wider crossings over South Road and hence marginally longer crossing times. Furthermore, signal timings at other existing junctions along South Road will be amended to provide improved progression for vehicles.

8.6.16 Although flows along the South Road corridor through Southall town centre are anticipated to increase by approximately 33% over the 2025 Base Year scenario (should the demand flows be realised), they will not materially affect cycle and pedestrian movement.

8.6.17 The greatest percentage increases in traffic flows are anticipated along Beaconsfield Road and Pump Lane at the A312 where increases in the region of 50% and 75% respectively are predicted. However, it should be noted that the magnitude of the increase is primarily as a result of the low base flows and hence the actual increase is not anticipated to materially affect cycle and pedestrian movement.

8.6.18 The IEMA guidelines also suggest that a further impact is fear and intimidation which is largely dependent on the volume of traffic and, in particular, the HGV composition. The redevelopment of the Site will involve a significant amount of construction activity for the duration of the programme, whilst the completed Scheme will see increases in HGV activity associated with the servicing of the various plots.

8.6.19 Construction traffic will access the Site via the A312 and Pump Lane, thereby avoiding Southall town centre and adjacent residential areas and, as such, will not affect pedestrian and cycle movements. Likewise, it is envisaged that the majority of deliveries to the completed development will be via the A312 and Pump Lane thereby avoiding Southall town centre.

Effect on Public Transport Users

8.6.20 As with pedestrians and cyclists, existing public transport users will be affected by changes in the facilities, services and patronage as a result of the redevelopment of the Site.

8.6.21 Public transport is anticipated to be key to the success of the Scheme. Existing levels of congestion on the wider highway network is such that travel by car, particularly as driver alone during peak periods, is not considered to be typical. The redevelopment of the Site will result in significant demand for travel by bus and rail, particularly to access retail and leisure facilities on the Site and by residents to employment opportunities external to the Site.

8.6.22 It is envisaged that there could be in the region of up to 15,000 two-way additional trips by public transport per day (reference Table 8.10) when the Site is fully developed. The demand will be split between rail and bus services, and whilst it is anticipated that the majority of the existing services could accommodate the demand, there will be a need to increase capacity along some routes. Full details are included in the TA (Appendix 8.1).

8.6.23 The construction of the new roads through the Site (Figure 3.10) creates opportunities for additional bus routes to be introduced, particularly between Hayes to the west and Southall. In addition, it is envisaged that existing routes could be extended or diverted to encompass the Site.

8.6.24 The proposals are to introduce a network of bus routes through the Site, through the extension and diversion of existing routes (as appropriate) along with the creation of new routes. When fully developed, it is envisaged that there will be in the region of up to 30 buses an hour in each direction through the Site.

8.6.25 Where services are extended, it will be necessary to increase the number of buses along the corridor to maintain existing frequencies. This in itself will create additional capacity along the corridor thereby benefiting existing passengers.

8.6.26 South Road is a major bus corridor along which flows are anticipated to increase by up to approximately 33% should the development demand flows be realised. The additional flows will result in increased delay to vehicles which in turn will increase delay for buses where there are no bus lanes. This can be considered as a **moderate adverse** effect without any appropriate mitigation to lessen such effects.

Accidents and Safety

8.6.27 The redevelopment of the Site will result in a general increase in trips by all modes in the vicinity. The proposals include a network of footpaths and cycleways along with increased capacity for vehicles where appropriate. Therefore, although there will be increased activity in the vicinity of the Site, there should not be any noticeable changes in accident patterns directly associated with the redevelopment of the Site.

8.7 Mitigation Measures

8.7.1 Mitigation measures will be put in place to off-set the potential transport-related environmental effect associated with the redevelopment of the Site. These will include measures specific to construction traffic and Development traffic as outlined below.

Construction Traffic – Main Site

8.7.2 As set out in Chapter 5: Construction and Phasing, a Construction Environmental Management Plan (CEMP) would be implemented prior to commencement of demolition and construction works. This would ensure that:

- Haulage routes minimise impacts to sensitive receptors;
- Deliveries would arrive on a 'just in time' basis and where possible avoiding peak hours;
- Provision would be made to ensure that vehicles can be unloaded on the Site wherever possible, rather than on the adjacent roads;
- The site labour force would be encouraged to use public transport;
- All transportation to and on the Site would be on rubber tyred vehicles;
- HGV wheels to be washed prior to vehicles leaving the Site
- If short-term road closures are required; consents would be obtained from LB Ealing and / or LB Hillingdon (as appropriate) prior to this occurring.
- Traffic management plans will be implemented to minimise the potential impact of the reduced highway capacity during the implementation of the off-site highway and access works.

8.7.3 Contractors will investigate the potential opportunity of using the Grand Union Canal for transferring bulk materials to and from the Site. The canal runs along the western boundary of the Site and represents an opportunity to potentially reduce construction traffic. However, the scope to use the canal to transport materials will depend on several factors including the type and source / destination of materials to avoid unnecessary double handling.

8.7.4 Furthermore, it would not be desirable to transport highly contaminated materials using the Canal due to the potential risk of a pollution incident.

Construction Traffic – Off-Site Highway Works

8.7.5 Construction Environmental Management Plans (CEMP) would be implemented for each of the junction improvement schemes by the relevant contractor prior to commencement. This would ensure that:

- Haulage routes minimise impacts to sensitive receptors;
- Deliveries would arrive on a 'just in time' basis and where possible avoiding peak hours;
- Appropriate measures such as wheel washing and dust covers will be applied;

- Lane closures will not be permitted during commuter periods unless absolutely necessary.

Development Traffic

8.7.6 Mitigation measures are promoted through the application process to include increasing vehicular and public transport capacity where appropriate, together with the implementation of the Framework Travel Plan (submitted as a separate document as part of the Planning Application) and individual land use specific travel plans, Car Clubs and reduced levels of parking to encourage sustainable travel.

Highway Capacity

8.7.7 In addition to the Site accesses, the proposals include significant off-site highway capacity improvements at Junction 3 of the M4, Bulls Bridge Roundabout and along South Road at Southall Station. The proposals (see Section 4 of the TA) include:

- General widening on the northern, southern and western approaches at Junction 3 of the M4 (Figure 8.2) along with an additional circulatory carriageway, plus the introduction of an interactive signal control system.

- The creation of a Hamburger style junction at Bulls Bridge Roundabout (Figure 8.3), along with some widening on the northern approach.

- The widening of South Road between Park Avenue and Merrick Road (Figure 8.4) to create two lanes in each direction. The existing roundabout junction at Merrick Road will be signalised to assist in assigning priority.

8.7.8 Furthermore, an Urban Traffic Control System will be implemented along South Road linking the various signals. It is envisaged that the majority of the signal timings within the town centre will be altered to respond to changes in traffic patterns associated with the redevelopment of the Site. These could include giving priority to The Green at Merrick Road to ensure that buses are not unnecessarily delayed. Alternatively, other measures such as bus gates or short sections of bus lanes could be introduced to afford priority to buses. Further details are set out in the TA (Appendix 8.1)

8.7.9 The assessments included within the TA illustrate that the highway improvement measures will mitigate the effect of the development traffic along the A312, whilst there will be increases in levels of congestion and queue lengths along the South Road and Uxbridge Road corridors should development flows materialise.

Public Transport

8.7.10 Key to the success of the Scheme is achieving an excellent bus network through the Site. The proposals envisage a network of bus services through extending or diverting existing services along with the creation of new routes.

8.7.11 During the initial phases of development, residents will be expected to rely on existing services operating along South Road and the A4020 The Broadway. Once the Eastern Access on to South Road is opened, there will be opportunities to bring services into the Site.

8.7.12 As the Site is developed out, new services will be introduced and frequencies increased to respond to demand, with up to 30 buses an hour anticipated during peak periods when the Site is fully developed. Where services are extended, it will be necessary to increase the number of buses to maintain existing levels of service along existing routes. This practice will result in a net increase in capacity along the existing transport corridors.

Travel Plans

8.7.13 In line with Central Government policy and in accordance with PPG13, Travel Plans would be implemented for all elements of the scheme. The primary aim of the Travel Plans would be to encourage travel by sustainable modes and to reduce the reliance on travel by car (and in particular single occupancy vehicle trips).

8.7.14 The proposals include the introduction of a Framework Travel Plan setting out the broad principles to be adopted by individual tenants and developers of individual plots. Individual Travel Plans will set out design parameters such as requirements to provide cycle parking and changing facilities along with targets to be adopted as appropriate. Such Travel Plans will be implemented and promoted by the Estate Management team, including an identified Travel Plan Coordinator.

8.7.15 Developers of residential plots will be required to provide tenants of individual dwellings with a Welcome Pack on first occupation. The Welcome Pack will include information on opportunities for sustainable travel, to include bus and rail timetables, contact details for operators along with maps illustrating the local footpath and cycle networks.

8.7.16 Commercial developments (i.e. retail, leisure and office uses) will implement Travel Plans broadly in line with the Heads of Terms included in the TA. The Travel Plans will include information on opportunities along with measures and targets to encourage sustainable travel. Measures will include the provision of changing facilities and cycle parking in line with prevailing standards, along with setting up car share schemes, and other initiatives as appropriate.

8.7.17 A key element of the individual Travel Plans is setting targets for changing the way people travel. The formulation of the Travel Plans would require specific information on future commercial tenants including where staff members live and how the organisation operates. Bespoke Travel Plans would therefore be implemented by future tenants.

Car Clubs

8.7.18 The proposals include a significant quantum of residential and commercial development. Parking for the residential element, in particular, will be limited to an overall ratio of 0.7 spaces per unit and a total of 50 spaces will be set aside for the introduction of Car Clubs.

8.719 Car Clubs enable people without access to a car the opportunity to use a vehicle on an infrequent basis. The Car Club spaces will be allocated throughout the Site in appropriate locations close to plots with lower levels of parking provision. Residents without access to parking will be provided with free membership for the first year, and will only have to pay for the use of the car.

Through Design and Management

8.7.20 Car use and associated traffic levels both within the Site and on the surrounding highway network will be influenced through the detailed design and management of the Site.

8.7.21 The use of public transport and in particular buses will be encouraged through the provision of bus lanes and modern infrastructure at stops, to include up-to-date information on the bus services. In addition, bus stops will be located in key positions with direct routes to reduce journey times to the stops.

8.7.22 Walking and cycling will be encouraged through a network of footpaths and cycleways that will provide direct links between key destinations, both internally and externally. Crossing facilities will be provided at key appropriate locations throughout the Site, with pedestrians and cyclists having priority wherever possible.

8.7.23 Cycle parking will be provided in public areas in addition to on private land.

8.7.24 Parking will be managed by the Estate Management office to discourage long stay commuter parking.

8.8 Residual Effects

Construction Traffic

8.8.1 The management strategies formed as part of the CEMP would ensure that any potential environmental effects associated with construction vehicle movements to and from the Site are minimised.

8.8.2 There would be a **short term minor adverse** effect along the designated routes, although this will lessen towards the end of the construction programme.

On Pedestrians and Cyclists

8.8.3 The Scheme will create additional routes through the Site thereby benefiting all wishing to cross the Site. In addition, there will be increased pedestrian and cycle activity along streets bordering the Site.

8.8.4 Overall, there will be a **long term moderate beneficial effect** on pedestrian movement associated with the redevelopment of the Site.

On Public Transport Users

8.9.5 The Scheme will attract a significant quantum of public transport trips and the proposals include the creation of a network of routes through the Site. The assessments in the TA suggest that occupancy levels on some existing routes will increase whilst the additional capacity and new routes created will result in greater public transport provision and opportunities in the local and wider area.

8.9.6 Overall, the redevelopment of the Site will result have a **negligible effect** on public transport users.

Traffic Conditions

8.9.7 The proposals include significant off-site highway improvements and access works during which the capacity of the highway network in the vicinity will be reduced. The works will be phased and traffic management plans introduced so as to minimise the effect of the reduced highway capacity. Nevertheless, there will be a **short term substantial adverse effect** associated with the highway works.

