access is reduced during the winter. Stage 2 of the proposed development is limited to a maximum of 3 storeys (10.5m ASD) adjacent to the Blair Peach School and shadowing effects would be slightly less than those for Stage 1.

17.5.5 Overall, the effects on amenity of the existing properties for Stage 1 are considered to result in a minor significance and negligible significance for Stage 2.

Curtilage of Existing Properties to the East

17.5.6 The curtilage of the Listed Water Tower would be affected by Stage 1 development only, which has been restricted to 4 storeys (15m ASD) to minimise potential effects upon the land surrounding the Water Tower. Good solar access would be enjoyed year-round throughout the day, although this would reduce in winter. Overall negligible significance would result.

17.5.7 The thoroughfare to the south of the Site, the Straight, would generally not be affected by Stage 1 or 3 developments. Localised effects would arise from the school complex proposed as part of Stage 2, during late evening in summer months. The effects would of negligible significance.

17.5.8 Along the Canal frontage the proposed Scheme would increase shading of the Canal and towpath throughout Stage 2 and 3. Orientation of the Canal allows excellent solar access to much of the water body throughout the afternoon for both stages in March, and throughout the day in June. Solar access deteriorates in winter months. However, the shade cast would not be static, changing through the movement of the sun. Good levels of solar access would be gained where the public realm interrupts the building line, thus permitting 'slots' of sunshine through to the Canal and towpath.

17.5.9 Three new bridges are proposed across the Canal and Brook, namely Pump Lane Link Road Bridge during Stage 1, Minet Country Park Pedestrian Bridge and the Springfield Road Pedestrian Bridge during Stage 2; each of the bridges has the potential to cast shadow onto the water bodies and thus affect amenity. However, due to the orientation of the bridges, shadows would be transient due to the constantly changing sun position. Due to the more solid construction and wider carriageway, Pump Lane Link Road Bridge would have a permanent adverse impact of minor significance upon the water bodies and land in the vicinity of the bridge. The structurally lighter construction of Minet Country Park Pedestrian Bridge and the Springfield Road Pedestrian Bridge, however, will have negligible effects.

17.5.10 The Canal would continue to provide a recreational facility, enhanced by the proposed Scheme and increased access from new public realm within the Site. The Canal would also continue to enjoy proposed and continuing uses, as demonstrated by the solar shading assessment. However, the Development, due to wintertime sun angles and shorter daylight hours, would reduce solar levels and amenity at this time of year.

17.5.11 The adverse effect on the Canal for all Stages is assessed as minor significance.

West Southall Site Receptors

17.5.12 As noted above, temporary construction activities are unlikely to create significant effects upon neighbouring sensitive receptors. However, the effect of each successive stage of development

would have effects upon previously completed and occupied stages, as well as any existing neighbouring receptors (as discussed above and in Appendix 17.1). For example, on completion, Stage 2 would affect neighbouring occupants in the Stage 1 area when compared to the solar shading situation at the start of the Stage 2 construction; in turn, the same would also occur with respect to Stages 3 and 2.

Stage 1 Area

17.5.13 The eastern access would be affected by the Scheme during Stage 1 and by the localised effect of the school complex during Stage 2 only. Slight shading would occur from Stage 1 buildings during early mornings in March and June, providing generally good to excellent solar access; this would continue into the winter months with good sunlight levels through until early afternoon. For Stage 2, the school complex would cast slight shadows during late afternoon in March resulting in permanent substantially beneficial effects for Stage 1, and moderately to minor beneficial for Stage 2.

17.5.14 The proposed civic square within the northern part of the Site is envisaged for passive and active leisure uses. It would be influenced by development during Stage 1 and the proposed hotel during Stage 2 which would face onto the square. Much of the square would enjoy excellent levels of solar access throughout the majority of the year (Stage 1), and only a small impact during late afternoon/early evening in spring and summer (both stages). Solar access would be limited to between mid morning and mid afternoon in winter. Permanent beneficial effects would occur for both stages, being substantial (Stage 1) to moderate (Stage 2) significance.

17.5.15 Informal play/recreation spaces would be dispersed across the whole of the Site. Those proposed in the Stage 1 area would principally be affected by Stage 1 developments, and also some localised edge effects from Stage 2 developments. High levels of shade would occur until mid afternoon in March. This would be a negligible effect (during both Stage 1 and 2).

17.5.16 Internal routes within Stage 1 would again be affected principally by Stage 1 development, with some localised impact from Stage 2. Reasonable solar access levels would be experienced for Stage 1 in spring, increasing to good in summer months. During winter this would be limited to 'slots' of sunlight between buildings. Nonetheless, permanent beneficial effects would result, of minor (Stage 1) to negligible (Stage 2) significance.

17.5.17 Private courtyards and communal gardens would be provided across the Site, enclosed within the proposed building footprints. The extent of solar access is very much dependent upon the orientation of individual buildings. The degree of sunlight at ground level in such spaces covers the full spectrum across each Stage, and the Site as a whole, which is inevitable if a regimented fixed building orientation is to be avoided. The result is that some properties would have excellent levels of solar access during March, whilst other would have none. Overall it is considered that negative effects would be offset by the benefits of site re-use and creation of amenity spaces. Negligible effects would therefore arise.

Stage 2 Area

17.5.18 Stage 2 development would experience effects similar to Stage 1. The change in orientation of the main access road (south-west) and the openness of the park to the east exposes the route to excellent levels of direct sunlight until mid afternoon in March and June. Stage 1 and 3 developments would not affect this route. The permanent beneficial effects would be of substantial significance.

17.5.19 Active canal side public realm would be created as part of Stage 2 development, which would enjoy good levels of solar access from mid morning until mid afternoon in March; excellent levels would occur throughout the day in June. Permanent beneficial effects of substantial significance would be the result.

17.5.20 An extensive park with sports courts would be created In Stage 2. The southerly location of this feature within the Site ensures excellent levels of solar access throughout the day in March (minor

shadows from the adjacent gasholder only). Shadows would be limited to late evening only on summer and winter, with excellent solar access levels throughout the year earlier in the day. Permanent beneficial effects of substantial significance would be enjoyed.

17.5.21 Effects upon internal routes within Stage 2 are very similar to those described for Stage 1 due to the varied orientation and relationship to adjacent development and stages. Again, permanent beneficial effects would result of minor (Stage 2) to negligible (Stage 3) significance.

17.5.22 As with internal routes, Stage 2 effects upon private and communal courtyards and gardens can be likened to the effects described for Stage 1. Negligible effects would arise.

Stage 3 Area

17.5.23 Due to the geographical relationship between Stage 3 and Stages 1 and 2, the final stage of development would not be influenced in solar shading terms by earlier construction.

17.5.24 However, similarities can be drawn with the other stages. The southern section of the main street shares the same orientation as that in the Stage 2 area, and a comparable relationship with the park resulting in excellent levels of solar access throughout the day in March with some shading in late evening during June. The permanent beneficial effects would be of substantial significance.

17.5.25 Informal play/recreation spaces occur within Stage 3, lying immediately to the west of the main access road thus benefiting from a favourable juxtaposition with the park. Excellent levels of solar access would be enjoyed in March with some shading in late evening in summer. This would be a permanent beneficial effect of substantial significance.

17.5.26 Effects upon internal routes within Stage 3 are very similar to those described for Stage 1 due to the varied orientation and relationship to adjacent development and stages. Permanent beneficial effects of minor significance would result.

17.5.27 As with Stage 2, effects upon private and communal courtyards and gardens can be likened to the effects described for Stage 1.

Wind

17.5.28 The wind assessment has been based upon the Parameter Plans reproduced in Figures 3.4a–p, however, the effects on wind conditions are presented in this chapter corresponding to the Illustrative Master Plan for the ease of the reader. The following section should be read in conjunction with Figure 17.5 which presents the plot numbers of the blocks referred to.

17.5.29 Appendix 17.2 presents the full assessment of wind effects upon the Scheme**.**

West End of the Site (CPS Blocks)

17.5.30 The west end of the Site narrows to a point and comprises eleven blocks of buildings which are primarily residential.

17.5.31 Blocks CPS 03, 04, 05 & 06 along the southern boundary of the Site are similar in height to the existing buildings along the southern boundary of the railway tracks. The wind conditions around these buildings are expected to be suitable for standing/entrance use or better throughout the year. This represents a negligible effect at entrances and a minor beneficial effect on pedestrian thoroughfares where the ‘target’ condition is suitable for leisure walking.

17.5.32 Plots CPS01, 02, and 07 to 11 all have a courtyard area which is either surrounded on four sides or open to the north. These courtyards are therefore sheltered from the prevailing winds and conditions are expected to be suitable for sitting in the summer, a negligible effect. There is a funnel between blocks CP07 & CP08 at the west end of the site and this will accelerate winds from the south. The wind microclimate is expected to be suitable for standing/entrance use in/around blocks CPS01, 02, 07 to 11 which represents a negligible to minor adverse effect for entrances and thoroughfares respectively. These conditions are considered to be compatible with the likely pedestrian use of this part of the site.

North Central Part of the Site (CPN Blocks)

17.5.33 There are eleven buildings which make up the north, central part of the site. There is a cluster of potentially taller buildings in/around the junction between CPN06, 07 & 09 with the ends of these buildings being up to 12-storeys in height. The south elevation of this group of buildings is exposed because of the open park area adjacent to the NG Gas compound. The south elevation of this group of buildings is also relatively tall and so the interaction with the winds from the southerly quadrant, which includes prevailing winds, is increased. We would expect leisure walking conditions to exist in the spaces between buildings along the south elevation. This represents a negligible effect for pedestrian thoroughfares and a minor adverse effect for entrances sited in this area.

17.5.34 Away from these areas standing conditions are predicted which implies a negligible or minor beneficial effect for entrances and thoroughfares respectively.

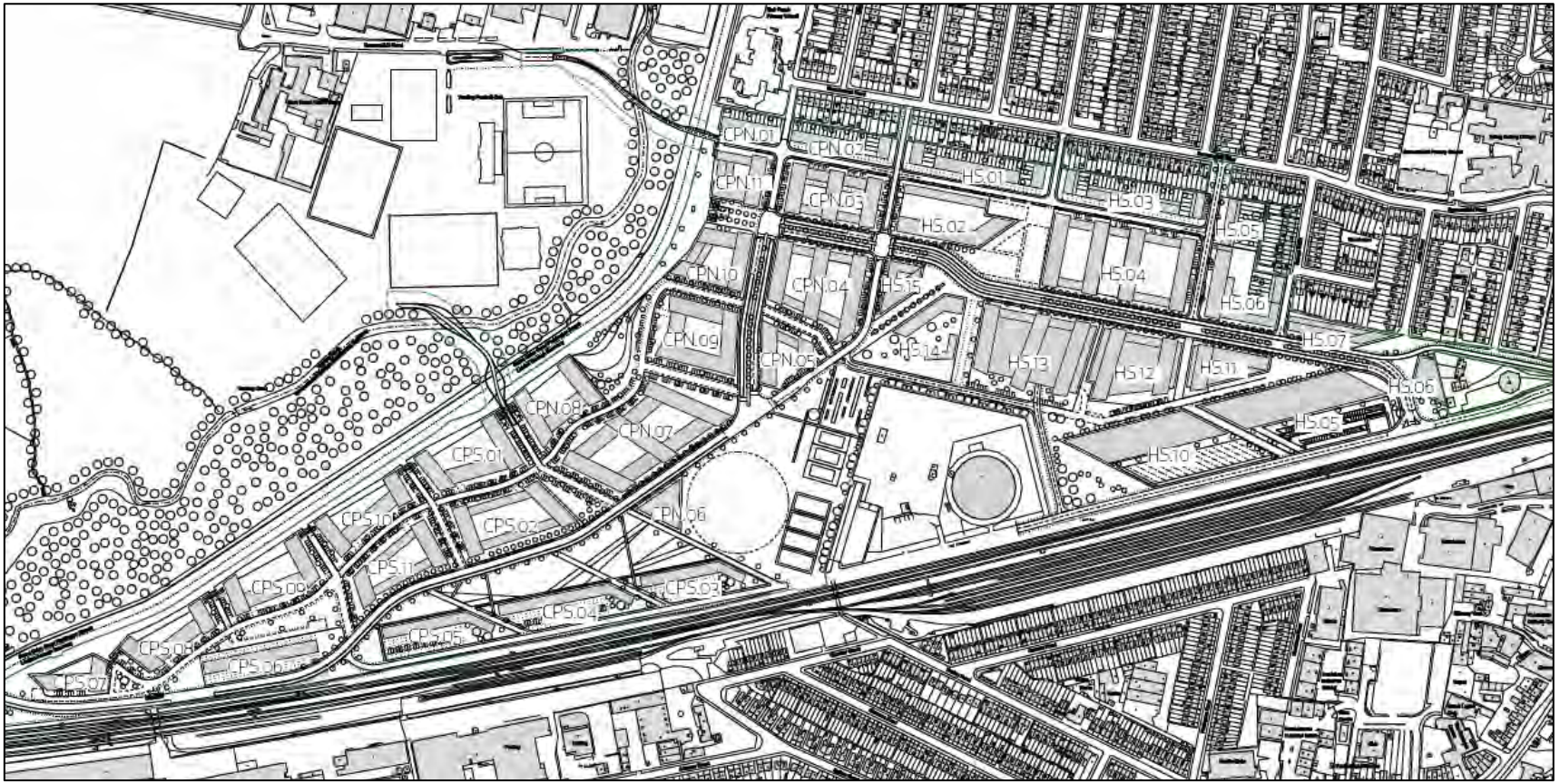


Figure 17.5 Site Plan for Wind Assessment

East Part of the Site (HS Blocks)

17.5.35 There are fifteen blocks which make the eastern part of the Scheme. HS15 has a 17-storey corner and is the tallest building on the Site, however this is restricted to the east corner of the building.

17.5.36 The southern ends of HS12 and HS13 are 10-storeys but slope down to 7-storeys. At the High Street end of the blocks. It is likely that the southern corners of these buildings will experience conditions suitable for leisure walking in the winter because they are directly exposed to the prevailing winds, assuming only limited shelter from the NG Gas compound. Entrances in these areas would therefore be classified with a minor adverse effect whereas, pedestrian thoroughfares would be classified with a negligible effect. The surrounding areas are expected to be suitable for standing/entrance use which implies conditions suitable for locating entrances and calmer than required for a thoroughfare.

Construction Impacts

17.5.37 The effects described in the previous sections are based upon the fully operational completed scheme. During construction the main wind impact generally occurs at the end of demolition and prior to the commencement of construction when the site is more open and the wind has a more direct effect on neighbouring buildings around the periphery of the site. These are short term effects and do not require specific mitigation measures.

17.6 Mitigation and Enhancement

Solar Shading

17.6.1 The quality and amenity of open spaces has been considered throughout the scheme evolution with regard to potential effects on solar shading. Therefore fixing the spatial parameters for the proposed Scheme has reduced the potential for adverse effects on solar shading. As an example, proposed building heights to the south of the new park have been restricted to four storeys in order to ensure good solar access within the recreational spaces of the park.

17.6.2 Solar shading effects result from the form, orientation and layout of built developments. As these elements would be substantially fixed by the proposed urban form, opportunities for further mitigation are limited. With regard to solar access, it should be noted that some shading in urban areas is unavoidable and cannot be mitigated as BR209 (section 4.5)[17.4] notes, "…*mutual shading is an unavoidable characteristic of dense urban areas*". This applies particularly where the east-west façade of a building casts shade upon areas to the north of its footprint. No further mitigation is therefore proposed.

Wind

17.6.3 The assessment of the wind conditions associated with proposed development assumed no beneficial enhancements due to landscaping. However planting does provide shelter for pedestrians particularly during the summer season when trees are in full leaf.

17.6.4 The proposed Scheme has extensive planting proposed both between the different building plots but also within/around the more open communal spaces. In our experience this planting is likely to generate a half category improvement in the wind microclimate on the Lawson Comfort Scale. However, it is prudent to assume only a small beneficial effect from planting in the winter months unless there is significant use is evergreen species.

17.6.5 The plans submitted for the outline planning application do not show any detail in terms of the locations of building entrances, which is to be expected. This assessment does, however, indicate areas where the wind conditions are expected to be windier than required for entrance use, i.e.

suitable for leisure walking. Entrances should therefore be located away from these windier areas or detailed design would need to consider additional screening of the entrances or recessing the entrances to provide a sheltered buffer zone for residents/visitors.

17.7 Residual Effects and Enhancements

Solar Shading

17.7.1 Residual impacts would be as described in Appendix 17.1 and summarised above. Table 17.5 below summarises the residual adverse and neutral impacts that would arise from implementation of the scheme. All other impacts arising from the proposed Scheme would be beneficial in terms of creating new public realm and open space that is suitable for its proposed use.

Wind

17.7.2 Provided entrances are sited away from the areas where leisure walking conditions are predicted then the residual effects are negligible or minor beneficial with the wind microclimate expected to be suitable for the intended pedestrian use of the proposed Scheme or calmer than desired. Table 17.6 below summarises the key issues and impacts:

Table 17.5 Summary of Residual Solar Shading Impacts

Environmental topic	Significance	Mitigation measure	Residual significance
Adjacent Receptors (off-site)			
Curtilage of Existing Properties to the north.	Minor adverse	Scheme design, restriction of storey heights.	Negligible
Curtilage of Existing Water Tower	Negligible	Scheme design, restriction of storey heights.	Negligible
The Straight	Negligible	Scheme design, restriction of storey heights.	Negligible
Grand Union Canal – Development	Minor adverse	Scheme design, restriction of storey heights.	Minor adverse
Grand Union Canal – Bridges	Minor adverse	Restriction of Bridge width, parapet design	Minor adverse
West Southall Receptors			
Informal recreation spaces within proposed Scheme	Minor, Moderate and Substantially beneficial.	Not required	Minor, Moderate and Substantially beneficial.
Private and communal courtyards/gardens within proposed Scheme	Minor, Moderate and Substantially beneficial.	Not required	Minor, Moderate and Substantially beneficial.

Table 17.6 Summary of Residual Wind Impacts

Impact identified	Significance	Mitigation measure	Residual significance
Blocks CPS: standing/entrance conditions at entrances	Negligible	None	Negligible
Blocks CPS: standing/entrance conditions on thoroughfares	Minor beneficial	None	Minor beneficial
Blocks CPS: leisure walking conditions at entrances	Minor adverse	Relocate entrances, recess or screen entrances at detailed design stage	Negligible
Blocks CPN: standing/entrance conditions at entrances	Negligible	None	Negligible
Blocks CPN: standing/entrance conditions on thoroughfares	Minor beneficial	None	Minor beneficial
Blocks CPN: leisure walking conditions at entrances	Minor adverse	Relocate entrances, recess or screen entrances at detailed design stage	Negligible
Blocks HS: standing/entrance conditions at entrances	Negligible	None	Negligible
Blocks HS: standing/entrance conditions on thoroughfares	Minor beneficial	None	Minor beneficial
Blocks HS: leisure walking conditions at entrances	Minor adverse	Relocate entrances, recess or screen entrances at detailed design stage	Negligible

References

17.1 ODPM (2002) PPG17: Planning for Open Space and Recreation, Office of the Deputy Prime Minister, TSO

17.2 Greater London Authority (2004) The London Plan, Spatial Development Strategy for Greater London

17.3 London Borough of Ealing (2004) Plan for the Environment – the Unitary Development Plan

17.4 Littlefair, P. J (1991) Site Layout Planning for Daylight and Sunlight – A Good Practice guide (BR209) Building Research Establishment

17.5 London Borough of Hillingdon (1998) Unitary Development Plan

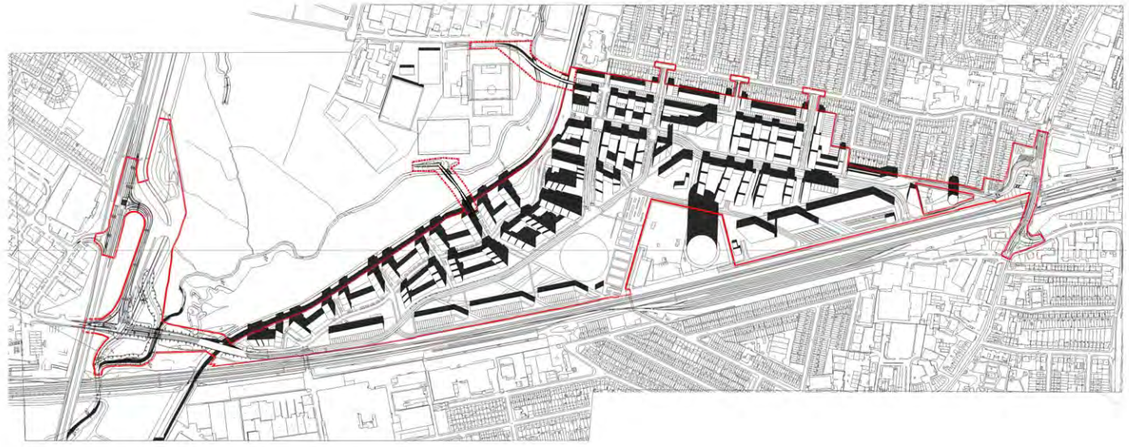
17.6 Greater London Authority (2002) London's Skylines, Views and High Buildings, Spatial Design Strategy Technical Report 19, August 2002,

17.7 www.metoffice.gov.uk/climate/uk/averages/19712000/sites/greenwich.html (accessed 11th September 2007)

17.8 http://aa.usno.navy.mil/data/docs/RS_OneYear.php US Naval Observatory, Astronomical Applications Department (accessed 17th November 2007)

Southall shading studies - Equinox (March 21st & September 22nd) - maximum heights scheme

March 21st and September 22nd Equinox 9am



March 21st and September 22nd Equinox 12pm

March 21st and September 22nd Equinox 3pm

March 21st and September 22nd Equinox 6pm

NOTE:
1. For extent of proposed public and private realm, see Parameter Plan: Public and Private Realm.

2. All times shown are Greenwich Mean Time (GMT)

3. Sunrise/Sunset times using 2007 as an example year are:

	March	September
Sunrise	06:02	05:45
Sunset	18:14	17:59

The figures illustrate the shading effects of the proposed development assuming maximum building heights as shown on the Perameter Plans.
The figures do note take into account the size of spaces and the routes within the development blocks; in some cases such breaks would allow additional levels of solar access.

KEY

Application boundary

Devlopment boundary

RPS

Date: 22.09.08 Scale: NTS Rev:

Job No: JLD0211 Drawn: MB Checked: CC

Project: West Southall

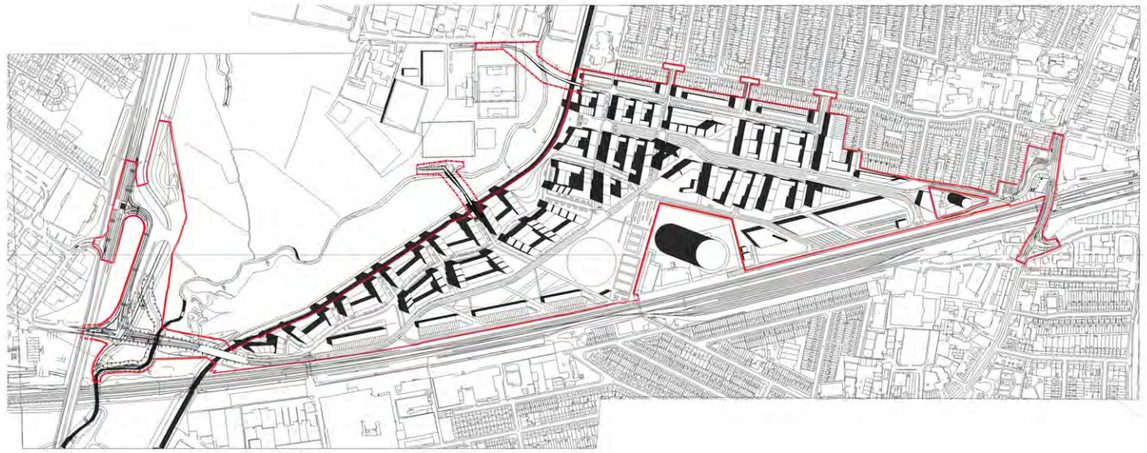
Title: Solar Shading

Figure No: Figure 17.2

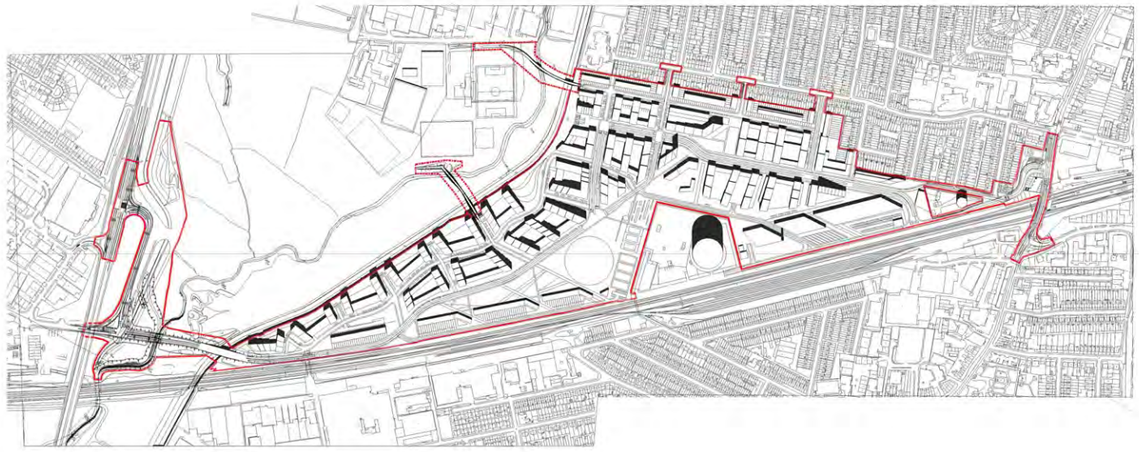
www.rpsgroup.com

Drawing Ref:

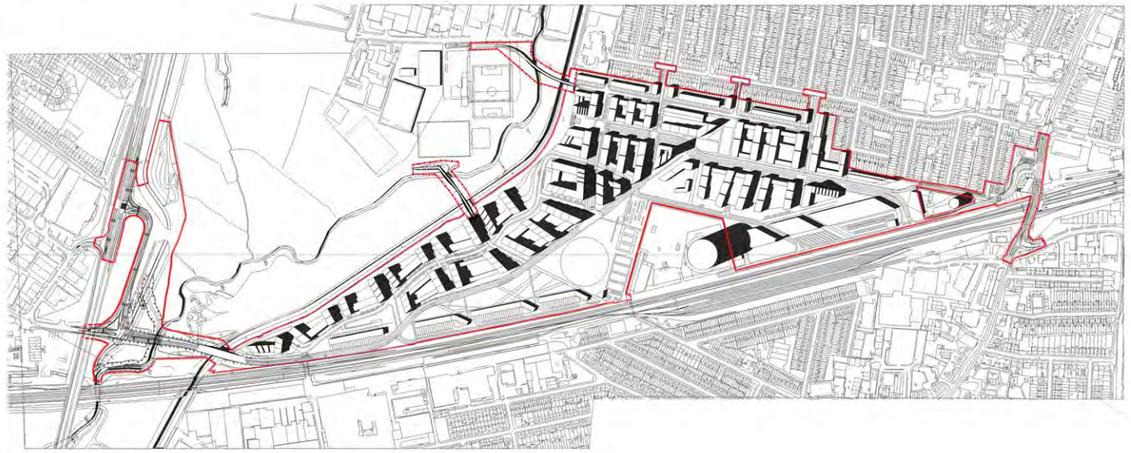
Southall shading studies - Summer solstice June 21st - maximum heights scheme



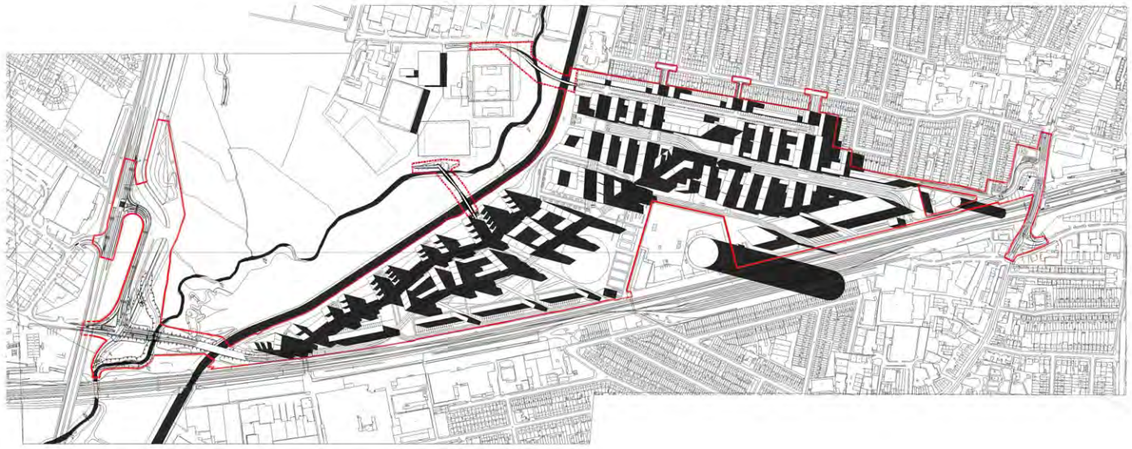
June 21st 9am



June 21st 12pm



June 21st 3pm



June 21st 6pm

NOTE:
1. For extent of proposed public and private realm, see Parameter Plan: Public and Private Realm.

2. All times shown are Greenwich Mean Time (GMT)

3. Sunrise/Sunset times using 2007 as an example year are:

	June
Sunrise	03:43 (04:43 BST)
Sunset	20:21 (21:21 BST)

The figures illustrate the shading effects of the proposed development assuming maximum building heights as shown on the Perameter Plans.
The figures do note take into account the size of spaces and the routes within the development blocks; in some cases such breaks would allow additional levels of solar access.

KEY

Application boundary

Devlopment boundary

RPS

Date:	22.09.08	Scale:	NTS	Rev:	
Job No:	JLD0211	Drawn:	MB	Checked:	CC

Project: West Southall

Title: Solar Shading

Figure No: Figure 17.3

www.rpsgroup.com

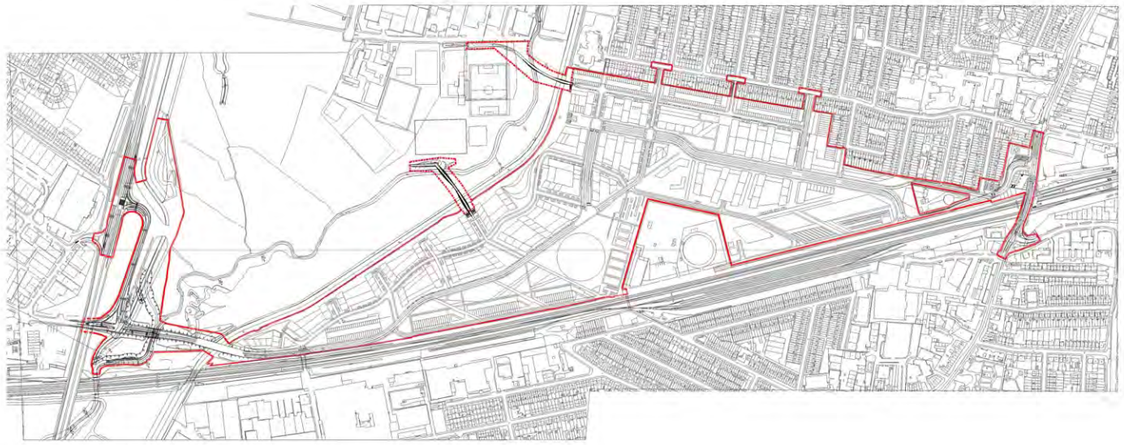
Drawing Ref:

Southall shading studies - Winter solstice December 21st - maximum heights scheme

December 21st 9am

December 21st 12pm

December 21st 3pm



December21st 6pm

NOTE:
1. For extent of proposed public and private realm, see Parameter Plan: Public and Private Realm.

2. All times shown are Greenwich Mean Time (GMT)

3. Sunrise/Sunset times using 2007 as an example year are:

	December
Sunrise	08:03
Sunset	15:53

The figures illustrate the shading effects of the proposed development assuming maximum building heights as shown on the Perameter Plans.
The figures do note take into account the size of spaces and the routes within the development blocks; in some cases such breaks would allow additional levels of solar access.

KEY

Application boundary

Devlopment boundary

RPS

Date:	22.09.08	Scale:	NTS	Rev:	
Job No:	JLD0211	Drawn:	MB	Checked:	CC

Project: West Southall

Title: Solar Shading

Figure No: Figure 17.4

Drawing Ref:

18 OPERATIONAL WASTE

18.1 Introduction

18.1.1 The West Southall Scheme will produce household and commercial waste materials that will require routine off-site disposal. This Chapter addresses the implications of these waste arisings as a consequence of the operational/occupied stage through commercial and residential activities associated with the proposed Scheme.

18.1.2 Details of the waste generated during the construction phase of development are discussed in Chapter 6: Construction and Phasing of this ES.

18.2 Planning and Legislative Context

National Policy

18.2.1 As part of this assessment, a detailed review of applicable national legislation and guidance has been undertaken. Local authority policies have also been reviewed. The most important points relating to waste are outlined in this section; however a full policy review is also included in Chapter 5: Planning Policy Context.

18.2.2 The Duty of Care is set out in section 34 of the Environmental Protection Act (1990) and associated regulations. It applies to anyone who is the holder of controlled waste. Persons concerned with controlled waste must ensure that the waste is managed properly, recovered or disposed of safely, does not cause harm to human health or pollution of the environment and is only transferred to someone who is authorised to receive it. The duty applies to any person who produces, imports, carries, keeps, treats or disposes of controlled waste or as a broker has control of such waste.

18.2.3 Planning Policy Statement 10 (PPS10): Planning for Sustainable Waste Management (18.1) advises on how the land use planning system can contribute towards sustainable waste management. This guidance primarily sets out the general policy guidance on the siting of waste management facilities. However, it also sets out a number of objectives for waste management including:

- Encouraging sensitive waste management practices in order to preserve or enhance the quality of the environment;
- Enabling waste to be disposed of in one of the nearest appropriate installations;
- Minimising adverse environmental effects from the handling, transporting and disposal of waste; and
- Ensuring that the design and layout of new developments support sustainable waste management.

18.2.4 In addition, the National Waste Strategy (2007) [18.2] sets out a hierarchical waste management structure to be followed when assessing the management of waste as follows:

- Minimisation (i.e. reducing the generation of waste at source);
- Re-use (i.e. use of materials elsewhere or in another process without treatment);
- Recycle (the treatment of waste such that value can be recovered e.g. by reprocessing, composting, energy recovery etc); and
- Disposal, which is the least preferred option.

18.2.5 In addition to PPS 10, the Code for Sustainable Homes (2006) [18.3] contains a number of minimum standards for waste management including:

- Site waste management, ensuring that there is a Site Waste Management Plan (SWMP) in operation;

- Household waste storage, where adequate space is provided for the containment of waste storage in each dwelling;

- Household recycling facilities, where 3 internal or external storage bins are provided with no less than 30 litres capacity (internal) and 60 litres capacity (external) ; and

- Composting facilities are provided to houses with gardens or a communal/community composting service is provided for normal garden, food and other compostable household wastes.

Regional Policy

18.2.6 The London Plan's (2008)[18.4] Policy 4A.3, Sustainable design and construction, states that *"the Mayor will, and boroughs should, ensure future developments meet the highest standards of sustainable design and construction and reflect this principle in Development Plan Document policies including promoting sustainable waste behaviour in new and existing developments".*

18.2.7 The Greater London Authority (GLA) Municipal Waste Management Strategy (September 2003) [18.5] has set a number of key targets up to 2020 and these include:

- Reducing waste growth;

- Increase the levels of recycling and composting from 8% to 50% by 2010;

- Increase the levels of public waste awareness by promotion and education; and

- Reduce the levels of transportation of waste and opt for more environmentally friendly methods such as, rail and barge.

18.2.8 The West London Waste Authority (WLWA) is a partnership of six London Councils including LB Ealing. The Mayor's Waste Strategy has been encompassed within the draft WLWA Joint Municipal Waste Strategy (September 2005) (18.6) and has produced its own set of policy targets to help the GLA achieve its targets by 2020, two of which are set out in the following key policies:

- the WLWA and its constituent Boroughs will prioritise waste reduction and reuse, and

- jointly, the WLWA and constituent Boroughs will aim to recycle and compost at least:

    - 40% of municipal waste by 2010; and

    - 50% of municipal waste by 2020.

LB Ealing Policy

18.2.9 The London Borough of Ealing also produced a Waste Collection Strategy for Ealing (September 2003) (18.7) and a Recycling and Waste Minimisation Strategy [18.8] which identified 12 key waste management performance targets that apply to all new household/commercial developments, these include:

- reduce the rate of household waste growth to 1% per annum by 2020; and

- 45% recycling and composting of household waste by 2013.