8.9.8 Once the access and highway mitigation measures are complete, there will be additional capacity on the highway network. The results of the assessments in the TA suggest that the impact of the development traffic will be fully mitigated along the A312 corridor but with increased delay and queuing along the South Road corridor through Southall town centre. As such, following completion of the Scheme, overall there would be some increased inconvenience to car drivers resulting in a **long term minor adverse effect**. Further mitigation options for this potential effect will be explored with the Highways Authority, LB Ealing and Transport for London.

Accidents

8.9.9 The proposals would result in increased cycle, pedestrian and vehicular activity in the vicinity of the Site which increases the likelihood of conflicts. However, the proposals include dedicated pedestrian and cycle facilities throughout the Site as appropriate, along with improved crossing facilities at South Road. Overall there will be a **negligible effect** on accidents.

Conclusion

8.9.10 The overall conclusion is that the redevelopment of the Site will have a **moderate to substantial beneficial** effect for non-car users and a **moderate adverse** effect on car drivers in line with local, regional and national policy guidance.

References

8.1 HMSO (2001) Planning Policy Guidance Note 13 (PPG13) Transport

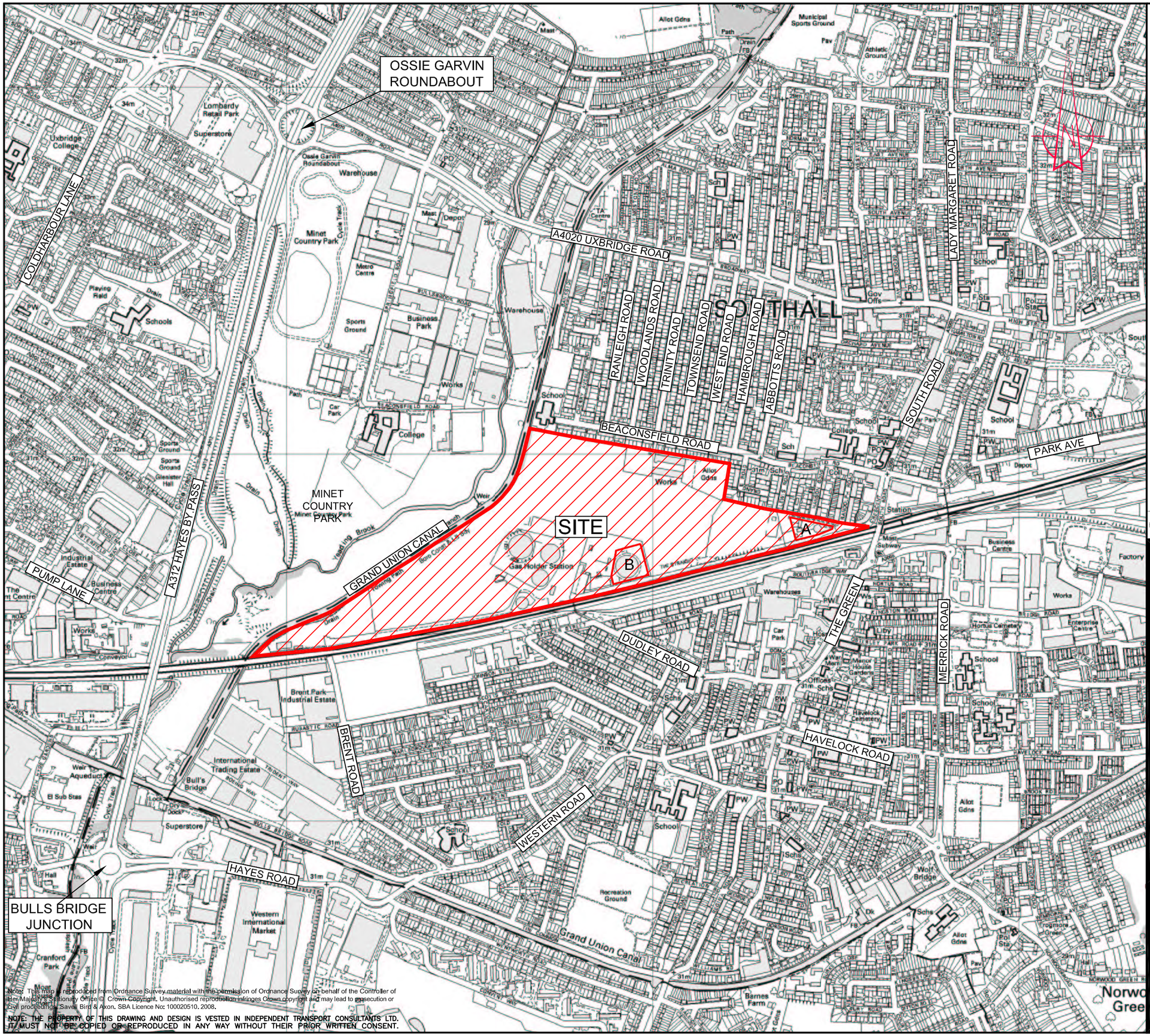
8.2 Greater London Authority (2008) The London Plan: Spatial Development Strategy for Greater London Consolidated with Alterations since 2004

8.3 London Borough of Ealing (2004) A New Plan for the Environment. Unitary Development Plan (UDP) Saved Policies September 2007

8.4 London Borough of Hillingdon (1998) Unitary Development Plan (UDP) Saved Policies September 2007

8.5 London Borough of Hillingdon (2006) Design and Accessibility Statement: Accessible Hillingdon.

8.6 London Borough of Hillingdon (2006) Design and Accessibility Statement: Transport Interchanges.



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CLIENT:
National Grid

PROJECT:
West Southall

DRAWING TITLE:
Local Highway Network

SCALES:
1:10,000 at A3

DRAWN:	CHECKED:	DATE:
M.B.W.	A.M.	04.08.08

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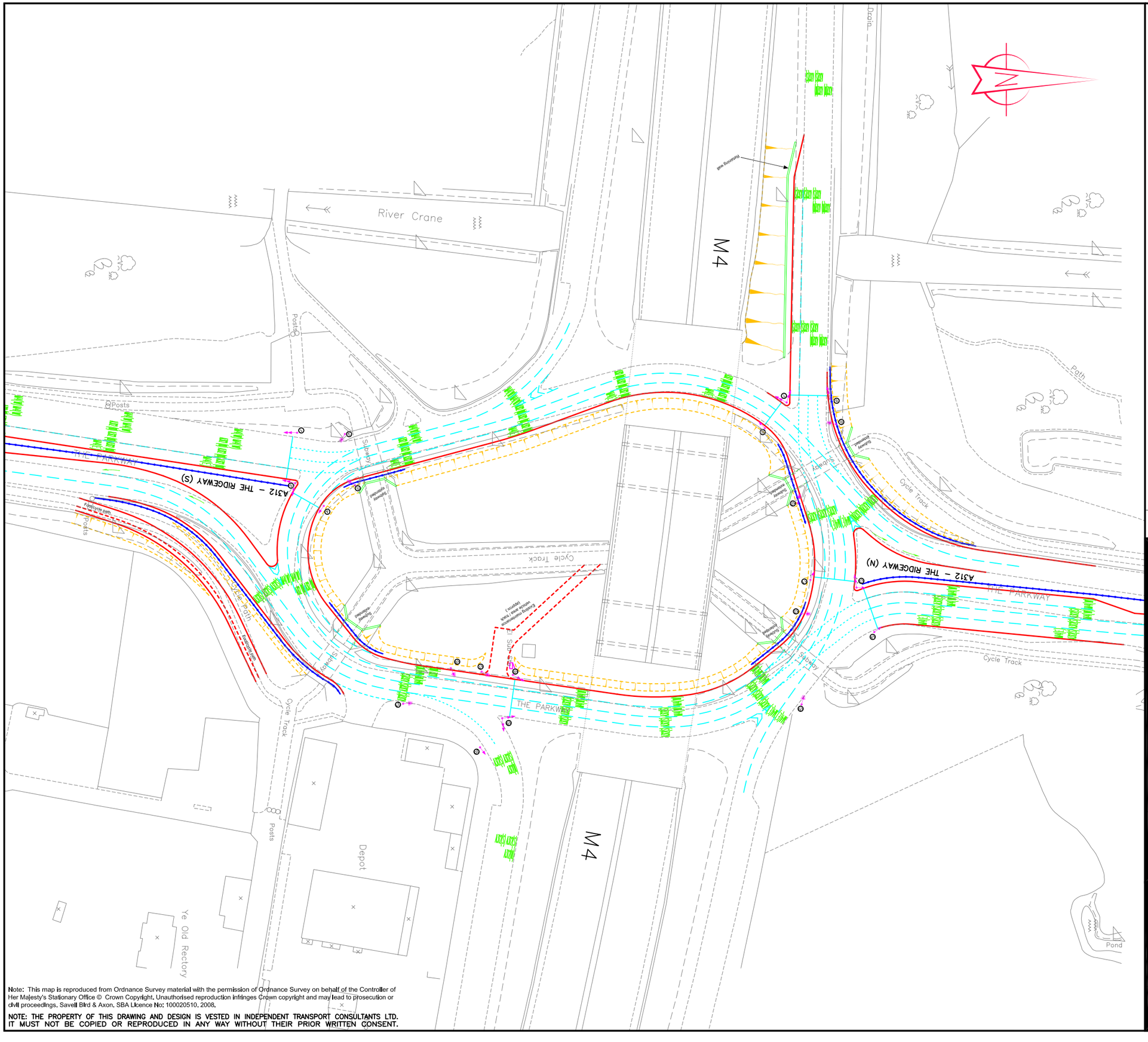

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PROJECT:

West Southall

DRAWING TITLE:

Proposed Alterations to M4 Junction 3

SCALES:

1:1250 at A3

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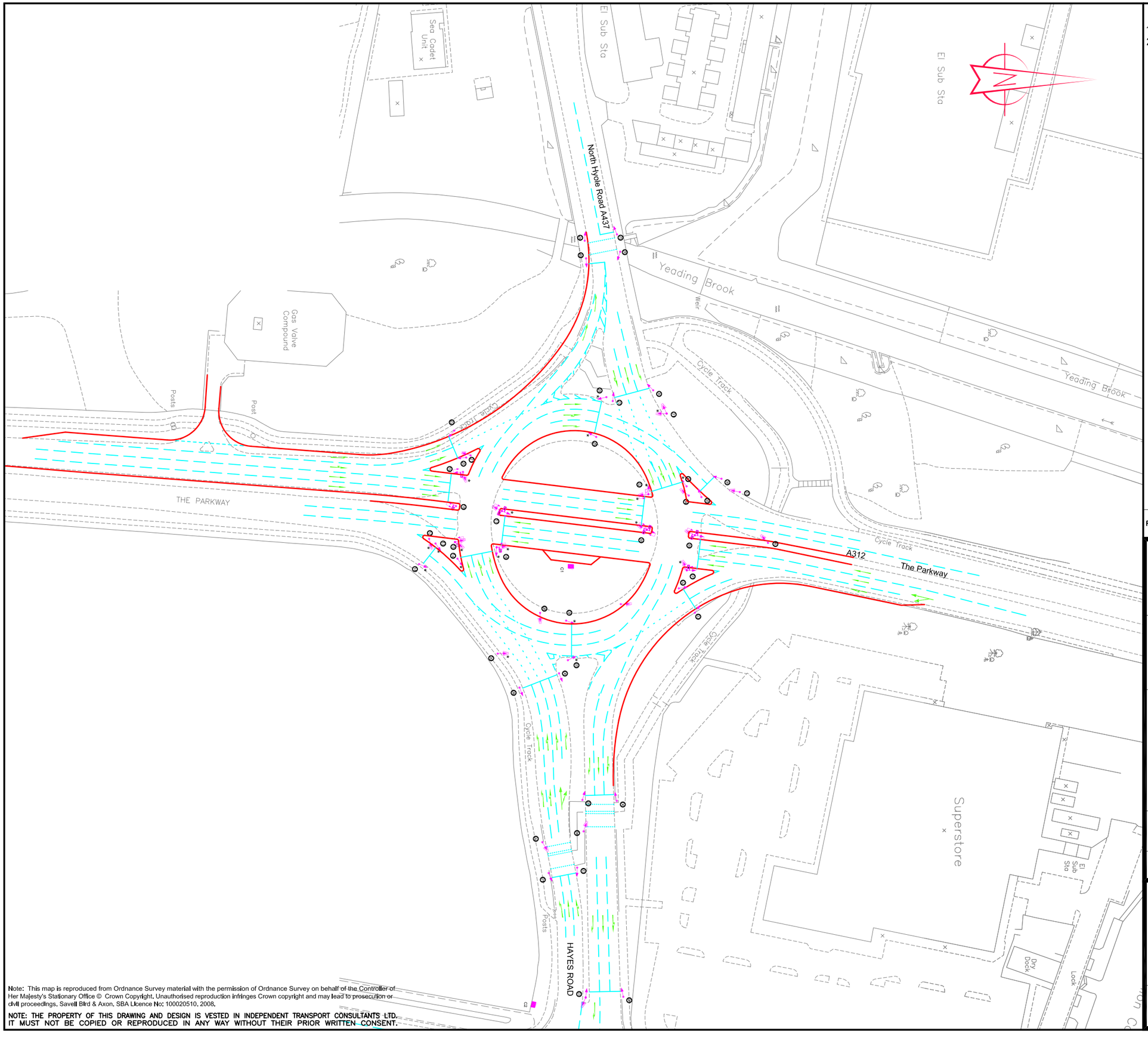