18.2.10 In addition to these targets, LB Ealing has also implemented a number of non-statutory Local Performance Indicators (LPI) and Strategic Waste Management Policies (2003) as follows:

- Percentage of population served by kerbside or within 1 km of a recycling facility - target 100% (LPI L-EG034);

- Total tonnage of waste recycled target 31,000 tonnes (LPI L-EG035);

- The Council will develop and deliver a waste awareness and reduction programme, focusing on all aspects of sustainable waste management e.g. waste reduction, reuse, recycling and composting;

- The Council will increase the amount of household waste that it collects for recycling and composting;

- The Council will continue to review the range of materials collected through the existing kerbside collection systems, 'bring sites' and the Waste and Recycling Centres, and introduce new materials where appropriate; and

- The Council will examine operational and financial mechanisms to encourage a reduction in residual waste.

18.3 Methodology & Significance Criteria

18.3.1 Waste management effects have been assessed at two levels:

- At the local level in terms of household and commercial waste generation, management and disposal; and

- At the regional level in terms of waste disposal.

18.3.2 The Waste types to be generated by the proposed Scheme can be separated into two categories, household waste and commercial waste. The methodologies for calculating each waste type is outlined below:

Residential Household Waste

18.3.3 The Applicant wishes to apply for a range of residential units, from 3,400 to 3,750. For the purposes of the assessment the calculations for the generation of Residential municipal waste have been based on a mid-range quantity of 3,500 units.

18.3.4 The volumes and mass of waste likely to be generated by the residential dwellings of the proposed development have been based on 2006/07 DEFRA statistics and Best Value Performance Indicators (BVPIs) from the Department of Communities and Local Government (2006/07) [18.9].

Municipal Business (Commercial) Waste

18.3.5 The volume and mass of waste generated by commercial sources have been based upon typical waste generation figures from Envirocentre [18.10]. The floorspace areas in Gross External Area (m2) presented in the Parameter Plans (see Figures 3.4a-p) were then used to calculate the output from commercial sources proposed for the proposed development.

18.3.6 The waste quantities have been evaluated in the light of current regional waste generation in order to assess the implications of the proposed Scheme on existing waste management practices and disposal capacity.

Significance Criteria

18.3.7 Potential environmental risks to resources and receptor groups have been characterised using the following criteria:

- nature of impact;

- duration of impact;

- geographic significance of impact; and

- scale of impact.

18.3.8 This is consistent with the methodology set out in Chapter 2: ES Scope and Methodology.

18.3.9 Waste management effects have then been categorised on the basis of their interaction with receptors, as follows:

- direct or indirect;
- beneficial or adverse; or
- neutral.

18.3.10 Direct effects include pollution, for example to air and water, and odour and visual impacts of poorly stored waste upon site users. Indirect effects include items such as traffic movements associated with waste production and the landfill capacity required to dispose of the waste produced at the Site. Neutral effects are considered to be where the Site deals with its own waste for example by encouraging residents to recycle through the provision of areas within the proposed development to store material for subsequent recycling/treatment off-site.

18.3.11 Effects have also been categorised as beneficial or adverse, according to their overall effect upon the receiving environment.

18.3.12 The classifications presented in Table 18.1 denote the significance of the impacts identified.

Table 18.1 Classification of Impact Significance

Significance	Description
Major	Effects of greater than local scale.
Moderate	Effects that may be judged to be important at a local scale
Minor	Effects that are of low importance in the decision making process
Negligible	Effects that are below normal perception

18.4 Baseline Conditions

Regional

18.4.1 The Greater London Authority (GLA) presented a number of key facts in its 2003 Waste Strategy:

- 4.4 million tonnes of municipal waste is collected by the London Councils annually, this amounts to a quarter of the total tonnage of waste collected;
- 73% of this collected municipal waste was landfilled in 2001/02 at sites outside of London;
- 19% of this municipal waste was incinerated at plants within London (Edmonton and Lewisham);
- 8% of municipal waste was recycled or composted; and
- municipal waste is increasing by 3.5% per annum which is half a percent above the national average.

LB Ealing

18.4.2 The WLWA produced the following figures for LB Ealing which have been validated by the Environment Agency:

- 164,000 tonnes of municipal waste was collected in 2004/05;

- Residents generated 1,201kg of waste per household in 2004/05;
- 76% (412,000 tonnes) of the total waste collected by the WLWA was delivered to WLWA disposal facilities; and
- LB Ealing achieved a household waste recycling rate of 14% in 2004/05.

18.4.3 The predominant method of municipal waste disposal through the WLWA for LB Ealing are the two rail transfer stations in Brentford and South Ruislip, with the final disposal destination being landfill sites in Bedfordshire and Buckinghamshire. In this context, municipal waste comprises household waste, waste delivery to civic amenity sites by householders and waste collected from business by the local authority.

The Site

18.4.4 No data is readily available for the types, volumes or mass of solid waste, which are currently generated at the Site and disposed of off-site. It has been assumed that there is very limited waste production from the Site as the majority of it is currently occupied by car parking uses.

18.4.5 Waste will be generated in connection with site preparation and construction of the proposed Scheme. Preparation of the Site for development will involve clearing of debris and on-site treatment of contaminated soils. However, please refer to Chapter 6: Construction and Phasing and Chapter 12: Ground Conditions for further discussion of these waste streams and the controls and measures for the management of these activities.

18.4.6 A number of private sector facilities are available for the receipt of commercial wastes within proximity of the Site and these are listed in Table 18.2 below.

Table 18.2 Private Sector Waste Facilities within 10km radius of Southall

	Private Sector Waste Facilities within 10km radius (closest to 5 miles) of Southall		
Licence No.	Operator	Site	Licensed Throughput (tpa)
80557	Biffa Waste Services Ltd	Plot 14b, Marsh Road, Wembley, Middlesex, HA0 1GL	75,000
80037	L J Grundon & Sons Ltd	High View Farm, New Years Green Lane, Harefield, Middlesex, UB9 6LX	4,999
83077	S Grundon (Waste) Ltd	Lakeside Road, Colnbrook Bypass, Colnbrook, Slough, Berkshire, SL3 0EG	275,000
80564	SITA Environment Ltd	Holloway Lane Quarry, Holloway Lane, Sipson, West Drayton, Middlesex, UB7 0AE	100,000
80024	SITA Environment Ltd	(North, Of) Colnbrook Bypass, Hillingdon, Middlesex, UB7 0BF	Not available
80026	SITA UK Ltd	Harmondsworth Landfill, Holloway Lane, Sipson, West Drayton, Middlesex, UB7 0AE	75,000
80025	SITA Wastecare Ltd	Rigby Lane, Hayes, Middlesex, UB3 1ET	Not available
80379	Veolia ES (UK) Ltd	Alperton Central Depot, Marsh Road, Alperton Lane, Wembley, Middlesex, HA0 1EL	103,750
80021	Veolia ES Cleanaway (UK) Ltd	Bedfont Road, Feltham, Middlesex, TW14 8EA	24,999

18.5 Assessment of Effects

Types and Volume of Waste Arising

18.5.1 Wastes arising has been identified as household or domestic wastes from the residential portion of the proposed Scheme and commercial wastes from the operation of businesses on the Site.

18.5.2 A significant proportion of the waste material generated from the residential dwellings and business premises would be classified as municipal waste. The options for the disposal of these wastes have been identified as:

- Collection and disposal of waste materials by the responsible department of LB Ealing or commercial operators;

- Recycling or re-use of operational wastes on or off-site; and

- segregation of recyclable materials for collection by LB Ealing or a private contractor.

Municipal Household Waste

18.5.3 Household type wastes will be produced by the future residents of the Site. A range of materials are likely to be produced and these will need to be collected, transferred and disposed of on a regular basis.

18.5.4 An estimated 4,400 tonnes per annum of household municipal waste may arise from the proposed domestic dwellings this figure takes into account the a 2.5% growth factor applied to refuse and recycling collection (based on Environment Agency data). The cost of waste collection per head has been calculated as £70.86 per annum. Other collections (bulky waste) and household waste would be taken to Civic Amenity Sites. Such waste is likely to be transported to the WLWA rail transfer station sites at Brentford, South Ruislip or the household recycling and reuse sites at Acton, Southall and Greenford. The quantities of bulky household waste is not included in the 4,400 tonnes per household.

Municipal Business (Commercial) Waste

18.5.5 Commercial wastes will be produced by retail premises, offices and administrative facilities. Wastes are likely to include paper, card and packaging, broken equipment, fluorescent tubes, cans, glass and plastic bottles, textiles and food wastes.

18.5.6 An assessment has been made of the amount of commercial waste which will be generated. The waste generation rate for offices is calculated by using 0.01 to 0.03m3/100m2 gross floor area/day. This is the figure relating to waste generation rates from offices but has been used as the base rate as it most likely reflects the make up of waste averaged across all different types of premises. An average of 0.02 m3/100m2/day has used therefore been to calculate the below rates inthis assessment except where figures exist for retail and supermarkets premises. The amount of waste paper has been calculated to be 0.005m3/100m2/day. Glass and plastics generation rate is 0.001 to 0.003m3/100m2/day, therefore, an average of 0.002m3/100m2/day has been used in this assessment.

18.5.7 The calculated estimated waste arising from the commercial operations of the proposed Scheme are set out in Table 18.3. These calculations have been based on the total GEA for the Scheme which is 384,323 m2. The residual waste from the Scheme totals 28,053.9 m3/year.

Table 18.3 Estimated Waste Arising from Commercial Operations

Type of premises	Total gross estimated area (GEA) m2	Typical Recyclables Generation Rate	Recyclable Waste Generated From the proposed Scheme	Typical Residual Waste Generation Rate	Residual Waste Generated From proposed Scheme
Retail	14,758	>100m2: 50L/100m2/ day	7,379L/day 269,3335 L/year **2693.34m3/year**	50L/100m2 floor area/day	7,379 L / day 269,3335 L / year **2693.34 m3/year**
Supermarkets	5,718	240L/100m2 / day	13,720.80L/day 500809.20L/year **5008.09m3/year**	0.2m3 / 100m2 gross floor area/day	11.44m3/day **4181.95m3/year**
Café/ Restaurant	1,720	Waste paper: 0.005m3/100m2/day	0.09m3/day **32.85m3/year**	0.02m3/100m2 gross floor area/day	0.35m3/day **127.75m3/year**
		Glass & plastics: 0.02m3/100m2/day	0.34m3/day **124.10m3/year**		
Hotel	9,206	Waste paper: 0.005m3/100m2/day	0.46m3/day **167.90m3/year**	0.02m3/100m2 gross floor area/day	1.85m3/day **675.25m3/year**
		Glass & plastics: 0.02m3/100m2/day	1.84m3/day **671.60m3/year**		
Conference	2,979	Waste paper: 0.005m3/100m2/day	0.15m3/day **54.75m3/year**	0.02m3/100m2 gross floor area/day	0.60m3/day **219m3/year**
		Glass & plastics: 0.002m3/100m2/day	0.06m3/day **21.90m3/year**		
Cinema	4,651	Waste paper: 0.005m3/100m2/day	0.23m3/day **83.95m3/year**	0.02m3/100m2 gross floor area/day	0.93m3/day **339.45m3/year**
		Glass & plastics: 0.002m3/100m2/day	0.09m3/day **32.85m3/year**		
Healthcare	2,511	Waste paper: 0.005m3/100m2/day	0.13m3/day **47.45m3/year**	0.02m3/100m2 gross floor area/day	0.51m3/day **186.15m3/year**
		Glass & plastics: 0.002m3/100m2/day	0.05m3/day **18.25m3/year**		
Education	3,402	Waste paper: 0.005m3/100m2/day	0.18m3/day **62.05m3/year**	0.02m3/100m2 gross floor area/day	0.68m3/day **248.20m3/year**
		Glass & plastics: 0.002m3/100m2/day	0.07m3/day **25.55m3/year**		
Office	1,039	Waste paper: 0.005m3/100m2/day	0.05m3 / day **18.25m3/year**	0.02m3/100m2 gross floor area/day	0.21m3/day **76.65m3/year**
		Glass & plastics: 0.002m3/100m2/day	0.02m3 / day **7.30m3year**		

Type of premises	Total gross estimated area (GEA) m2	Typical Recyclables Generation Rate	Recyclable Waste Generated From the proposed Scheme	Typical Residual Waste Generation Rate	Residual Waste Generated From proposed Scheme
Studio	1,672	Waste paper: 0.005m3/100m2/day	0.08m3/day **29.20m3/year**	0.02m3/100m2 gross floor area/day	0.34m3/day **124.10m3/year**
		Glass & plastics: 0.002m3/100m2/day	0.03m3/day **10.95m3/year**		

18.5.8 The majority of the commercial waste (if collected by LB Ealing) would be taken to the WLWA transfer stations and the remaining waste would be taken to private sector transfer station sites such as those outlined in Table 18.1.

Potential Effects

Pollution of the aquifers

18.5.9 The residential and commercial wastes are likely to be stored over the short-term in localised areas on-site for collection. Waste leachates and uncontrolled waste stored on-site have the potential to be washed into the adjacent watercourse during rainfall events causing adverse effects. Similarly, the uncontrolled storage of waste on-site has the potential to be blown into the watercourses. These potential effects are assessed to be of **minor adverse** significance. Such effects are likely to be prevented by appropriate Estate Management Practises.

Storage and Handling of Wastes

18.5.10 During the operational phase of the Scheme, residents will generate a large volume of waste on-site. The uncontrolled storage and handling of this waste has the potential to cause nuisance on the surrounding environment such as attracting vermin and pests and causing odour and other nuisances. These potential effects are assessed to be of **minor adverse** significance.

Treatment of waste off-site

18.5.11 Waste generation and disposal can result in excessive resource use and environmental impacts associated with landfilling and incineration, e.g. gaseous emissions, leachate pollution and use of open space. Legislation is in place to ensure such facilities are monitored and tightly controlled to reduce the potential environmental effects. There is also a move to treat waste as a resource; facilities such as Material Recovery Facilities (MRFs) encourage recyclables to be removed from the waste stream. Based on existing municipal waste collection and disposal in place at LB Ealing the potential effects are assessed to be of **minor adverse** significance.

Transportation of Waste

18.5.12 The transportation of waste from the residential and commercial units for treatment prior to disposal is most likely to take place by road via local authority collection vehicles for household waste and licensed carriers for the commercial waste. Due to the location of the Site adjacent to the Canal, consideration has been given to using the Canal to transport waste. The use of the canal network as a method for transportation of material to and waste from the Site has also been researched is discussed further in Chapter 8: Transport and Movement of this ES. With this all in mind, the potential effects from the transportation of waste are assessed to be of **minor** significance.

18.6 Mitigation and Enhancement

18.6.1 Local authority policies have been reviewed to inform suggested mitigation measures for waste generation during the operational/occupation phase of the development, which have been fed back into the design stage.

18.6.2 The production of both household and commercial waste materials from the completed Scheme can be mitigated by encouraging residents and users of the Site to adopt the advice and services offered by LB Ealing in the form of waste education and awareness. The future Estate Management body will also have a role in encouraging sustainable waste management practices at the Site, as described below.

Storage and Handling of Waste

18.6.3 Municipal and commercial waste would be collected regularly by either the local authority or commercial sector. Designated areas for waste should be kept secure however, must be readily accessible to reduce littering/uncontrolled waste storage. Containers with covers should be provided for putrescible (food) wastes to prevent rainfall ingress and subsequent release of liquid waste. Residents will be encouraged to segregate and recycle waste in line with LB Ealing's recycling policy.

Waste Reduction and Reuse

18.6.4 Minimising waste generation in the first instance would be of most benefit to the completed proposed Scheme. Residents and users of the Scheme will be encouraged to adopt LB Ealing's Recycling and Waste Minimisation Strategy and will also benefit from increased education and raised awareness that the Estates Management team will have implemented by the time the Scheme is built-out. Reuse of furniture and other valuable items can be made through the voluntary sector network which includes a number of charities, the future Estate Management body would coordinate this.

Waste Recycling

18.6.5 Recycling will be achieved through the provision of local authority kerbside recycling services and additional easily accessible recycling facilities such as paper, glass, textile, plastics and can banks. The amount of waste recycled from West Southall could meet and easily achieve LB Ealing's targets of recycling or composting 45% of household waste by 2013. Subject to confirmation of the local authority plans to address the composting of kitchen waste, provisions will be made for this waste type in addition to green garden waste for composting.

Non-Recyclable wastes

18.6.6 Both Household and Commercial non-recyclable wastes will be collected and disposed of through the existing WLWA network of facilities and those operated by the private sector, but may be mitigated by future Council initiatives to encourage minimisation by using smaller bins / fewer containers or using financial incentives/rewards to encourage further recycling by introducing 'pay as you throw' schemes.

Off-site Treatment of Waste

18.6.7 Treatment of waste off-site is controlled by strict environmental legislation covering for example, Mechanical and Biological Treatment (MBT), landfill and Energy from Waste facilities which reduces the impact of such facilities.

General Management Strategy

18.6.8 The onsite Site/Facilities Manager will also be responsible for co-ordinating the removal of waste and recycling material safely and effectively, whilst at the same time minimising potential disruption whilst these operations are being undertaken.

Detailed Design

18.6.9 The location of waste management facilities for the commercial part of the proposed Scheme will be considered in accordance with the BREEAM requirements (i.e. within 20m of a main entrance) and adequate capacity for current and future development or material changes will comply with the BREEAM standard.

18.6.10 The nature of the proposed Scheme encourages considerable opportunities for innovative waste management techniques. Such as the integration of waste management storage and access requirements within the detailed design and awareness raising and promotion of waste management schemes to foster involvement of tenant companies, residents and wider public and enable increased recycling and waste minimisation.

Transportation

18.6.11 As discussed in 18.5.3 there is the potential for using the adjoining canal and nearby rail networks for the transportation of waste. However, this is dependant on a number of other factors including the location of the end disposal or recycling plants. Feasibility studies will be required to research this further.

18.6.12 The impact of the transportation of waste can be mitigated against by using newer efficient vehicles. Consideration should be given to the use of biodiesel or electric vehicles, but this will be in the control of the council or its disposal contractors and is therefore outside the scope of influence of the ES.

18.7 Residual effects

18.7.1 The disposal of non-recyclable wastes is likely to result in effects of a local nature on disposal capacity, rather than those of a regional nature within the WLWA area. If the above mitigation measures are incorporated into the Scheme then the impacts on local waste disposal capacity are likely to be **negligible - minor adverse** overall.

Table 18.4 Summary of Residual Effects

Environmental topic Waste	Impact Identified	Significance	Mitigation measure	Residual impact
Operational Waste	Pollution of Aquifers	Minor	The on-site Estate Management practises will reduce the risk of pollution occurring. The designated areas for waste will be readily accessible to reduce littering/uncontrolled waste storage. Containers with covers will be provided for putrescible and soluble wastes.	Negligible
	Storage and handling of Wastes	Minor	The designated areas for waste will be readily accessible to reduce littering/uncontrolled waste storage. Containers with covers will be provided for putrescible wastes. All waste streams will be collected regularly.	Negligible
	Treatment of waste off-site	Minor	Not applicable, as influenced by external sources and legislation.	Minor
	Transportation of Waste	Minor	New technologies may encourage more efficient vehicles, however again this is influenced by external sources.	Minor

References

18.1 HMSO (1995) Planning Policy Statement 10 (PPS10): Planning for Sustainable Waste Management

18.2 Department for Environment, Food and Rural Affairs (2007) National Waste Strategy for England 2007

18.3 Building Research Establishment (2006) Code for Sustainable Homes

18.4 Greater London Authority (2008) The London Plan: Spatial Development Strategy for Greater London Consolidated with Alterations since 2004.

18.5 Greater London Authority (2003) Rethinking Rubbish in London: The Mayor's Municipal Waste Management Strategy. September 2003.

18.6 London Borough of Ealing (2005) Draft Joint Municipal Waste Management Strategy, ERM September 2005

18.7 London Borough of Ealing (2003) Waste Collection Strategy for Ealing 2003 – 2013, September 2003

18.8 London Borough of Ealing Recycling and Waste Minimisation Strategy

18.9 Department of Communities and Local Government (2007) Best Value Performance

18.10 Envirocentre. Chapter 7: Planning for Resource Sustainable Communities, Vol.1: Waste Infrastructure & Management. A Code of Practice.

19 CUMULATIVE EFFECTS

19.1 Introduction

19.1.1 This chapter addresses the potential for cumulative effects to arise from the Proposed Developed at the West Southall Site, in combination with other major developments in the area.

19.1.2 Generally, cumulative effects are considered in two ways, defined as follows:

- The combined effects of different types of impacts from the proposed Scheme on a particular sensitive receptor, known as 'impact interactions'. For example, the consequence of increased traffic flows on air quality and noise, and the effects of increased employment on travel patterns; and

- The combined effects from several developments in the area, which individually might be insignificant, but when considered together, could result in a significant cumulative effect.

19.1.3 In this instance, 'impact interactions' cumulative effects have been considered under each topic area and, where appropriate, such effects have been discussed in the corresponding technical chapters. See Chapters 6-18 of this ES.

19.2 Methodology

19.2.1 The assessment of Cumulative Effects has been undertaken in the following stages:

- Data collection about other permitted or allocated developments within the defined study area;

- Identification of Sensitive Receptors;

- Identification and assessment of cumulative effects from the proposed Scheme in combination with other permitted or allocated schemes within the area; and

- Identification of appropriate mitigation and management of the effects identified.

19.2.2 The same significance criteria have been adopted for the cumulative assessment as for the overall assessment as defined in Chapter 2: EIA Scope and Methodology and the individual technical chapters. The definition of significance as outlined in Table 2.12 has been reproduced below as Table 19.1.

Table 19.1 Definitions of Significance

Level of Significance	Description
Substantial	Very large or large change in environmental or socio-economic conditions. Effects, both adverse and beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving regional or local objectives or, could result in exceedance of statutory objectives and/or breaches of legislation.
Moderate	Intermediate change in environmental or socio-economic conditions. Effects which are likely to be important considerations at a local level.
Minor	Small change in environmental or socio-economic conditions. These effects may be raised as local issues but are unlikely to be of importance in the decision making process.

Level of Significance	Description
Negligible	No discernible change in environmental or socio-economic conditions. An effect that is likely to have a negligible or neutral influence, irrespective of other effects.

Identification of Sensitive Receptors

19.2.3 This assessment considers the likely combined effects of the Proposed Scheme with other permitted or allocated schemes on identified sensitive receptors located within the vicinity of the Site. The key objective of the assessment is to determine whether a particular receptor can accommodate additional change, or an adverse effect would be likely to result.

19.2.4 Residents, schools, local employees and users of the transport system have generally been identified as sensitive receptors in each of the technical chapters. A summary of the sensitive receptors identified in each of the technical topics is provided in Chapter 2: EIA Scope and Methodology, Table 2.11 has been reproduced below as Table 19.2.

Table 19.2 Sensitive Receptors

Chapter in ES	Sensitive Receptors
Chapter 6 Construction and Phasing	Local residents within the surrounding area who may be impacted by noise, dust, increased traffic, increased population associated with the construction phase. Workers on-site during remediation and ground works.
Chapter 7 Socio-economics and Population	Local Residents within LB Ealing, LB Hillingdon, LB Hounslow; Commercial users of the Site and surrounding areas; Employees of the Site (direct and indirect). The local economy and, particularly retailers and other businesses in Southall Town Centre.
Chapter 8 Transport and Movement	All aspects of traffic, public transport and pedestrian and cycle movement and associated infrastructure, particularly those used by residents and retail users.
Chapter 9 Noise and Vibration	Residents within close proximity to local roads which may be affected by road noise effects. Residents of the proposed Scheme located in residential dwellings along the southern boundary of the Site.
Chapter 10 Air Quality	Locations where members of the public may be regularly exposed to air pollutants such as local residents within the immediate vicinity of the Site or within the adjacent Air Quality Management Area (AQMA) declared by LB Ealing and LB Hillingdon.
Chapter 11 Townscape and Visual Effects	Residents in surrounding residential areas; users of the Minet Country park, the Grand Union Canal, and the surrounding roads.
Chapter 12 Ground Conditions	Construction workers; Future Site users; Groundwater.
Chapter 13 The Water Environment	The Yeading Brook; Grand Union; Canal, Major aquifer. Local residents and Site users (flood risk)
Chapter 14 Ecology	Flora and fauna in the adjacent Minet Country Park, the Canal and Yeading Brook
Chapter 15 Archaeology	Potential Palaeolithic remains on the Site.
Chapter 16 Built Heritage	Grade II Listed Water Tower west of Eastern Access route The 'Crescent' and dwelling to be demolished on Beaconsfield Road, Randolph Road and Grange Road.
Chapter 17 Microclimate (wind and solar)	Local residents; Users of the existing roads; Future residents and people using buildings and open space.
Chapter 18 Operational Waste	Air quality; local water sources; site users.

*Receptors agreed with LB Ealing and LB Hillingdon

19.3 Description of Consented Development Schemes

19.3.1 Presently, there is no EIA guidance on how to define an appropriate study area for cumulative effects. Therefore, the proximity of committed schemes and their scale in relation to the proposed development has been used to produce the following screening criteria. These criteria have been applied in order to select those developments in the locality of the Application Site to be subject of assessment.