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National Grid

PROJECT:

West Southall

DRAWING TITLE:

Proposed Alterations to the A312/Hayes Road Junction

SCALES: 1:1250 at A3

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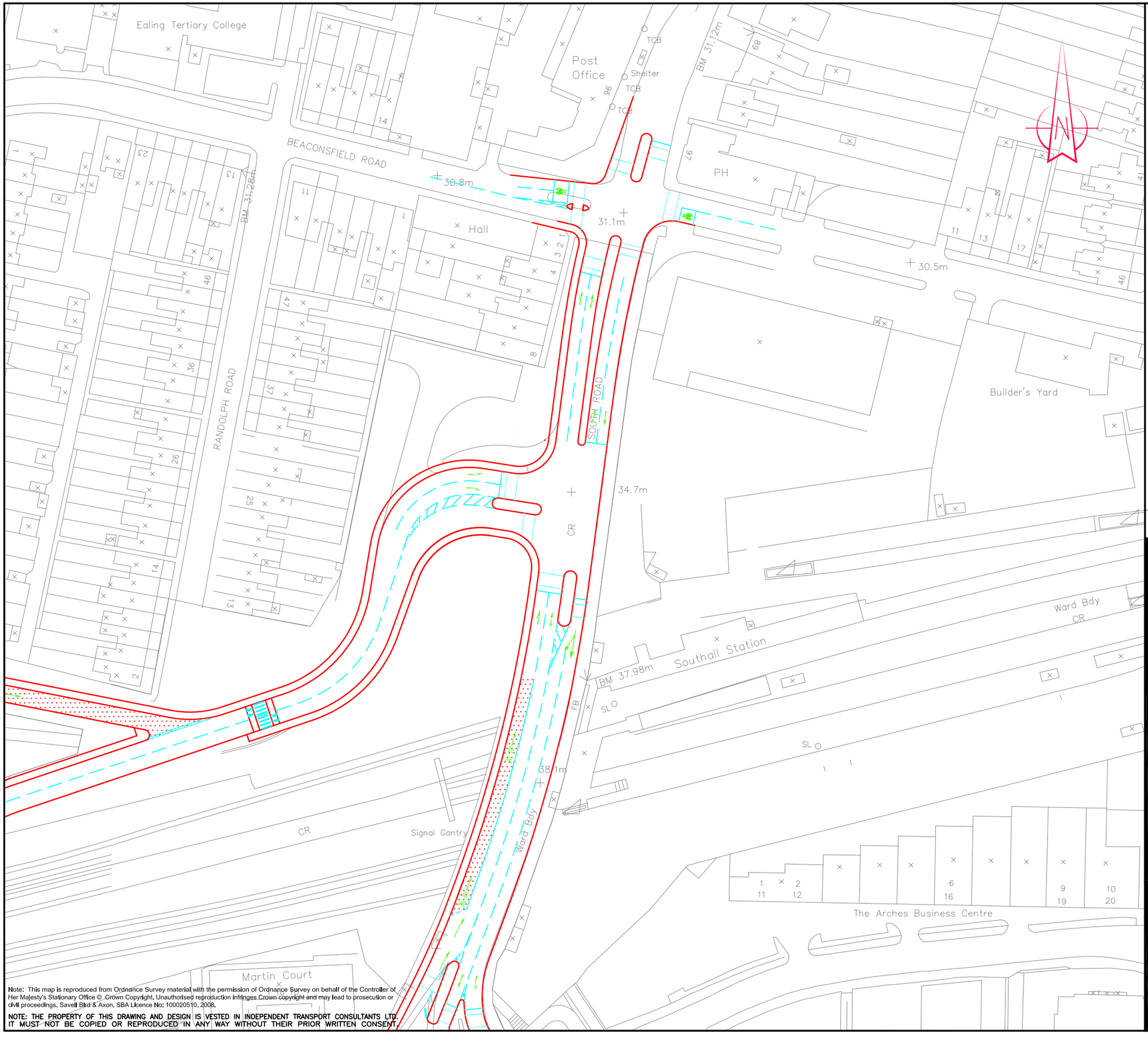

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CLIENT:

National Grid

PROJECT:

West Southall

DRAWING TITLE:

Eastern Access

SCALES:

1:1000 at A3

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9 NOISE AND VIBRATION

9.1 Introduction

9.1.1 This chapter provides an assessment of the potential noise and vibration effects associated with the proposed Scheme. Potentially significant noise and vibration effects include:

- Construction: Noise and vibration effects from plant and activities associated with the construction phases of the proposed development affecting noise sensitive receptors (NSRs) adjacent to the Site and those within the Site from the preceding construction phases.

- Operation: Noise and vibration effects associated with the operation of the proposed development, including: noise from off-site sources affecting on-site NSRs; noise from on-site sources, including plant and road traffic, affecting on-site and surrounding off-site NSRs; and noise changes associated with any changes in traffic flows on the local road network.

9.1.2 The policy context and legislation, methods of assessment and criteria used to assess the potential effects of the proposed Scheme are described in this chapter. The baseline conditions of the Site and its environs are set out both in terms of measured noise levels as well as qualitatively. The potential direct and indirect effects arising from the construction and operational/occupation phases are addressed, with appropriate mitigation measures recommended to prevent, reduce or offset the effects. The significance of any residual effects is also described.

9.2 Planning and Legislative Context

9.2.1 The primary planning guidance in England with regards to noise is contained within Planning Policy Guidance (PPG) 24 'Planning and Noise' [(9.1)]. Local planning guidance is contained within LB Ealing's Local Development Framework (LDF) [(9.2)] and LB Hillingdon's Unitary Development Plan (UDP) [(9.3)]. Descriptions of PPG 24, LB Ealing's LDF and LB Hillingdon's UDP are provided below. Descriptions of other national and international standards and guidance that have been used in the assessment are provided in Appendix 9.1.

Planning Policy Guidance 24 (PPG 24)

9.2.2 PPG 24 offers guidance to local authorities on the assessment of noise and its potential impact on noise sensitive dwellings. The document defines four Noise Exposure Categories (NEC), which range from A to D and indicate to what extent noise should be considered in the granting of planning permission for new residential developments. PPG 24 also defines noise levels for each category, for a variety of noise sources. Table 9.1 reproduces the summary in PPG 24 relating to the recommended NEC for new dwellings near to existing noise sources. Where a site falls exactly on the boundary between two categories, it is generally at the discretion of the local authority to determine the appropriate NEC. Nevertheless, a worst-case assessment should place the Site in the higher of the two categories.

Table 9.1 Summary of PPG 24 Noise Exposure Categories for New Dwellings

Noise Levels and Advice Corresponding to The Noise Exposure Categories for New Dwellings $L_{Aeq,T}$ dB				
Noise Source	**Noise Exposure Category (NEC)**			
	A	**B**	**C**	**D**
Road Noise				
07:00 - 23:00	<55	55 - 63	63 - 72	>72
23:00 - 07:00	<45	45 - 57	57 - 66	>66
Rail Noise				
07:00 - 23:00	<55	55 - 66	66 - 74	>74
23:00 - 07:00	<45	45 - 59	59 - 66	>66
Mixed Noise				
07:00 - 23:00	<55	55 - 63	63 - 72	>72
23:00 - 07:00	<45	45 - 57	57 - 66	>66
Advice	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.	Noise should be taken into account when determining planning applications and, where appropriate, conditions should be imposed to ensure a commensurate level of protection against noise.	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.	Planning permission should normally be refused.

9.2.3 The levels reported in the above table refer to free-field noise levels, measured on an open site, at least 3.5 m away from any reflecting façades, excluding the ground, at a height of 1.2 m to 1.5 m above the ground. PPG 24 also recommends that the daytime period is 07:00 to 23:00 hours and the night-time period is 23:00 to 07:00 hours.

9.2.4 A further stipulation of PPG 24 in relation to night-time noise levels is that, where individual noise events regularly exceed 82 dB L_{Amax} (S time weighting) several times in any hour, the Site should be treated as being in NEC C, regardless of the $L_{Aeq,8h}$ (except where the $L_{Aeq,8h}$ already puts the Site in NEC D).

9.2.5 Where internal levels are considered, PPG 24 recommends that further guidance on suitable internal noise levels can be found in British Standard (BS) 8233 "*Sound insulation and noise reduction for buildings – Code of Practice*" [9.4]. Where industrial noise is considered, PPG 24 recommends that further guidance can be found in BS 4142 "*Method for Rating industrial noise affecting mixed residential and industrial areas*" [9.5].

9.2.6 PPG 24 provides the following guidance on noise change:

"Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to a halving or doubling the loudness of a sound."

9.2.7 PPG 24 is currently under review and a revised document is due to be released shortly.

Ealing Local Development Framework (LDF)

9.2.8 The LDF is the LB Ealing's emerging framework for spatial planning and property development in Ealing. It includes saved policies from the statutory Unitary Development Plan (UDP) [9.6] (see chapter 5: Planning Policy Context) which was adopted in October 2004 and sets out the Council's intentions for land use and development from 2002 to 2017. Saved policy 4.11 of the UDP concerns noise and vibration and states:

"4.11 Noise and Vibration

1. *Development generating noise or vibration will not be permitted where it would cause noise or vibration above acceptable levels, particularly where it would harm existing or proposed noise sensitive development, unless this can be satisfactorily attenuated.*

2. *Noise - sensitive development will not be permitted where its users would suffer noise above acceptable levels, unless this can be acceptably attenuated.*

For new developments such as housing, care is to be taken to ensure that the noise levels within the Development area fall within a set category before development takes place. These categories are defined within Government Guidance (PPG24), and are described in more detail in the relevant Supplementary Planning Guidance.

(i) Category A requires no consideration.

(ii) Categories B and C require consideration for adequate protection.

(iii) Category D indicates that planning permission should not be given."

9.2.9 The relevant Supplementary Planning Guidance is SPG 10 Noise and Vibration [9.7]. The UDP also refers to policy 4A.14 of The London Plan [9.8] and the Major of London's Ambient Noise Strategy [9.9]. A description of these documents is provided in Appendix 9.1.

Hillingdon Unitary Development Plan (UDP)

9.2.10 The LB Hillingdon is preparing its Local Development Framework (LDF) [9.10] that will eventually replace the existing UDP, which was adopted in 1998.

9.2.11 The only noise effects that would occur as a result of the Scheme and affect NSRs within the LB Hillingdon would be those that arise due to changes in traffic flows on roads within the Borough and noise emissions from new roads. Policy OE4 of the UDP refers to noise from new or improved roads:

"OE4: In the case of new or improved roads or railways the local planning authority will wish to be satisfied that as far as practicable measures are taken to mitigate the effects of noise and vibration on nearby buildings so that internal sound levels conform to acceptable criteria."