The screening criteria include:

- Developments that are within 2km of the boundary of the proposed Scheme; and,
- Comprise more that 10,000m^2 and/or 100 or more residential units and/or are of a particularly sensitive nature (e.g. new schools or hospitals); and,
- Developments for which an ES and Transport Assessment (or equivalent) have been prepared and are available for review; and,
- Developments that have planning permission or a 'resolution to grant' planning permission, on or before 1 August 2008.

19.3.2 The level of information available for each of the identified permitted or allocated development schemes is highly variable and, as a consequence, the rigour to which any assessment of the potential effects can be accurately applied differs. The following sections therefore provide, in the first instance, an overview of the other consented development proposals included in the cumulative effects assessment.

19.2.3 The Developments which have been considered for the cumulative effects assessment, based on the 'screening criteria' outlined above are identified in Table 19.3 below. The location of these developments in relation to the Site is shown in Figure 19.1.

Table 19.3 Description of Permitted Developments

	Name/Address	Date of Approval	Description of Development
1	Hayes and Harlington Goods Yard, Hayes	Approval for mixed use development granted 07 April 2006 (10057/APP/2005/1620) An associated application was made to for creation of new access to Hayes and Harlington station and highway improvements along station approach. Application number: 10057/APP/2005/1623 Permission was Granted 5th January 2006	Redevelopment of site to provide 471 residential units, an Hotel, an Apart-Hotel, Retail (Class A1), Financial & Professional Services (Class A2) & Café/Restaurant (Class A3/A4/A5) units, an Exhibition/Display Area, Management & Marketing Suite, Health & Fitness Centre (Class D2), Landscaped Public Square, Communal Gardens & Underground Parking.
2	London Gate, Hayes	Planning application submitted September 2006. Status awaiting decision. (59872/APP/2006/2790)	Development of the Site for a mixed use to provide a new creative quarter including a new public square, music visitors centre, recording and broadcasting studios, rehearsal and post production rooms, gallery/event area, digital warehousing and distribution and vinyl production with associated retail, bar/café area and leisure facilities. Erection of 358 residential units and 58 live/work units with part ground floor employment uses with associated parking, servicing and landscaping.

	Name/Address	Date of Approval	Description of Development
3	Featherstone Primary School, Featherstone Road, Southall	Planning application validated January 2008 (P/2008/0084 duplicate P/2008/0083). Status – Planning permission refused at committee, decision appealed, and pending inquiry date.	Redevelopment of former school site by the erection of two 3-storey residential buildings and one part 2, 3 and 4-storey residential building, including retention/ alteration of part of existing locally-listed building, to provide 148 private residential units; provision of residential amenity space, parking provision (for 102 cars and 150 cycles), servicing and vehicular access from Featherstone Road.
4	Site of former Salisbury Depot, Salisbury Road, Southall	Planning application validated April 2008 (P/2008/0086 duplicate P/2008/0085). Status – Planning permission refused at committee, decision appealed, and pending inquiry date.	Redevelopment of former depot site by the erection of a part single, 2, 3, 4 and 5 – storey residential building to provide 103 affordable residential units; provision of residential amenity space, parking provision.

19.3.4 The authors of each of the ES Chapters have reviewed the available information for the permitted schemes, to determine the potential cumulative effects when combined with the Proposed Scheme. It is important to note that the Council were clearly satisfied with the effects of The Hayes and Harlington Good Yard as planning permission has been granted for that scheme.

19.3.5 In view of the inherent uncertainty with the timing and quantifiable effects associated with these other developments and the length of the phasing for construction associated with the West Southall Scheme (approximately 15 years), it is difficult to accurately determine the significance of cumulative effects. As such, the cumulative effects can only be broadly identified and assessed in a qualitative manner.

19.3.6 Due to the nature of the cumulative effects identified, it is not considered necessary to change any of the proposed and existing mitigation measures already identified for the proposed Scheme in the technical chapters.

19.3.7 It can be assumed that each of those developments identified above have or will be sufficiently conditioned to mitigate any adverse effects from their construction and operation activities as part of the relevant planning permission, for example, by the imposition of a Construction Environmental Management Plan (CEMP) to control emissions or other pollution during this phase.

19.3.8 Where any potential effects are considered to arise, these are set out in Table 19.5 below.

Table 19.5 Cumulative Effects Identified and Significance Following Mitigation.

Discipline	Potential Effects	Impact Significance
Construction	All Developments should ensure best practise measures during Construction including adherence to a Construction Environmental Plan (CEMP) or such like management system, therefore any potential effects would be ameliorated. It is suggested that a construction liaison group is implemented if all developments commence construction simultaneously.	**Negligible**
Socio-economics Effects	An additional population of approximately 2,200 people is considered to result form the above two developments. Therefore, in addition to the proposed Scheme, the cumulative effect in terms of population is approximately 8,700 people.	**Minor Adverse**
	Both of these sites will increase demand for community facilities, including school places and local GP services. However, the new primary school and GP facilities included on-site as part of the proposed Scheme will have the capacity to accommodate additional demand above and beyond that created by the Scheme.	**Negligible**

Discipline	Potential Effects	Impact Significance
	There will also be an increase in the use of other local community facilities including sports and leisure and open space.	**Negligible**
	The cumulative schemes will also help to meet the new homes targets for the area, including affordable homes.	**Minor Beneficial**
Transport	The effects of the construction of the proposed access routes and off-site works associated on the transport network will be managed through the implementation of a Construction Method Statement to be agreed with LB Ealing and LB Hillingdon following submission of detailed road design. This will outline the number, type and frequency of HGV movements on surrounding roads during construction. This Statement will consider the construction traffic associated with other developments in the proximity. This should also be considered by any potential construction liaison group.	**Minor Adverse**
Noise and Vibration	The noise assessment carried within this ES has been based upon transport data which has accounted for increases in vehicular traffic associated with this and the identified cumulative developments. Therefore no additional cumulative assessment has been undertaken.	
Air Quality	The air quality assessment carried within this ES has been based upon transport data which has accounted for increases in vehicular traffic associated with this and the identified cumulative developments. Therefore no additional cumulative assessment has been undertaken.	
Townscape and Visual	The cumulative developments outlined above will add to the urban setting in which the West Southall development would be viewed. These new residential developments are considered to improve the townscape character of the local area and, in addition to the West Southall development, will result in improvements to the local visual amenity provided.	**Minor Beneficial**
Ground Conditions	The planned remediation works for the proposed development have been designed to mitigate the identified risks posed by the presence of this contamination. The remediation will have substantially beneficial effects, not only on the Site itself but on the ground conditions of all surroundings in the locale.	**Moderately Beneficial**
Water	There is potential that additional demands on foul water drainage system may combine with other concurrent increases in demand from the nearby cumulative developments. In order to mitigate any potential effects the EA and Thames Water will be approached for the appropriate discharge consents prior to works commencing and, on the assumption that such consents are issued, they will be fully adhered to.	**Negligible**
Ecology	No cumulative ecological impacts are expected from developments surrounding the proposed Scheme.	**Negligible**
Archaeology	Effects on archaeological remains are not considered to be effected by cumulative developments. Effects on the Site will only result from the proposed development.	**Unknown**
Built Heritage	None identified	
Microclimate	None identified	
Operational Waste	The additional developments may increase the volume of waste produced by the Borough, however a proportion of these residents in the new developments may migrate from other areas within the Borough. Additional capacity for municipal waste collection, transfer and disposal may be required; however it is considered that the LPA's local waste strategy plans take account of the increase in population due to Borough housing targets.	**Minor adverse**

1. Proposed Development
2. London Gate Development
3. Hayes and Harlington Station Goods Yard Development
4. Featherstone School Site
5. Salisbury Depot Site

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Project: West Southall

Title: Location Plan of Cumulative Developments

Figure No: Figure 19.1

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20 MITIGATION MEASURES AND RESIDUAL IMPACTS

20.1.1 This Chapter summarises the residual effects of the proposed Scheme assuming implementation of the proposed mitigation measures outlined in Chapters 6 through to 17 inclusive.

20.1.2 Overall, the proposed development at West Southall would have a substantial beneficial effect in the locality. The Development will deliver residential provision including private and affordable housing consistent with the objectives of the London Plan and will provide a significant proportion of the Borough's identified annual housing needs.

20.1.3 The proposals respond positively to the location of the Application Site, offering the opportunity to deliver a comprehensive and integrated development that makes best use of the it's location. The benefits likely to be brought about by the proposed Scheme are:

- The potential to create approximately 1,320 jobs;
- The supply of public amenity space accessible to residents and members of the general public;
- The opportunity of socio-economic benefits of regeneration of a largely derelict and underused site, benefiting both the existing and future population;
- The opportunity to create construction employment over a sustained period of time (15 years);
- The provision of a Health Centre that could accommodate more than 8 GPs;
- a two forms of entry (2 FE) primary school sufficient to accommodate the demand arising from the future West Southall population;
- Additional provision and variety of retail;
- The proposed Springfield Road and Minet Country Park Footbridges will provide the new and wider Southall population with easy access to a District Park. It will also provide the population of Southall with enhanced access to open space within the Scheme itself;
- The provision of formal multi-purpose sports pitches, which will be available to the future population and for people already living in Southall; and
- The opportunity to promote sustainability.

20.1.4 A thorough and complete assessment has been undertaken of the proposed Scheme and the likely significant environmental effects. The development of mitigation measures to address potential adverse effects is a process that has informed the design of the proposed development, and its relationship with the surrounding area. This chapter summarises the residual effects of the Scheme assuming implementation of these proposed mitigation measures (for which the Applicant invites LB Hillingdon and LB Ealing to adopt conditions to planning permission or include appropriate planning obligations/developer contributions in a 'Section 106' agreement) and presents a composite summary of the main residual effects.

20.1.5 Mitigation and residual effects during the construction stage of the proposed development are shown on Table 20.1 and those that apply to the operation/occupation stages are summarised in Table 20.2.

Table 20.1 Mitigation and Residual Effects during Demolition and Construction of the Proposed Development

Topic	Issue	Predicted Effect	Mitigation and Enhancement	Residual Effect
Construction and Phasing	Waste associated with remediation	Approximately 30,000m^3 non treatable contaminated soils require off site disposal	Sustainable waste management measures and the pre-treatment of soil prior to landfill in line with the Regulations.	Minor adverse (temporary)
	Construction waste	Approximately 3% of raw materials brought onto site will end up as waste.	Site Waste Management Plan (SWMP) and the Framework Construction Environmental Management Plan (CEMP) will be adopted to address waste minimisation, reuse and recycling.	Minor adverse (temporary)
Socio-economic Effects	Employment Effects	Direct and indirect employment effects from 820 FTE jobs created as a result of construction.	Active encouragement of use of local labour with the local employment-training group.	Moderate beneficial effect (temporary)
Transport and Movement	Construction Traffic effects	Associated environmental effects from construction traffic including increased vehicle movements, increased noise and dust nuisance.	Implementation of the Framework CEMP to include construction traffic management plans and the potential use of the Grand Union Canal for the transfer of construction materials and construction waste. (Also see the Air Quality and Noise section)	Minor adverse (temporary)
	Traffic Conditions	The capacity on the highway network surrounding the Scheme will be reduced during off-site highway improvements.	Works will be phased and traffic management plans introduced so as to minimise the effect of the reduced highway capacity.	Substantial adverse (temporary)
Noise and Vibration Effects	Construction Activity	Potentially significant adverse noise and vibration effects could occur when works are undertaken close to Noise Sensitive Receptors.	A selection of appropriate plant and techniques and noise barriers would be utilised together with an agreed method statement and the implementation of measures outlined in the Framework CEMP. The phasing programme of the proposed development will also mitigate these effects further by ensuring that new dwellings are not occupied until noise screening insulation of the ongoing works is achieved	Negligible
Air Quality	Dust Emissions	Dust emissions from construction.	The London Best Practice Guide (BPG) provides best practice mitigation measures based on the level of risk identified at construction sites. This BPG will be adopted together with other good practice measures through the implementation of the Framework CEMP.	Negligible.
	Construction Traffic	Emissions of nitrogen oxides, fine particles and other combustion related pollutants from associated construction traffic, comprising contractors' vehicles and HGVs, diggers, on-site plant and other diesel-powered vehicles.	BPG will be adopted together with other good practice measures will be adopted through the implementation of the Framework CEMP and traffic management plan.	Negligible