9.2.12 The LB Hillingodn's Noise Supplementary Planning Document (SPD) [9.11] was adopted on 24 May 2006 and considers both noise sensitive development (such as housing) and noise-generating development. The SPD sets out detailed guidance for the control of noise as part of new development in Hillingdon. With reference to noise change that occurs as a result of increased road traffic flow, the SPD states that the LB Hillingdon consider that:

- "*a change of 3 dB(A) is the minimum perceptible change in a sound level under normal conditions (e.g. outdoors)";* and

- "*this does not mean 3 dB(A) is the minimum perceptible change, in general, in a noise index (e.g. $L_{A10,T}$, $L_{Aeq,T}$)".*

9.2.13 The SPD does not state what the LB Hillingdon considers to be the minimum perceptible change in noise index nor what it considers to be an appropriate threshold of significance for the assessment of changes in road traffic noise.

9.3 Methodology & Significance Criteria

9.3.1 The proposed assessment methodologies and significance criteria for the noise and vibration effects associated with the proposed Scheme are provided below. The EIA is required to consider the effects of a development upon the environment. However, consideration has also been given to the effects of the environment upon the residential elements of the Scheme and the suitability of the prevailing noise climate for mixed-use development.

Construction Noise and Vibration Effects

9.3.2 Construction of the Scheme is expected to occur over approximately 15 years. Noise and vibration levels from those activities considered most likely to give rise to significant effects have been predicted for a number of phases throughout the construction period at existing NSRs surrounding the Site, and future NSRs within the Site that will be built and occupied as the construction progresses. This has been informed by the indicative Phasing Plan shown as Figure 6.1 in Chapter 6: Construction and Phasing. Consideration has also been given to the guidance contained within BS 5228: Noise and vibration control on construction and open sites Parts 1, 2 and 4 [9.12, 9.13, 9.14].

9.3.3 There are no set standards for the definition of the significance of construction noise effects. BS 5228 does not promote specific limits for construction noise except for night-time. SPG 10 suggests the noise limits provided in Table 9.2 below which, in the absence of appropriate national guidance, have been adopted as the threshold of significance for construction noise.

Table 9.2 Threshold of Significance – Construction Noise

Noise Level at NSR from Construction Sources, $L_{Aeq,10\text{-}hours}$ (dB) [1]	Significance
<= 72	Not Significant
> 72	Significant

Note 1: Although not explicitly stated in SPG10, it is assumed that this refers to a freefield noise level.

9.3.4 For vibration, BS 5228: Part 4 suggests levels that are said to be conservative thresholds for minor or cosmetic (i.e. non-structural) damage for various types of buildings affected by vibration from piling. These have been adopted as the threshold of significance for piling vibration and are provided in Table 9.3.

Table 9.3 Threshold of Significance – Construction Vibration: Piling

Building Classification	PPV mm/s at building foundations	
	Intermittent Vibration	Continuous Vibration
Residential - in generally good repair	10	5
Residential - preliminary survey reveals significant defects	5	2.5
Industrial/commercial - light and flexible structure	20	10
Industrial/commercial - heavy and stiff structure	30	15

9.3.5 BS 7385: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from groundborne vibration [9.15] suggests vibration levels above which cosmetic damage could occur.

These have been adopted as the threshold of significance for construction vibration from all sources other than piling and are provided in Table 9.4. Minor damage is possible at vibration magnitudes that are greater than twice those given in Table 9.4 and major damage to a structure may occur at values greater than four times the tabulated values.

Table 9.4 Threshold of Significance – Construction Vibration: All Sources Other than Piling

Building Classification	Frequency Range of Vibration (Hz)	PPV mm/s	
		Transient Vibration	Continuous Vibration
Unreinforced or light framed structures Residential or light commercial type buildings	4 Hz to 15 Hz	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	7.5 mm/s at 4 Hz increasing to 10 mm/s at 15 Hz
	15 Hz and above	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above	10 mm/s at 15 Hz increasing to 25 mm/s at 40 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	4 Hz and above	50	25

Noise Effects of the Development on the Environment

9.3.6 The noise change due to changes in flows in road traffic on the local road network have been assessed using the Calculation of Road Traffic Noise (CRTN) [9.16] methodology based upon traffic flow data obtained from the Transport Assessment. A 3 dB change in noise level is just noticeable but it is generally accepted that, for environmental assessment, an increase of 3 dB(A) or more can be assumed to be the threshold at which a permanent noise effect becomes significant.

9.3.7 It is also standard practice to categorise the degree of effect according to the extent of the predicted noise change. This is frequently implemented by the use of semantic descriptors associated with noise change bands. The approach has been used in the UK over the last 10 years in the assessment of road traffic schemes and is based on the premise that subjective response to noise from a new source is proportional to the change in overall noise level. Hence, the following semantic scale will be adopted to describe noise change arising from changes in road traffic flow.

Table 9.5 Significance Criteria for Noise Change (Road Traffic and off-site NSRs)

Predicted Change In $L_{Aeq,T}$ or $L_{A10,T}$	Semantic Scale Rating	Significance Rating	
Decrease of more than 10 dB	Substantial Decrease	Major	Beneficial
Decrease of 6 - 10 dB	Moderate Decrease	Moderate	Beneficial
Decrease of 3 - 5 dB	Minor Decrease	Minor	Beneficial
Decrease of less than 3 dB	No significant change	Negligible	~
Increase of less than 3 dB	No significant change	Negligible	~
Increase of 3 - 5 dB	Minor Increase	Minor	Adverse
Increase of 6 - 10 dB	Moderate Increase	Moderate	Adverse
Increase of more than 10 dB	Substantial Increase	Major	Adverse

9.3.8 Noise effects of proposed industrial noise sources and plant within the Scheme have been assessed qualitatively with consideration given to BS 4142.

Noise Effects of the Environment on the Development

9.3.9 Noise levels at NSRs within the Scheme have been predicted using a SoundPLAN computer model that includes the Great Western Main Line (the railway) and the most significant roads surrounding the Site. Noise propagation has been predicted according to CRTN and Calculation of Railway Noise (CRN) [(9.17)]. The model included the topography of the Site, including the railway embankment, which has been determined by survey. The assessment takes aircraft noise into account based upon the published aircraft noise contours for Heathrow Airport. Specifically, summer 2006 standard average mode daytime (baseline daytime); yearly average night-time (baseline night-time); and forecast average worst mode one day for 2016 with five terminals in operation at Heathrow Airport.

9.3.10 Models of the baseline situation and the future, 2025, 'with development' situation have been created. The baseline noise model has been calibrated and verified using data obtained from long and short-term surveys at a number of locations within and around the Site. The 'with development' model is based upon predicted future road traffic flows, based upon data obtained from the Transport Assessment, and includes Crossrail trains within the numbers of railway movements assumed for the railway.

9.3.11 Noise effects of proposed industrial noise sources and plant, both off-site and within the Scheme, have been assessed qualitatively with consideration given to BS 4142.

9.3.12 The assessment of noise effects upon the development will be based upon PPG 24 and the advice summarised in Table 9.1. A significant effect will be deemed to occur for areas that fall within NEC D, i.e. areas for which the guidance to local authorities is that "*planning permission should normally be refused*".

Vibration Effects of the Environment on the Development

9.3.13 The effects of vibration from the railway have been assessed based upon measurements of train pass-bys and a timetable of train services for the line that includes passenger and freight services. The assessment has been based upon the guidance contained within BS 6472: Guide to evaluation of human exposure to vibration in buildings. Part 1: Sources other than blasting [(9.18)].

9.3.14 The Vibration Dose Value (VDV) ranges which might results in a low probability of adverse comment are drawn from BS 6472 Part 1 and are provided in Table 9.6. Exceedance of these ranges has been adopted as the thresholds of significance. BS 6472 Part 1 suggests that adverse comment would be possible at values twice those given in Table 9.6 and that adverse comment would be probable at four times the tabulated values.

Table 9.6 VDV Ranges Corresponding to a Low Probability of Adverse Comment

Place	Daytime 16-Hour VDV ($m/s^{1.75}$)	Night-Time 8-Hour VDV ($m/s^{1.75}$)
Residential	0.2 to 0.4	0.1 to 0.2
Office	0.4 to 0.8	0.2 to 0.4 [1]
Workshops	0.8 to 1.6	0.4 to 0.8 [1]

[1]These VDV thresholds would not apply unless night-time work was a regular activity at the Site.

9.4 Baseline Conditions

Site Description

9.4.1 The Site is located adjacent to the railway and is bounded to the north, east and south by residential and industrial areas and to the west by the Minet Country Park. The Site is affected, to various

extents in different locations, by noise from trains and road traffic on major and minor roads. The Site is approximately 5 - 6 km to the northeast of Heathrow Airport. However, the noise from aircraft passing overhead is negligible compared with the noise from the railway and nearby roads.

9.4.2 A plan of the Site showing baseline noise and vibration survey locations is provided in Figure 9.1. The Site is currently in use for long-term airport car parking. There is currently a 4 m high solid fence surrounding the Site. The Site is generally flat and the railway is on a low embankment, the top of which is approximately 2 to 3 m above the ground level of the Site.

9.4.3 A full description of the Main Site and surrounding area is given in Chapter 3: Site and Proposed Development, of this ES. However, of relevance to this assessment of noise and vibration are the following features: there are currently three gas holders in the middle of the southern boundary of the Site with associated pipework and plant. By 2009/2010, when construction of the Scheme will commence, two of the gas holders will have been removed. The Grand Union Canal bounds the Site to the west, beyond which is the Minet Country Park. The A312 Hayes bypass 'Parkway' is, at its closest location, approximately 275 m to the west of the Site boundary. The Blair Peach Primary School is adjacent to the northwest corner of the Site and there is a college approximately 375 m to the west of the Site boundary. Yeading Football Club is, at its closest location, approximately 125 m to the west of the Site boundary. Terraces of 2-storey houses bound the Site to the north, east and beyond the railway to the south. There are industrial units within the residential area to the south of the railway. There is a former water tower to the southeast of the Site that has been converted into flats. The water tower is approximately 30 m high and is a listed building.

Baseline Noise Surveys

9.4.4 A long-term noise survey was undertaken at the southern boundary of the Site over 13 days from 21 May to 2 June 2007. The survey was at a height of 4.5 m at a free-field location. Four short-term measurements were also undertaken in and around the Site simultaneously with the long-term survey. All the short-term measurements were undertaken on 6 June 2007 and comprised three consecutive 15-minute periods. Short-term measurements were undertaken at a height of 1.5 m and in free-field locations. The measurements are representative of the assessment baseline year, which is 2009/2010, when construction is assumed to commence.

9.4.5 The locations of the monitoring positions are provided in Figure 9.1. The measurement locations were as follows:

Long-term

- LT: On the southern site boundary to the southeast of the gas holders.

Short-term

- ST-1: In front of the Water Tower, The Crescent.
- ST-2: On the canal path at the northwest corner of the Site.
- ST-3: In the middle of the Site.
- ST-4: On the canal path opposite Minet Park adjacent to the south west corner of the Site.

9.4.6 The surveys were undertaken using Rion NL-32, NL-31 and Brüel & Kjær 2250 sound level meters and the L_{Aeq}, L_{A90}, L_{A10}, and L_{Amax} metrics were measured in 15-minute periods. The meters were calibrated prior to use using a Rion NC-74 sound level calibrator, which is traceable to a National Standard. The calibrations of the meters were checked at the end of the monitoring period and no significant drift was observed for any of the surveys.

9.4.7 Meteorological conditions during the noise survey were recorded by a weather monitoring station at the long-term survey location. The windspeed, wind direction, temperature and rainfall were recorded in 5-minute periods for the duration of the survey. Only data that were obtained during periods when there was no rainfall and the wind speed was less than 2 m/s were used to determine the baseline noise levels. This ensured that there was no influence due to meteorological conditions.

9.4.8 A summary of the results of the baseline noise surveys is provided in Tables 9.7 to 9.10. A graph of the results of the long-term survey is provided in Figure 9.2.

Table 9.7 Summary of Long-term Baseline Noise Survey Results - Daytime (07.00 to 23.00 hours)

Date	Day	Daytime (07.00 to 23.00 hours)			
		Noise Level (dB)			
		L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
21/05/2007*	Monday	70	88	66	48
22/05/2007	Tuesday	71	94	67	44
23/05/2007	Wednesday	71	97	68	44
24/05/2007	Thursday	72	102	70	47
25/05/2007	Friday	71	94	69	43
26/05/2007	Saturday	69	90	65	46
27/05/2007	Sunday	66	91	62	46
28/05/2007	Monday	69	90	62	48
29/05/2007	Tuesday	71	94	68	49
30/05/2007	Wednesday	72	92	69	53
31/05/2007	Thursday	71	93	66	46
01/06/2007	Friday	71	100	69	45
02/06/2007**	Saturday	71	95	67	43
Average		71	-	67	46

* survey started 13:00 hours
** survey ended 15:00 hours

Table 9.8 Summary of Long-term Baseline Noise Survey Results - Daytime (07.00 to 19.00 hours)

Date	Day	Daytime (07.00 to 19.00 hours)			
		Noise Level / dB			
		L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
21/05/2007*	Monday	70	88	66	48
22/05/2007	Tuesday	71	94	68	44
23/05/2007	Wednesday	71	97	69	44
24/05/2007	Thursday	72	102	70	47
25/05/2007	Friday	72	94	70	43
26/05/2007	Saturday	70	90	67	45
27/05/2007	Sunday	66	91	62	46
28/05/2007	Monday	No Data	No Data	No Data	No Data
29/05/2007	Tuesday	71	94	69	49
30/05/2007	Wednesday	72	92	69	53
31/05/2007	Thursday	No Data	No Data	No Data	No Data
01/06/2007	Friday	72	100	69	44
02/06/2007**	Saturday	71	95	67	43
Average		71	-	68	46

* survey started 13:00 hours ** survey ended 15:00 hours

Table 9.9 Summary of Long-term Baseline Noise Survey Results - Night-time (23.00 to 07.00 hours)

Date	Day	Night-time (23.00 to 07.00 hours)			
		Noise Level / dB			
		L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
21/05/2007*	Monday	67	90	53	43
22/05/2007	Tuesday	66	91	56	46
23/05/2007	Wednesday	67	93	55	43
24/05/2007	Thursday	67	93	53	41
25/05/2007	Friday	66	91	55	39
26/05/2007	Saturday	60	90	48	42
27/05/2007	Sunday	No Data	No Data	No Data	No Data
28/05/2007	Monday	64	90	53	48
29/05/2007	Tuesday	65	90	56	47
30/05/2007	Wednesday	65	89	55	49
31/05/2007	Thursday	65	92	54	44
01/06/2007	Friday	65	91	53	44
02/06/2007**	Saturday	No Data	No Data	No Data	No Data
Average		66	-	54	44

* survey started 13:00 hours
** survey ended 15:00 hours

Table 9.10 Summary of Short-term Baseline Noise Survey Results

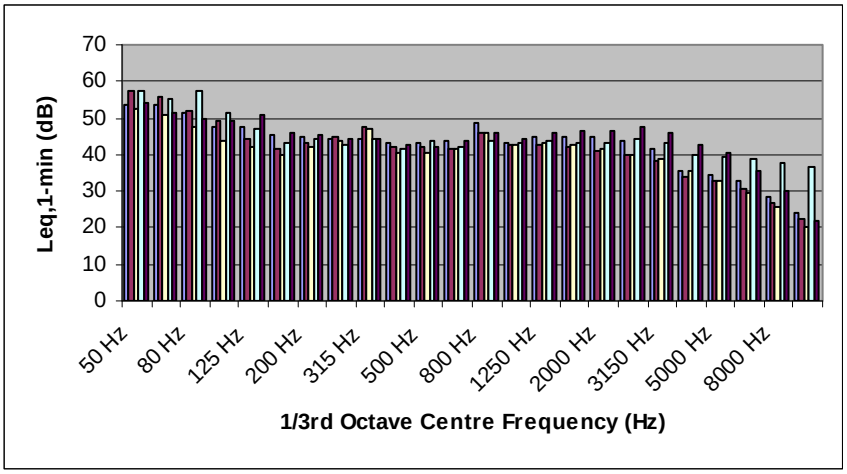
Start Time	Short term Location	Noise Level (dB)				Difference cf. Long-term Survey			
		$L_{Aeq,15min}$	L_{Amax}	L_{A10}	L_{A90}	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
06/06/2007 12:45	1	63	79	66	48	-2	-6	1	1
06/06/2007 13:00		66	83	68	49	-3	-5	2	1
06/06/2007 13:15		67	85	68	49	-3	-5	-1	1
06/06/2007 13:45	2	61	80	59	49	-10	-9	-9	0
06/06/2007 14:00		54	62	57	48	-18	-29	-16	0
06/06/2007 14:15		56	69	60	47	-16	-21	-14	-1
06/06/2007 11:15	3	51	65	54	45	-22	-25	-19	-1
06/06/2007 11:30		54	66	58	45	-15	-22	-10	-5
06/06/2007 11:45		53	64	57	45	-19	-27	-9	-2
06/06/2007 16:45	4	56	73	57	50	-16	-19	-8	2
06/06/2007 17:00		63	88	59	49	-7	1	-13	2
06/06/2007 17:15		55	70	56	49	-16	-19	-12	2

Gas Holder Plant

9.4.9 Sample spectral measurements were made at five locations on the boundary of the compound that contains the plant associated with the gas holders. The plant appears to include valves, pumps and pipework and noise emissions would be described as a broadband ‘hissing’ or ‘whooshing’ noise. A summary of the measurements is provided in Table 9.11:

Table 9.11 Summary of Measurements at Boundary of the Gas Holder Compound

Approximate distance from middle of compound (m)	$L_{Aeq,1\text{-}min}$ (dB)
62	55
70	53
70	53
67	54
70	56



9.4.10 The noise levels at the edge of the gas holder compound are very similar to the levels at short-term location 3, which is a similar distance from the railway but approximately 350 m from the gas holder plant. Furthermore, the spectra of the measurements indicate that the noise emissions are not tonal at the boundary of the gas holder compound. This indicates that noise emissions associated with the gas holder plant do not influence the environmental noise levels within the Site and, therefore, the gas holder plant is a negligible noise source compared to the railway and road traffic.

Baseline Noise Model

9.4.11 The noise model of the baseline conditions includes the following noise sources:

- Railway – based upon railway timetables; and
- Parkway, South Road, Beaconsfield Road and The Broadway – based upon traffic flows obtained from the Transport Assessment.

9.4.12 Details of the input to the model are provided in Appendix 9.2. Crossrail services have not been included in the baseline noise model because Crossrail is not expected to be operational by 2009/2010. The speed of the trains was changed until the predicted daytime and night-time noise levels at the long-term survey location matched the measured results. The results of the baseline noise model are provided in terms of noise contours in Figures 9.3 and 9.4 for the daytime and night-time periods, respectively. The predicted ambient noise levels at the locations of the short-term surveys match the measured levels at these locations. This indicates that the contribution to the ambient noise level from aircraft is negligible, which is consistent with the on-site observations. On this basis, the model requires no further adjustment to take into account noise from aircraft and is considered robust for the purposes of the assessment. An assessment of the baseline noise levels is provided in the 'Assessment of effects' section.

Baseline Vibration Survey

9.4.13 A survey of vibration levels from train pass-bys was undertaken on 22 June 2004. Measured vibration levels will be representative of conditions in the baseline year, which is 2009/2010, as rail services are not expected to change significantly in the near future. The Crossrail project is not expected to commence construction until 2010. Measurements were made on the surface of the tarmac car park using an ISVR HV-Lab Techfilter PC-based data acquisition system and three Setra 141A accelerometers. Accelerometers were magnetically attached to a metal plate, which was weighted down to ensure good contact with the ground. The measurement location was

approximately 50 m to the east of the gas holder compound, 10 m from the southern site boundary, and approximately 20 m from the nearest railhead and 30 m from the furthest railhead.

9.4.14 Samples that included train pass-bys were obtained with a sampling frequency of 400 Hz. and 30-second duration. The boundary fence obscured the view of the railway from the measurement position and hence precluded detailed identification of the trains. The results of the vibration survey are provided in Table 9.12.

Table 9.12 Vibration Survey Results

Event	Sample Reference Number	30-second VDV ($m/s^{1.75}$)		
		W_d	W_d	W_b
		x	y	z
3 Co-incident Passenger Trains	9	0.0031	0.0003	0.0059
Passenger Train	21	0.0012	0.0004	0.0064
Passenger Train	22	0.0011	0.0004	0.0034
Passenger Train	10	0.0012	0.0005	0.0027
Passenger Train	12	0.0017	0.0004	0.0044
Passenger Train	13	0.0017	0.0003	0.0038
Passenger Train	14	0.0014	0.0004	0.0041
Passenger Train	15	0.0012	0.0004	0.0043
Passenger Train	16	0.0017	0.0006	0.0043
Passenger Train	17	0.0020	0.0003	0.0039
Freight Train (empty)	18	0.0016	0.0003	0.0041
Freight Train (empty)	26	0.0017	0.0005	0.0045
Freight Train (Full)	29	0.0036	0.0027	0.0177
Mean Passenger Train		0.0015	0.0004	0.0041

9.4.15 Baseline vibration levels were calculated based upon the number of trains described in the rail timetable provided in Appendix 9.2 and on the basis of the mean VDV of nine samples of passenger train pass-bys and the maximum VDV of three samples of freight train pass-bys. The results of the VDV calculation are provided in Table 9.13. An assessment of the baseline vibration levels is provided in the 'Assessment of effects' section.

Table 9.13 Baseline VDV Levels

	$VDV_{d,day}$ ($m/s^{1.75}$)	$VDV_{d,day}$ ($m/s^{1.75}$)	$VDV_{b,day}$ ($m/s^{1.75}$)	$VDV_{d,night}$ ($m/s^{1.75}$)	$VDV_{d,night}$ ($m/s^{1.75}$)	$VDV_{b,night}$ ($m/s^{1.75}$)
	x	y	z	x	y	z
VDV at ground surface, 10 m from southern site boundary	0.01	0.01	0.04	0.01	0.01	0.04

9.5 Assessment of Effects

Construction Phase

9.5.1 Due to the outline nature of the Scheme, the types and numbers of plant and the detailed methodology that will be employed to construct the Scheme have not been fully defined. Therefore, it is not possible to undertake a detailed quantitative assessment of construction noise or vibration effects; consequently, the significance of these effects has been considered based upon levels of noise and vibration emissions for generic construction plant and activities contained within BS 5228.

9.5.2 The construction of the Scheme will occur for a period of approximately 15 years and will be undertaken in a number of phases. The details of the construction and phasing of the Scheme are provided in Chapter 5: Construction and Phasing. There is the potential for construction effects to

occur at existing NSRs outside the Site and at NSRs within the Site that have been completed in previous phases.

9.5.3 Construction activities will follow Best Practicable Means (BPM) and guidance contained within BS 5228 to reduce noise and vibration effects, where necessary. BPM noise and vibration reduction methods may include provision of site hoardings that would act as noise barriers, selection of quieter plant or techniques and restriction of the working hours on the Site during certain phases or activities. These measures will be detailed in the final Construction Environmental Management Plan (CEMP).

Construction Noise Assessment

9.5.4 With regards to noise, the most significant construction activities will be site preparation and land remediation earthworks. Noise emissions during general building construction activities have also been considered. Impact driven piling is typically very noisy and effective mitigation is generally limited to significant reduction of piling duration per day or the use of non-impact techniques.

9.5.5 The significance of construction noise effects depends upon the quanta and type of plant that are used, the specific methods of construction and the proximity of NSRs. The significance of noise effects can be reduced by selection of quieter plant or by the use of noise barriers in between the work site and NSRs. Noise barriers are typically approximately 2 to 3 m high and made from wooden or steel boards attached to posts that are driven into the ground. Noise barriers are generally ineffective for NSRs on higher floors of buildings because they are not high enough to interrupt the line of sight between the source(s) and receptor(s). An effective noise barrier may be expected to reduce levels at NSRs by approximately 5 to 10 dB.