Topic	Issue	Predicted Effect	Mitigation and Enhancement	Residual Effect
Landscape and Visual Effects	Character Area 1 Minet Country Park and Yeading Brook	Loss of boundary wall during phase 1.	The effect will be offset by the creation of canal side public realm at Phases 2 and 3, and establishment of new visual links and physical links	Moderate Beneficial (permanent)
	Character Area 3	Water Tower is embedded within new development. Loss of distinctive façade of The Crescent .	The opening-up of areas around Listed Water Tower enhances localised visual and physical prominence. The effects of the loss of the Crescent will be offset in the longer-term by enhancement of Water Tower setting and high quality landscape.	Moderate Beneficial (permanent)
	Character Area 4	Re-introduction of new built form in proximity to the canal edge.	The effects will be offset by height restrictions and increased connectivity, including creation of canal side public realm.	Substantial Beneficial (permanent)
	Character Area 6 – Derelict Cricket Pitch	Effects of construction on adjacent Water Tower	Effects limited by imposition of height restrictions. Development would not encroach on setting of Water Tower. Permanent beneficial effects would result throughout due to creation of high quality, coherent townscape with improved connectivity on existing under-used brownfield land.	Moderate Beneficial (permanent)
Ground Conditions	Overall contamination of the Site.	The recorded contamination on the Site is considered to present the most significant potential impact associated with ground conditions.	The planned remediation works have been designed to mitigate these identified risks posed by the presence of contamination and will render the land safe and suitable for development. In addition to the treatment of contamination, measures will be put in place, as described the Remediation Strategy, to limit the potential for release of contaminants during the remedial and construction works themselves in the form of dust, odours, vapours, landgases, leachate, surface run-off etc.	Substantial Beneficial (permanent)
	Mobilisation of contaminants during construction and remediation.	Mobilisation of contaminants during remediation & construction works could potentially contaminate local watercourses and effect human health and adjacent property.	Controlled remediation works prior to commencement of construction – i.e. in-ground barriers and and ex and insitu treatment methodologies. However there may be a some temporary redistribution of contaminants within the Site but suppression measures will be used at Site boundaries to ensure minimal escape of dust, odours etc.	Minor Adverse (temporary)
Water Resources	Mobilisation of contamination, leakages and drains and	Effects arising from the mobilisation of identified contamination to off site receptors, leakages during refurbishment of the White Street Sewer and other site drainage and the decommissioning of drains	Remediation of groundwaters to remove source contaminants will be carried out. A new and improved drainage system including retention features and interceptors will be installed and appropriate disposal of	Minor Adverse, (temporary)

Topic	Issue	Predicted Effect	Mitigation and Enhancement	Residual Effect
	lagoons	and lagoons.	water and sediments will be undertaken in accordance with the SWMP and the Framework CEMP.	
	Sediment Load	Increased sediment load from erosion, vehicles, road wear.	Measures outlines in the Framework CEMP will be adopted to mitigate effects.	Moderate Adverse (temporary)
Ecology	Bridge construction	Bridge construction have the potential to damage habitats along the Grand Union Canal and in Minet Country Park	Ecologically sensitive landscaping to maintain a wildlife corridor after construction and implementing measures outlined in the Framework CEMP.	Minor Adverse (permanent)
	Pollutants	Indirect, long-term impact of atmospheric pollutants during the construction and operation phases.	As detailed in the Air Quality section.	Minor Adverse (temporary)
	Extractions and/or discharges	Direct, potentially long-term impacts resulting from extractions or discharges during construction.	Adherence to measures detailed in the Framework CEMP and employment of Best Practice.	Negligible
Archaeology	Effects on potential Prehistoric and Post Medieval remains.	There are significant levels of contamination present across the Site which will require remediation prior to the construction of the Development. A number of basements are also proposed as part of the Proposed Development. These may impact on the archaeological remains.	Archaeological evaluation will primarily be intended to target Prehistoric and Post-Medieval archaeological remains using geoarchaeological Boreholes and trial trench evaluation. Following evaluation, excavation may be required prior to commencement of construction and remediation for the proposed development.	Negligible to Minor Adverse

Table 20.2 Mitigation and Residual Effects during Occupation of the Proposed Development

Topic	Issue	Predicted Effect	Mitigation and Enhancement	Residual Effect
Socio-economic effects on local population	Employment	Creation of just under 1,320 jobs, which would stimulate another 130 jobs off-site (inner impact zone - the local area surrounding the Site) and another 660 jobs off-site (wider impact zone - LB Ealing, LB Hillingdon and LB Hounslow).	Not Required	Substantial Beneficial (permanent)
	Healthcare and Nursery Provision	The Development would generate demand for approximately 4 new GPs and generate demand for Nursery places.	On-site provision of Health Centre to accommodate more than 8 GPs and the new primary school will include nursery provision.	Moderate Beneficial (permanent)
	Education	The Development would generate demand fewer than 440 Primary School places.	The Scheme includes a two form of entry (2 FE) primary school which could accommodate up to 420 children. The primary school would need to form part of the second phase of development, ready to accept pupils in the third phase of development.	Negligible
	Recreation and Leisure	The development would generate demand for Recreation and Leisure Facilities.	Proposed development includes the provision of sports pitches and other leisure uses to supplement existing facilities in the area and these will be available to the future population and for people already living in Southall. The Scheme also proposes two new footbridges to the Minet Country Park, these will provide the new population of the proposed Scheme with access to a District Park.	Substantial Beneficial (permanent)
	Housing	The provision of a balanced mix of housing including the provision of intermediate and social housing.	Not required	Moderate Beneficial (long term)
Transport and Movement	Effects on Pedestrians and Cyclists	The Scheme will create additional routes through the Site.	None required	Moderate Beneficial (long term)
	Effects on Public Transport Users	Occupancy levels on some existing routes will increase whilst the additional capacity and new routes created will result in greater public transport provision.	None required	Negligible
	Traffic Conditions	Increased driver delay and queuing along the South Road corridor through Southall town centre is considered to arise. Therefore, there will be some increased inconvenience to car drivers.	The impact of the development traffic will be fully mitigated along the A312 corridor however further mitigation options for the potential effects elsewhere on the highways network will be explored with the Highways Authority, LB Ealing and Transport for London.	Minor adverse (long term)

Topic	Issue	Predicted Effect	Mitigation and Enhancement	Residual Effect
	Accidents	The proposals would result in increased cycle, pedestrian and vehicular activity in the vicinity of the Site increasing the likelihood of conflicts.	The proposals include dedicated pedestrian and cycle facilities throughout the Site as appropriate, along with improved crossing facilities at South Road	Negligible
Noise and Vibration	Effects of the environment on the development	Those dwellings which fall within approximately 150 m and 350 m of the southern site boundary falls within NEC B or C during the daytime and night-time, respectively.	An acoustic barrier will be included along the western part of the southern boundary to reduce the noise effects from the adjacent railway. Where required, internal noise levels may also be reduced by selection of appropriate glazing and/or ventilation systems and design of the internal room layout such that noise sensitive uses are located in façades facing away from noise sources.	Negligible
Air Quality	Pollutant Concentrations	Scenario 1 with the standalone Energy Centre predicted slightly elevated pollutant concentrations associated with increased vehicle emissions. However these do not breach the AQS objectives.	Mitigation measures would be implemented such as traffic management; managing the use of parking spaces; appropriate ventilation provision and design; tree planting, and monitoring of air quality in line with Borough Air Quality Action Plan.	Minor adverse.
		Scenario 2 with the Blue-NG Energy Centre does lead to a breach of the AQS objectives at some isolated locations associated with the emissions from the energy centre as well as vehicle emissions.	The facility will employ 'Best in Class' technology. Regular maintenance to optimise the performance of the engines will be carried out in order to minimise emissions. Traffic management mitigation will also be implemented as detailed	Minor adverse.
Townscape and Visual Assessment	Effect on Character Area 1- Minet Country Park and Yeading Brook	Existing land form and tree cover in area controls views within and across area.	New elevated views across Minet Country Park and Yeading Brook corridor created by new accesses (Phases 1 and 2).	Moderate beneficial permanent.
	Effect on Townscape Character Area 2 – Large Scale Urban Area	Creation of pedestrian and cycle access/linkage between commercial and business estates off Springfield Road would benefit customers/workers of this Character Area and also occupiers/users of the Proposed Development.	None Required	Minor beneficial permanent
		Views not generally gained from area due to urban context.	Some localised enhancement of views at Phase 2 in relation to Pedestrian Bridges.	Negligible
	Effect on Townscape Character Area 3 – Small Scale Urban	Proposals establish a high quality coherent townscape on unsightly land to the east of the Water Tower. New links are created between Beaconsfield Road/land to the north and the Site	Not Required	Moderate Beneficial (permanent)

Topic	Issue	Predicted Effect	Mitigation and Enhancement	Residual Effect
	Area	and the Grand Union Canal/ Minet Country Park.		
	Effect on Townscape Character Area 4 – West Southall Site and Character Area 6 – Derelict Cricket Pitch	Proposals establish a high quality coherent townscape on currently underused brownfield land. Proposed development establishes new public realm and open spaces, creating connections to the wider area including Minet Country Park.	Tree loss would be offset in the long-term by co-ordinated and extensive programme of tree planting across the Site.	Substantial Beneficial (permanent)
		Substantial enhancement of views into the area, and creation of new views within and from area. Creation of new landmarks and high quality townscape setting.	None Required.	Moderate Beneficial (permanent)
	Effect on Townscape Character Area 5 – National Grid Gas Compound	No new development proposed in this area, but the retained gas works have a negative effect on the character and quality of adjacent area.	Maintenance of pedestrian and cycle access to The Straight and Spencer Street underpass enables wider linkages to the north via West Southall Site.	Negligible
Water Resources	Sediment Load	Increased sediment load from erosion, vehicles, road wear.	Landscape and drainage design to reduce run-off. Surface water from roads and parking areas to be passed through oil/grit separator	Minor Adverse (permanent)
	Surface and Ground Water Quality	Pollution of surface water and groundwater by spillages and leaking tanks etc and remobilisation of existing soil contamination.	Careful design and maintenance of fuel and chemical tanks, refuelling points and refuse storage areas Pipelines to be protected from corrosion. Drainage design to include pollution control measures and to prevent discharge to surface and groundwater.	Minor Adverse (permanent)
	Flood Risk	Loss of flood plain retention capacity.	Construction of compensatory retention features	Minor Adverse (permanent)
Ecology	Habitat Creation	Creation of ecologically friendly open spaces. Provision of a vegetated buffer strip along the canal banks, bat roosting crevices and mammal ledges within the design of the bridges and wetland habitat (flood storage pond). Linkages throughout the development created by tree-lined streets, gardens	Measures to be fully worked-up during detailed landscape design (subject to reserved matters applications).	Moderate beneficial permanent.

Topic	Issue	Predicted Effect	Mitigation and Enhancement	Residual Effect
		and open spaces.		
	Species Disturbance and Pollution	Effects of increased traffic and associated noise and vibration on the local road network and indirect effects of increased recreational activity on the Minet Country Park. Light pollution is likely to affect bats commuting and foraging along the Grand Union Canal and Yeading Brook and loss of habitats in the water courses adjacent to the site due to shading by bridges..	Design lighting sympathetically to limit impact on bats and reduction in shading where possible through careful bridge design.	Minor Adverse (permanent)
	Direct Species Mortality	Indirect, long-term impact from increased traffic on the road network.	Mammal tunnels in bridges and wildlife corridors along the canal will help prevent any incidents (although expected to be rare).	Negligible.
Microclimate	Solar Shading Site receptors	Effects on informal recreation spaces within development	Scheme design will consider restriction of storey heights, building envelope and will implement a sensitive layout.	Negligible
		Effects on the curtilage of Existing Water Tower and the Straight. The development along the canalside and areas around the bridges.	Scheme design will consider restriction of storey heights, building envelope and will implement a sensitive layout. Increased lighting will be installed along the canal and design will take into account shading effects of bridge on ecology (further discussed above in ecology section).	Minor adverse (permanent)
		Private and communal courtyards/gardens within development	Scheme design will consider restriction of storey heights, building envelope and will implement a sensitive layout.	Moderate Adverse (permanent)
	Wind	Standing/entrance conditions at entrances and leisure walking conditions at entrances.	Scheme design will consider position and layout of entrances at detailed design stage.	Negligible
		Standing/entrance conditions on thoroughfares.	Not Required.	Minor beneficial
Operational Waste	Creation	Creation of waste	Collection of waste to be managed within LB Ealing targets.	Negligible
	Storage	Effects associated with the storage of wastes	The on-site Estate Management practises will reduce the risk of pollution occurring. The designated areas for waste will be readily accessible to reduce littering/uncontrolled waste storage. Containers with covers will be provided for	Negligible

Topic	Issue	Predicted Effect	Mitigation and Enhancement	Residual Effect
			putrescible wastes.	
	Transportation	Transportation and treatment of waste off-site	New technologies may encourage more efficient vehicles, however again this is influenced by external sources and legislation.	Minor adverse long term

GLOSSARY OF TERMS AND ABBREVIATIONS

ADMS	Atmospheric Dispersion Modelling System.
AL	Advisory Leaflet.
Ambient noise level	The term "ambient noise" is often referred to. Ambient noise is defined in BS 4142 as the 'Totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far'. It is commonly measured in terms of LAeq.
AQAP	Air Quality Action Plan.
AQMA	Air Quality Management Area.
AQS	The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007).
Aquifier	A permeable formation able to support a significant source of groundwater.
Archaeological Site	A place which people, in all prehistoric and historic ages, used or affected for habitation, social, religious, economic, industrial and agricultural purposes. The archaeological site may have had a varying level of intensity of use for varying lengths of time. The value of the site to the archaeological profession can change from time to time depending on its type, and complexity and/or the current understanding, or 'model', of the past.
Archaeology	The study of a man's past from known surviving materials, environmental evidence, and historical documents. Archaeology seeks to examine the ground by scientific excavation, to obtain and study new artefacts and new archaeological sites.
Assemblage	A group of species found within a site or location.
Baseline Surveys	Ecological information and data gathered through site, habitat and species specific surveys as well as the collation of published or recorded information.
BCT	Bat Conservation Trust.
BGL	Below Ground Level.
BGS	British Geological Society.
BH	Borehole.
BPG	Best Practice Guidance.
BPM	Best Practical Means.
BS	British Standard.
CAFÉ	Clean Air For Europe.
CDM	Construction (Design and Management) Regulations 2007.
CEMP	Construction Environmental Management Plan.