Site Preparation and Land Remediation Earthworks

9.5.6 Site preparation and land remediation earthworks may include the following items of plant:

- dump trucks;
- excavators;
- dozers;
- loaders; and
- graders and scrapers.

9.5.7 Noise emissions from earth-moving plant are typically 72 to 92 dB $L_{Aeq,T}$ at 10 m. On this basis, with reference to Table 9.2, a significant effect may occur when works are undertaken within approximately 10 to 100 m of NSRs, depending upon the quanta and type of plant used. This distance would be reduced to within approximately 3 to 55 m if there were an effective noise barrier, which would generally apply to NSRs on the ground floor for a 2 to 3 m high solid site hoarding located on the boundary of the work site.

9.5.8 The results of the assessment indicate that, with the implementation of BPM, such as selection of appropriate plant and techniques and, potentially, use of site hoardings which would act as noise barriers, significant adverse noise effects would not be expected to occur.

Building Construction

9.5.9 Building construction may include the following items of plant:

- cranes;
- excavators;
- pneumatic hand tools and associated compressors;
- generators;
- concrete mixers and or batching plants; and
- delivery HGVs.

9.5.10 Noise emissions from a building construction site are typically approximately 70 to 85 dB $L_{Aeq,T}$ at 10 m. On this basis, with reference to Table 9.2, a significant effect may occur when works are undertaken within approximately 8 to 45 m of NSRs, depending upon the quanta and type of plant used. This distance would be reduced to within approximately 2 to 25 m if there were an effective noise barrier, which would generally apply to NSRs on the ground floor for a 2 to 3 m high solid site hoarding at the boundary of the worksite if the most significant noise sources are at ground level.

9.5.11 The results of the assessment indicate that, with the implementation of BPM, such as selection of appropriate plant and techniques and, potentially, use of site hoardings which would act as noise barriers, significant adverse noise effects would not be expected to occur. The detailed phasing of the Proposed Development should reduce these effects further by ensuring that new dwellings are not occupied until noise screening of the ongoing works is achieved.

9.5.12 **Significance of Effects** - Construction Noise: Negligible

Construction Road Traffic Noise Assessment

9.5.13 The construction of the proposed development would require the transportation of materials to and from the site by HGVs. The assessment has considered the number of additional construction HGVs that would be predicted to give rise to a significant effect on the 'worst-case' basis of all HGVs using one route to site. Details of the construction road traffic noise assessment are provided in Appendix 9.3.

9.5.14 For the route from the M4 to the western access to the Site via the A312, a significant effect would not be predicted to occur provided that there were no more than 2,700 HGVs (5,400 movements) attending Site in one day. For the route to the eastern access to the Site, a significant effect would not be predicted to occur provided that there were no more than 500 HGVs (1,000 movements) attending Site in one day. If the route were to include Beaconsfield Road, a significant effect would not be predicted to occur provided that there were no more than 150 HGVs (300 movements) attending Site in one day. It is highly unlikely that any of the quanta of HGVs that have been predicted to give rise to a significant effect would occur on any of the routes considered. On this basis, significant construction road traffic noise effects are unlikely to occur.

9.5.15 **Significance of Effects** - Construction Road Traffic Noise – Negligible

Construction Vibration Assessment

9.5.16 Vibration from construction activities is generally not significant, with the exception of piling and dynamic compaction. The significance of construction vibration effects depends upon the quanta and type of plant that are used, the specific methods of construction, the physical properties of intervening ground and the proximity of receptors.

9.5.17 On the basis of case history data contained within BS 5228 Part 4, and with reference to Table 9.3, a significant effect may be expected to occur if piling is undertaken within approximately 2 to 5 m and 6 to 10 m of a NSR for vibratory and impact piling, respectively. On the basis of case history data contained within BS 5228 Part 4 and with reference to Table 9.4, a significant effect may be expected to occur if dynamic compaction is undertaken within approximately 10 to 30 m.

9.5.18 Based on the above, it is unlikely that significant vibration effects will occur during the construction of the Scheme. BPM, such as selection of alternative plant and/or techniques and/or vibration monitoring at sensitive receptors, would be employed to ensure that significant construction vibration effects would not be expected to occur if certain piling or dynamic compaction activities are required close to sensitive receptors. This would be detailed further in the CEMP. Again, the detailed phasing of the works should ensure that such activities do not occur close to occupied parts of the Site.

9.5.19 **Significance of Effects** - Construction Vibration: Negligible

Operational Phase

Noise Effects of the Development on the Environment

9.5.20 Details of the assessment of noise effects from changes in road traffic are provided in Appendix 9.3. With reference to Table 9.5, a significant effect is deemed to occur if the noise change is 3 dB or more.

9.5.21 With reference to Appendix 9.3, the predicted noise change for all road links assessed is less than 3 dB with the exception of Pump Lane between the A312 and the Pump Lane Link Road. However, there are no NSRs near to this link and, therefore, the effect is not significant.

9.5.22 Industrial units, cafes, restaurants, bars, service and delivery yards, external air handling units and the energy centre / Blue-NG facility will be designed such that significant noise effects will not occur at NSRs outside and within the Scheme. Noise emissions may be reduced, if necessary, by appropriate selection of construction materials of the walls, roofs and louvres of industrial buildings and the energy centre / Blue-NG; noise barriers or other means of enclosure of service and delivery yards; and selection of noise reduced air handling units.

9.5.23 Noise from industrial sources, including air handling units on commercial development, will be controlled such that the rating level, determined in accordance with BS 4142, is at least 5 dB below the pre-existing background noise level at NSRs. The background noise levels at NSRs will be determined by monitoring with the NSRs within the development in place.

9.5.24 Examples of guidance on the control of noise arising from the operation of bars, restaurants and other commercial development are provided in the following publications:

- Good Practice Guide on the Control of Noise from Pubs and Clubs [(9.19)];
- Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems [(9.20)]; and
- Delivering the goods: guidance on delivery restrictions [(9.21)].

9.5.25 Best practice in combination with appropriate planning conditions, which should be specific to the individual requirements of each development phase with regards to the location of NSRs and the acoustic and temporal characteristics of the noise sources, will ensure that significant adverse noise effects are unlikely to occur.

9.5.26 **Significance of Effects** - Noise Effects of the development on the Environment: Negligible

Noise Effects of the Environment on the Development

9.5.27 The assessment of noise effects upon the Scheme has been based upon PPG 24 and the advice provided in Table 9.1. A significant effect has been deemed to occur for areas that fall within NEC D, i.e. areas for which the guidance to local authorities is that 'planning permission should normally be refused'. With reference to Figures 9.3 and 9.4, there are no areas of the Site that fall within NEC D and, therefore, the effects of the prevailing noise environment upon the Scheme are not deemed to be significant.

9.5.28 However, PPG 24 states that, for residential development within areas that fall within NECs B and C, "…*conditions should be imposed to ensure a commensurate level of protection against noise*". With reference to Figures 9.3 and 9.4, the area of the Site within approximately 150 m and 350 m of the southern site boundary falls within NEC C or B during the daytime and night-time, respectively.

9.5.29 Residential development within areas of NEC B and C will be designed to achieve internal noise levels appropriate to the intended use of the room, for example, living rooms during the daytime and bedrooms during the night-time. Non-residential, noise sensitive development, such as educational or medical use buildings, will be designed to achieve internal noise levels appropriate to the intended use of the building.

9.5.30 Appendix 9.4 provides an assessment of example types of glazing that would be expected to provide satisfactory internal noise levels based upon the guidance contained within BS 8233, Building Bulletin (BB) 93 [(9.22)] and Health Technical Memorandum (HTM) 08-01 [(9.23)] for dwellings and offices, schools and medical facilities, respectively. The external noise levels are based upon the results of the 'with development' noise model that includes the following noise sources:

- Railway – based upon railway timetables and including forecast Crossrail trains;
- Parkway, South Road, Beaconsfield Road and The Broadway – based upon forecast traffic flows obtained from the Transport Assessment; and
- The spine road within the development – based upon forecast traffic flows on the access roads obtained from the Transport Assessment.

9.5.31 The railway movements associated with the railway comprise the current breakdown of train types and times and the forecast type and times of Crossrail trains. The assumption that, with the exception of Crossrail trains, the train timetable and types of rolling stock will remain the same in the future is a 'worst-case' assumption because the railway is currently used by a relatively high number of HSTs that include Class 43 power cars. The Defra report Additional railway noise source terms for 'Calculation of Railway Noise 1995 [(9.24)] states: "*The rolling noise source term in CRN for the Class 43 locomotive is higher than for any other diesel locomotive with 4 axles".* On this basis, noise from the HSTs is likely to be the dominant noise source at NSRs to the south of the Site. However, the authors of the Defra report referred to above consider that, despite being over 22 years old, the Class 43 is "*unlikely to be withdrawn in the foreseeable future'*".

9.5.32 Forecast noise exposure contours for Heathrow Airport in 2016 with five terminals are provided in the LB Ealing's SPG 10. The 57 dB $L_{Aeq,16h}$ (07.00 to 23.00 hours) LHR worst-day contour is approximately 500 m to 1 km to the southeast of the Site. With reference to Tables 9.7 to 9.10, existing noise levels, which are influenced by a number of sources, are already significantly in excess of the possible future contribution of aircraft noise associated with Heathrow Airport. Therefore, notwithstanding any increases to the ambient noise levels that may occur in the future from sources independent of the Scheme, the possible future expansion of Heathrow Airport is not expected to influence the ambient noise levels within the Site.

9.5.33 The results of the noise model are provided as contours at 1.5 m above ground level for the daytime and night-time in Figures 9.5 and 9.6, respectively. The model includes an example building layout from the illustrative Scheme, to demonstrate the screening effects that can be achieved by orientating some buildings to act as noise barriers to other areas of the development; and a 'green wall' at the top of the railway embankment, which will act as a noise barrier and reduce noise emissions to the Site from the railway. The locations of the model receptors included in the tables within Appendix 9.4 are provided in Figures 9.5 and 9.6.

9.5.34 On the basis of the illustrative building layout contained within the illustrative Scheme, the results of the model indicate that satisfactory internal noise levels would be achieved with open windows during the daytime and night-time in NSRs that are screened from the railway and spine road by intervening buildings within the development. For example, model receptors 6 and 13; NSRs in the north and northwest of the site, the rear of blocks near and to the north of model receptor 6, the rear of blocks near and to the west of model receptor 13; and NSRs that face inwards to partially enclosed or enclosed spaces between three or four blocks.

9.5.35 With reference to Appendix 9.4, the results of the assessment indicate that satisfactory noise levels would be expected to be achieved for all the proposed uses throughout the development during the daytime and night-time on the basis of 6-16-6 double-glazing (or similar). This glazing is typical of the thermal double-glazing provided as standard in new homes. Where double-glazing is indicated in Appendix 9.4, the windows must be closed in order to achieve the required values of attenuation and, therefore, an alternative means of ventilation should be provided in noise sensitive rooms. This could be either active or passive, for example, acoustically treated trickle-vents in the frames of the windows, which are also frequently provided as standard in new homes.

9.5.36 External daytime ambient noise levels at 1.5 m above ground level are expected to not exceed 55 dB $L_{Aeq,16h}$ at gardens and balconies of NSRs throughout the Site, with the exception of facades facing onto the spine road where, in general, noise levels are up to 65 dB $L_{Aeq,16h}$. Guidelines for Community Noise (GCN) [9.25] states: "*To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB L_{Aeq} on balconies, terraces, and outdoor living areas.*"

9.5.37 However, a review of health effects based noise assessment methods undertaken for the DETR by Porter et al in 1998 [9.26], just before the issue of GCN, it is noted that:

"around 56% of the population in England and Wales are exposed to daytime noise levels exceeding 55 dB L_{Aeq}" …

and,

"The percentages exposed above the WHO guideline values could not be significantly reduced without drastic action to virtually eliminate road traffic noise and other forms of transportation noise (including public transport) from the vicinity of houses. The social and economic consequences of such action would be likely to be far greater than any environmental advantages of reducing the proportion of the population annoyed by noise. In addition, there is no evidence that anything other than a small minority of the population exposed at such noise levels find them to be particularly onerous in the context of their daily lives."