CERC	Cambridge Environmental Research Consultants Ltd.
CHP	Combined Heat and Power - the simultaneous production of electricity and useful heat often by gas driven generator. The heat can subsequently be used for domestic heating and hot water production or the production of chilled water by absorption cooling.
CIBSE	Chartered Institute of Building Services Engineers.
CLEA	Contaminated Land Exposure Assessment.
CO_2	Carbon Dioxide.
CoCP	Code of Construction Practice.
Code for Sustainable Homes	The Code is the governments mandatory rating which measures the sustainability of a new home against categories of sustainable design. The Code uses a 1 to 6 star rating system to communicate the overall sustainability performance of a new home.
Compensation	A prescribe measure, over and above mitigation, which provides an enhancement or ecological benefit.
Connectivity	A measure of the functional capability of habitats to facilitate the movement or dispersal of species throughout a site.
Conservation Area	An area designated under Planning (Listed Buildings and Conservation Areas) Act 1990 as being of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance.
Contamination	Contamination is the addition, or the result of addition, or presence of a material or materials to, or in, another substance to such a degree as a render it unfit for its intended purpose.
Controlled Water	All territorial waters, coastal waters, inland freshwaters and groundwater.
CRTN	Calculation of Road Traffic Noise.
cSAC	candidate Special Areas of Conservation.
DAS	Design and Access Statement.
dB	Decibel.
Defra	Department for Environment, Food and Rural Affairs.
DBA/S	Desk Based Study -Site research undertaken from existing documents, air photographs, local knowledge and initial site inspection.
DETR	Department for the Environment, Transport and the Regions.
DfT	Department for Transport.
DMRB	Design Manual for Roads and Bridges.
DoE	Department of Environment.
DOT	Department of Transport.
EA	The Environment Agency.
EC	European Commission.

Ecological Isolation	An area of land or habitat which through geographical isolation or the presence of physical barriers constrains the dispersal or colonisation, or sustainability of species populations and habitats.
Ecology	The study of living organisms in relation to their surroundings.
EIA	Environmental Impact Assessment.
Emergence Survey	A survey of bats flying out of their roost undertaken at dusk and early evening often with the aid of an ultra-sonic bat detector.
Enhancement	An additional benefit to biodiversity, unrelated to any negative effect.
Environmental Effect	The total effect of any operation on the surrounding environment.
Environmental Impact Assessment (EIA)	The environment are fully understood and taken into account before the development is allowed to go ahead. It provides a focus for public scrutiny of the project and enables the importance of the predicted effects, and the scope for modifying or mitigating them, to be properly evaluated by the decision-making authority.
Environmental Statement (ES)	The outcome of the Environmental Assessment presented in a formal document or documents in accordance with EC Directive 85/337. Includes such information that is reasonably required to assess the environmental effects of a development.
EPA	Environmental Protection Act.
ES	Environmental Statement.
EU	European Union.
Excavation	An archaeological excavation is the process by which soil is removed to reveal and study structural remains of habitation, commercial, industrial, agricultural and religious activity, and scientifically recover objects/ environmental evidence associated with these types of land use.
Fill/Made Ground	An engineering term to describe soils formed and deposited by the activities of humans. "Fill" can be of any age and any composition and may be contaminated if associated with industrial processes.
FRA	Flood Risk Assessment.
FTE	Full Time Equivalent - this is the recognised economic standard for a job which involves a minimum of 35-40 hours work per week.
Full time Equivalent (FTE) job years	Some FTE jobs may be FTE jobs but of a temporary nature (for (example construction). These FTE jobs can be expressed as job years.
GLA	Greater London Authority.
GOL	Government Office for London.
GPZ	Groundwater Source Protection Zone.
Groundwater	Water associated with soil or rocks below the ground surface but is usually taken to mean water in the saturated zone.
Habitat	A place in which a particular species lives.
HAP	Habitat Action Plan.

Hazard	The potential for something to cause harm.
HDV	Heavy Duty Vehicle.
HGV	Heavy Goods Vehicle.
Home Zones	Residential areas that are designed to allow traffic to penetrate but which encourage pedestrian and cycle movement.
Homezone	A Home Zone is a residential street, or group of residential streets, designed for community use - that is, for pedestrians and cyclists rather than motorists.
IEEM	Institute for Ecological and Environmental Management.
IEMA	Institute of Environmental Management and Assessment.
ILE	Institution of Lighting Engineers.
Impact	The way in which an ecological receptor is affected, both negatively and positively by a project.
Impact Significance	Opinions from a relevant planning authority at an initial stage as to what are the nature and potential scale of the environmental impacts arising from the proposed development, and assessing what further studies are required to establish their significance.
Improved grassland	Grasslands which have been heavily modified by management, heavy grazing, or the application of herbicides, fertilizers or manure, which can lead to the loss of many species.
Integrity	The coherence of the site's ecological structure across its whole area which it enables it to sustain a population of flora or fauna.
JCA	Joint Character Areas.
JNCC	Joint Nature Conservation Committee.
LA10 noise level	This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.
LA90 noise level	This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.
LAEI	London Atmospheric Emissions Inventory.
L_{Aeq}	The Equivalent Continuous Sound Level (LAeq) is the level of a notional steady sound, which at a given position and over a defined period of time would have the same A-weighted acoustic energy as the fluctuating noise.

L_{Aeq} noise level	This is the 'equivalent continuous A-weighted sound pressure level, in decibels' and is defined in BS 7445 [A1] as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time". It is a unit commonly used to describe construction noise, noise from industrial premises and is also the most suitable unit for the description of other forms of environmental noise.
L_{Amax} noise level	This is the maximum noise level recorded over the measurement period.
LAQN	London Air Quality Network.
LB Ealing	London Borough of Ealing.
LB Hillingdon	London Borough of Hillingdon.
LB Hounslow	London Borough of Hounslow.
LCC	London Cycle Campaign.
LDF	Local Development Framework.
LDV	Light Duty Vehicles.
LEA	Local Education Authority.
LEZ	Low Emission Zone.
Lifetime Homes Standards	A Lifetime Home is the incorporation of 16 design features that allow for accessible and adaptable housing in any setting.
Light pollution	Different forms of unwanted or wasted light as identified by the Institute of Lighting Engineers, including sky glow, glare and light trespass.
LIP	Local Implementation Plan.
Listed Building	A building included in a list produced by the Secretary of State for Culture, Media and Sport. It comprises buildings and other structures that are of special architectural or historic interest.
LNR	Local Nature Reserve.
LPA	Local Planning Authority.
LQA	Land Quality Assessment.
LSOA	Local Super Output Area.
LVMF	London View Management Framework.
Made Ground	A man-made formation comprising natural and / or man-made constituents.
Mitigation	Measures which are prescribed or taken to avoid or reduce the negative impacts of any action..
Mode Spilt	Involves separating the predicted trips from each origin zone to each destination zone into distinct travel modes (e.g., walking, bicycle, driving, train, bus).
MP	Movement Position.
NAQIA	National Air Quality Information Archive.
NEC	Noise Exposure Category.

NHBC	National House-Building Council.
NO_2	Nitrogen Dioxide.
Non-Aquifier	A low permeability formation, generally regarded as containing insignificant quantities of groundwater.
Non-Technical Summary	A summary of the Environmental Statement in non-technical language.
NOx	Oxides of nitrogen.
NO_x	Nitrogen Oxides.
NSCA	National Society for Clean Air .
NSR	Noise Sensitive Receptor.
NTS	Non Technical Summary.
OFWAT	The Water Services Regulation Authority.
ONS	Office for National Statistics.
PADHI	Planning Advice for Developments near Hazardous Installations (PADHI) Report.
PCT	Primary Care Trust.
Perched	Groundwater lying above a low permeability strata that does not constitute an aquifer.
Principle Assessment Year	The year in which the Proposed Development will open – i.e. the first year of operation..
Phase 1 Habitat Survey	An environmental audit of a site or area of land's habitats, their location, quality and extent. Often extended to include an assessment of the site's potential to support important species or habitats.
$PM_{2.5}$	Particulates (up to 2.5ug in diameter).
PM_{10}	Particulates (up to 10ug in diameter).
PPC	Pollution Prevention Control.
PPE	Personal Protective Equipment.
PPG	Planning Policy Guidance set out the Government's policies on different aspects of planning. Local planning authorities must take their content into account in preparing their development plans and the guidance may also be material to decisions on individual planning applications and appeals.
PPH	People per Hectare.
PPS	Planning Policy Statement.
PTAL	Public Transport Accessibility.
Receptor	Any feature that is sensitive or has the potential to be affected by an impact.
Residual Effects	Those impacts of the development that cannot be mitigated following implementation of mitigation proposals.

Risk	The likelihood of harm occurring.
RSL	Registered Social Landlord.
Ruderal Vegetation	Usually tall and woody vegetation, typically found growing on disturbed or nutrient rich soils.
SA	Sustainability Appraisal.
SAP	Species Action Plan.
Scale	The level or context for an evaluation.
Schedule 2 Development	Development project types under EIA regulations where EIA is not mandatory in all cases but may be required, depending on the size, nature and scale of the development and the potential for significant environmental effects to arise.
Scoping	An initial stage in determining the nature and potential scale of environmental impacts arising as a result of a development, and an assessment of what further studies are required to establish their significance.
Scoping Opinion	A written statement of the opinion of the relevant planning authority as to the information to be provided in the Environmental Statement.
Scoping Report	The report produced as a result of the Scoping Process outlined above and submitted to the LPA.
Section 106	S.106 or Planning Agreements are used to ensure that developers provide/compensate for any necessary facilities or infrastructural improvements.
Semi-natural habitats	Assemblages of vegetation which are developing naturally but are affected or have been affected by human derived influences
SHAAP	Southern Hillingdon Area Action Plan.
SI	Site Investigation.
SINC	Sites of Importance for Nature Conservation.
SMR	Sites and Monuments Record.
SOP	School Organisation Plan.
SPD	Supplementary Planning Document.
SPG	Supplementary Planning Guidance.
SRN	Strategic Road Network.
SSSI	Site of Special Scientific Interest.
Successional development	The directional replacement of one community or habitat by another through natural or artificial influences.
Supplementary Planning Guidance (SPG)	Supplementary Planning Guidance-this is separately produced to give detailed guidance on how a policy or proposal in the Unitary Development Plan can be satisfactorily met.
SVG	Soil Value Guidelines.
TA	Transport Assessment.

TAG	Transport Analysis Guidance.
TCA	Townscape Character Area.
TfL	Transport for London.
TP	Trail Pit.
TPP	Transport Planning Practice.
UDP	Unitary Development Plan.
ULSD	Ultra Low Sulphur Diesel.
VDV	Vibration Dose Value.
WAC	Waste Acceptance Criteria.
Watching Brief	If a watching brief is a planning requirement, the Specialist Contractor is provided with time and facilities to watch and intervene in the engineering works and recover the resource.
WHO	World Health Organisation.
Zone of influence	The area which covers both the Application Site and the environment beyond the Site which may be affected, both directly and indirectly, by changes caused by the project.
ZVI	Zone of Visual Influence.