9.5.38 On the basis of the above, it is considered that the question of whether balconies (or similar external areas, such as terraces and roof gardens) be provided on facades facing onto the spine should be a commercial decision for the developer(s) and not a material planning consideration.

9.5.39 **Significance of Effects** - Noise Effects of the Environment on the Development: Negligible

SPG 10

9.5.40 The LB Ealing's SPG 10 provides noise criteria for various uses of receptor. These are reproduced and discussed in Appendix 9.1.

9.5.41 The criteria for office, educational and health NSRs are the same in SPG 10 as in BS 8233, BB 93 and HTM 08-01, respectively. The criteria for residential areas contained within SPG 10 are lower internal noise levels than those contained within BS 8233 (semantic rating 'Reasonable'). However, the example glazing specification in the assessment provided above (6-16-6 double-glazing) would be expected to achieve the internal noise criteria contained within SPG 10 throughout the entire Scheme.

9.5.42 The most significant difference between the guidance contained within SPG 10 and that contained within BS 8233 and GCN is that SPG 10 considers that kitchens, bathrooms and utility rooms are noise sensitive whereas all other guidance does not. Therefore, the requirements for the provision of acoustic ventilation systems, as described above, would apply to these rooms in addition to living rooms and bedrooms.

9.5.43 The criterion for external private and communal gardens contained within SPG 10 is 50 dB $L_{Aeq,1h}$. This would be expected to be achieved in gardens and on balconies of NSRs throughout the Site, with the exception of facades facing onto the spine road; facades of blocks adjacent to the spine road with a partial aspect of the road; and residential blocks in the south of the site facing the railway.

Vibration Effects of the Environment upon the Development

9.5.44 The results of a vibration survey undertaken 10 m from the southern site boundary, adjacent to the railway, are provided in Table 9.13. The thresholds for significant effect, which depend upon the intended use of the receptor, for example, residential use is more sensitive than office or industrial use, are provided in Table 9.6.

9.5.45 The values provided in Table 9.6 refer to the vibration levels within a building. The results of the survey are vibration levels at the ground surface and, therefore, it is necessary to apply transfer functions to take account of the decrease in vibration levels due to the mass loading of a building upon the ground and the increase in vertical vibration levels due to floor resonance. A reduction in vibration levels also occurs with increasing number of floors of a building, that is, vibration levels on the tenth floor of a building are less than vibration levels on the third floor. However, the transfer function is not as significant as those for mass loading or floor resonance and has not been included in this assessment.

9.5.46 The dynamic response of buildings depends upon the specific design, construction and foundations. Measurement and Assessment of Groundborne Noise & Vibration [9.27] provides guidance on typical transfer functions of groundborne vibration in buildings. This assessment has been undertaken on the basis of transfer functions of 0.32 and 2.51 for horizontal and vertical vibration, respectively.

9.5.47 On this basis, vibration levels within buildings would be expected to not exceed 0.1 $m/s^{1.75}$ $VDV_{b,day}$ and 0.1 $m/s^{1.75}$ $VDV_{b,night}$ within a building approximately 10 m from the southern site boundary. These levels are significantly less than the thresholds of significance for any use of building. Vibration levels would be expected to decrease with increasing distance from the railway and, therefore, the results of the assessment indicate that significant vibration effects would not be expected to occur throughout the Scheme and no mitigation is required. (Note: No building is proposed less than 20 m from the southern site boundary).

SPG 10

9.5.48 The LB Ealing's SPG 10 provides vibration criteria for various uses of receptor. These are reproduced and discussed in Appendix 9.1.

9.5.49 The criteria are derived from BS 6472 (1992 version, now superseded) but include transfer functions said to correspond to the transfer functions between the ground surface of an undeveloped site and the floors of a proposed building at that location. The assumed dynamic response of a building that the transfer functions contained within SPG 10 represent is not consistent with the results of current knowledge, which is summarised in Measurement and Assessment of Groundborne Noise & Vibration

9.5.50 Notwithstanding the above, and the differences between the 1992 and 2008 versions of BS 6472, the results of the assessment indicate that the vibration criteria contained within SPG 10 would be satisfied within all buildings of the development.

9.5.51 **Significance of Effects** - Vibration Effects of the Environment upon the Development: Negligible

9.6 Mitigation and Enhancement

Construction Noise and Vibration

9.6.1 The implementation of BPM, such as selection of appropriate plant and techniques and, potentially, use of site hoardings which would act as noise barriers, will ensure that significant adverse noise effects would not be expected to occur. Such measures will be detailed in the CEMP. The detailed phasing of the Scheme should reduce these effects further by ensuring that new dwellings are not occupied until noise screening of the ongoing works is achieved.

9.6.2 BPM, such as selection of alternative plant and/or techniques and/or vibration monitoring at sensitive receptors, would be undertaken if certain piling or dynamic compaction activities are required close to sensitive receptors to ensure that significant construction adverse vibration effects would not be expected to occur. Again, the detailed phasing of the works should ensure that such activities do not occur close to occupied parts of the Site.

Operational Noise and Vibration

9.6.3 An acoustic barrier will be included as part of the detailed design for the Scheme along the western part of the southern boundary in order to reduce the noise effects upon the development from the adjacent railway. The barrier be will be a minimum of 1.75 m in height and would be located at the top of the northern edge of the railway embankment.

9.6.4 Where required, internal noise levels may 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, such as the railway, or in façades that are sheltered from noise by other buildings in the Scheme. A review of guidance on desired or required noise levels within various uses of building is provided in Appendix 9.1. The exact specification for the on-site glazing would be decided upon during detailed design (subject to reserved matters approval) in order to take into consideration potential noise level changes which may include future Heathrow expansion and/or intensification of the railway.

9.6.5 External amenity areas, such as public or private gardens, will be designed to achieve appropriate daytime ambient noise levels. Screening will also be provided by the layout of the buildings on the Site. For example, buildings near the south western boundary of the Site, adjacent to the railway, will reduce noise levels at NSRs to the north of them. A review of guidance on desired or required noise levels within external amenity areas is provided in Appendix 9.1.

9.6.6 **Significance of Effects following Mitigation** - Noise Effects of the Environment on the Development: Negligible

9.6.7 Noise changes that would be expected to occur due to changes in traffic flow on local roads due to the development are not expected to be significant. The Scheme will be designed such that neither significant noise or vibration effects will occur on the environment or on the development.

9.7 Residual effects

9.7.1 With appropriate mitigation, as described in Section 9.6, there will be no residual effects.

9.7.2 **Significance of Residual Effects**: Negligible

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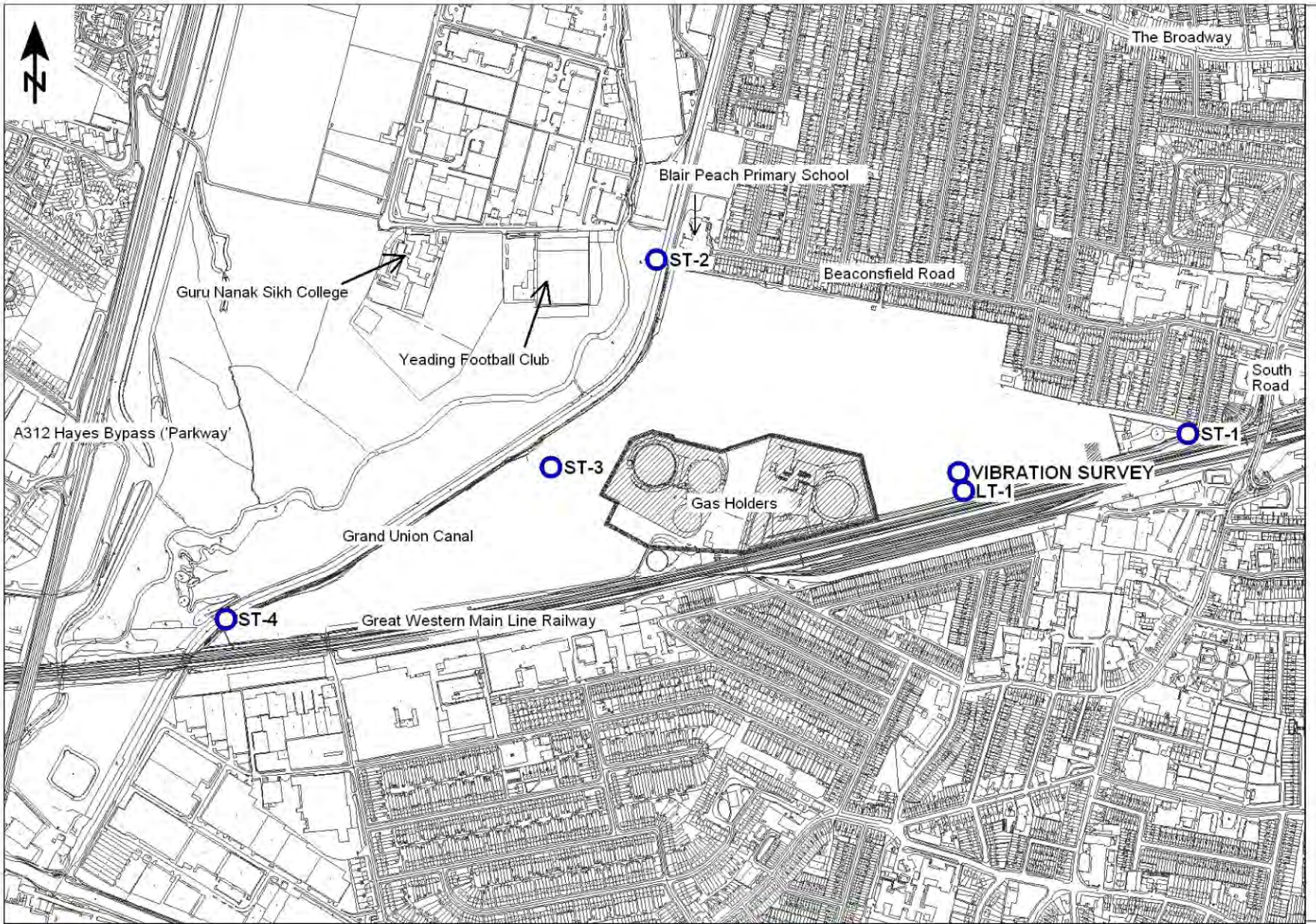

Baseline Noise / Vibration Survey Location

RPS

Date: 01/09/2008 Scale: Not to Scale Rev: A

Job No: JAE4276 Drawn: TD Checked:

Project: Southall Gas Works – Noise and Vibration Assessment

Title: Site Plan and Baseline Noise and Vibration Survey Location

Figure No: Figure 9.1

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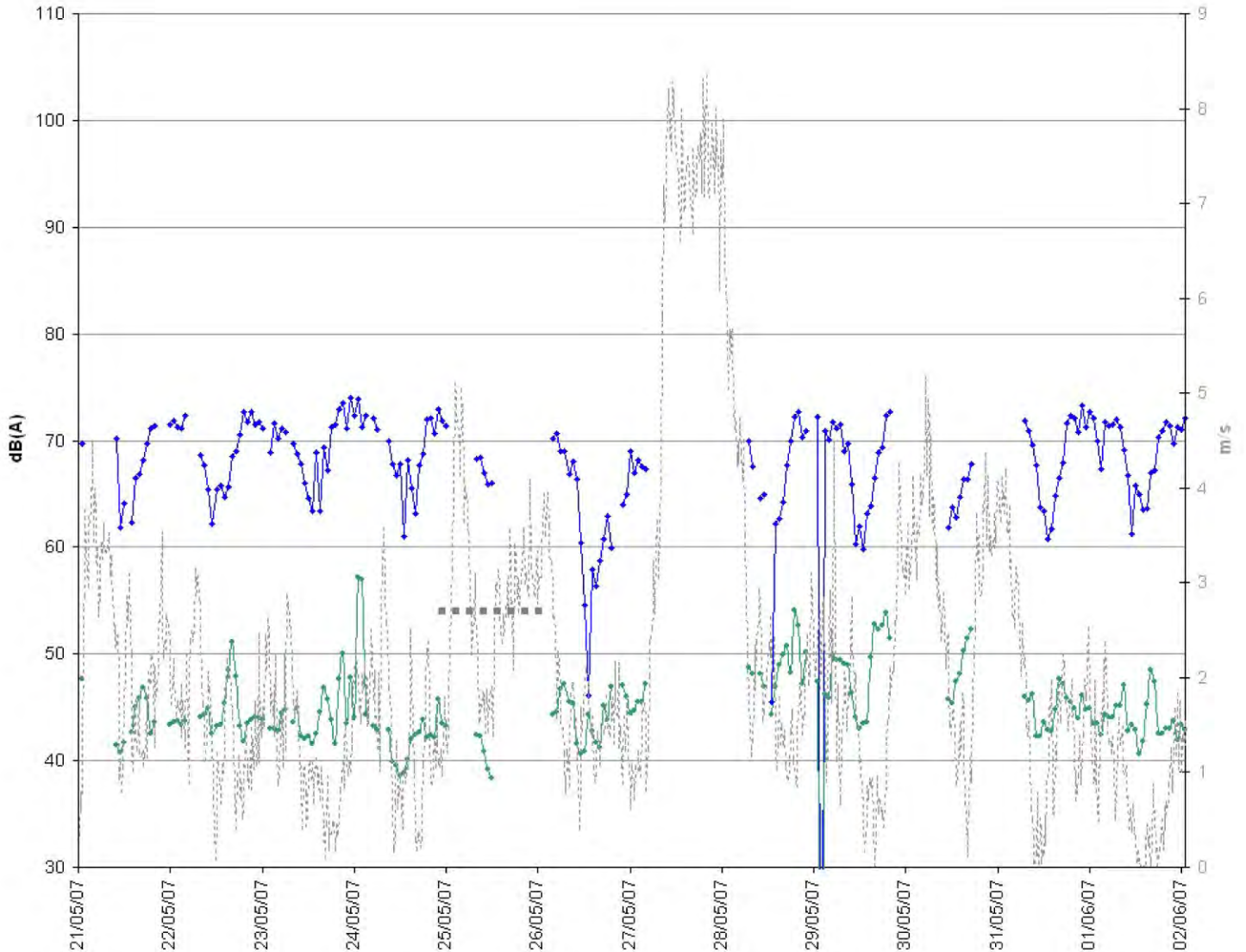

$L_{Aeq,1h}$ (dB)

$L_{A90,1h}$ (dB)

Wind Speed (m/s)

RPS

Date: 01/09/2008 Scale: Not to Scale Rev: A

Job No: JAE4276 Drawn: TD Checked:

Project: Southall Gas Works – Noise and Vibration Assessment

Title: Long-term Baseline Noise Survey Results

Figure No: Figure 9.2

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Drawing Ref:

Noise Exposure Category (NEC) Boundary

RPS

Project: Southall Gas Works – Noise and Vibration Assessment

Title: Baseline Noise Model Results - Daytime

Figure No: Figure 9.3

Date: 01/09/2008 Scale: Not to Scale Rev: A

Job No: JAE4276 Drawn: TD Checked:

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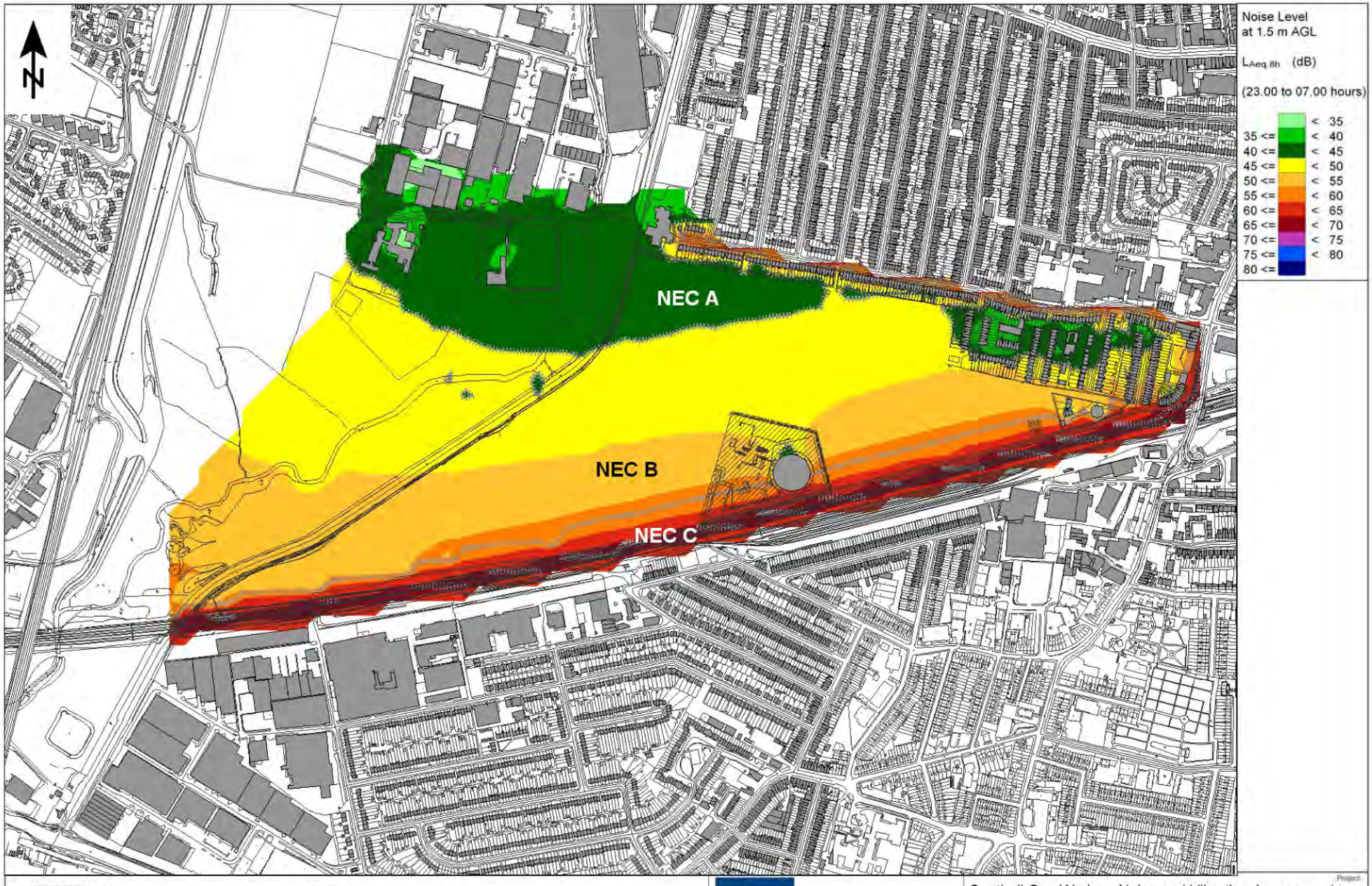

Noise Exposure Category (NEC) Boundary

RPS

Project: Southall Gas Works – Noise and Vibration Assessment

Title: Baseline Noise Model Results – Night-time

Figure No: Figure 9.4

Date: 01/09/2008 Scale: Not to Scale Rev: A

Job No: JAE4276 Drawn: TD Checked:

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Noise Model Receptor

RPS

Project: Southall Gas Works – Noise and Vibration Assessment

Title: 'With Development' Noise Model Results - Daytime

Date: 01/09/2008 Scale: Not to Scale Rev: A

Job No: JAE4276 Drawn: TD Checked:

Figure No: Figure 9.5

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Noise Model Receptor

RPS

Project: Southall Gas Works – Noise and Vibration Assessment

Title: 'With Development' Noise Model Results - Night-time

Date: 01/09/2008 Scale: Not to Scale Rev: A

Job No: JAE4276 Drawn: TD Checked:

Figure No: Figure 9.6

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10 AIR QUALITY

10.1 Introduction

10.1.1 This chapter details the air quality assessment undertaken to support the planning application for the mixed use development at West Southall, located in the London Borough of Ealing (LB Ealing).

10.1.2 The LB Ealing has declared the entire borough an Air Quality Management Area (AQMA) due to high levels of nitrogen dioxide (NO_2) and particulate matter (PM_{10}) attributable to road traffic emissions. The neighbouring London Boroughs of Hounslow (LB Hounslow) and Hillingdon (LB Hillingdon) have both declared AQMAs with respect to NO_2, also attributable to road traffic emissions.

10.1.3 The key objectives of the air quality assessment are considered to be:

- Construction Effects: potential air quality effects from plant and activities associated with the construction of the proposed Scheme;
- Operational Effects: potential air quality effects resulting from changes in traffic flow characteristics on the local road network due to the operation of the proposed Scheme and stack emissions associated with the provision of energy; and
- Environmental Suitability: the suitability of the site for its proposed uses with respect to air quality.

10.1.4 Two scenarios have been considered for the provision of energy comprising a stand-alone energy centre and the Blue NG scheme. The latter is associated with the Blue NG energy development, which is subject to a separate consent.

10.1.5 The methods and criteria used to assess potential air quality effects are described in the following sections. Where potentially adverse air quality effects have been identified, measures to eliminate, reduce or mitigate the effects are proposed.

10.2 Planning and Legislative Context

European Legislation

10.2.1 The European Union Framework Directive 1996/62/EC[10.1] on ambient air quality assessment and management came into force in November 1996 and had to be implemented by Member States, including the UK, by May 1998. The Directive aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants. As a Framework Directive it requires the Commission to propose and set "Daughter" Directives prescribing air quality limit values and alert thresholds together with guidance on monitoring and measurement of individual pollutants.

10.2.2 In the late 1990s, the Clean Air for Europe (CAFE) programme was established with a view to drawing together the air quality directives into a new single directive. On 21 September 2005, the European Commission adopted the Thematic Strategy on Air Quality proposed under the CAFE programme.

10.2.3 The main aims of the Strategy were to address the following:

- the need for an holistic approach to preventing air pollution;

- the evidence that particles with a mean aerodynamic diameter of less than 2.5 µm, $PM_{2.5}$, are potentially more hazardous than larger particles. The current limit values are for particles with a mean aerodynamic diameter of less than 10 µm, PM_{10}; and

- the current limit value based system requires Member States to reduce levels of pollutants in a relatively small number of highly localised 'hot-spots' rather than a general reduction in exposure. Effort and investment may be misplaced if pollutant levels are reduced in locations where the sources of pollution do not give rise to significant health or environmental concerns.

10.2.4 A new EU Directive 2008/50/EC[10.2], replacing all previous directives delivers the aims of the Strategy. The new Directive is to be implemented by Member States by June 2010. The new Directive makes provision for the:

- withdrawal of the provisional 2010 PM_{10} limit values and, an extension to the existing target dates for achievement of the limit values;

- introduction of an obligatory annual mean cap of 25 $\mu g.m^{-3}$ on urban background $PM_{2.5}$ to be met by 2015 with a target of 20 $\mu g.m^{-3}$ to be met by 2010; and

- adoption of a target requirement to reduce $PM_{2.5}$ concentrations by 20% at urban background locations by 2020 from levels measured in 2010.

National Legislation

10.2.5 The Air Quality Standards Regulations 2007[10.3] implement limit values prescribed by relevant EU Directives and Daughter Directives within England.

10.2.6 The UK Air Quality Strategy (AQS)[10.4] was originally published in January 2000 and described the Government's strategy for improving air quality in the UK. One of the key aspects of the strategy was the setting of air quality objectives for eight pollutants, namely benzene, 1,3-butadiene, ozone, carbon monoxide, lead, nitrogen dioxide, particulates and sulphur dioxide. The Government announced tighter objectives for particulates, benzene and carbon monoxide and a new objective for polycyclic aromatic hydrocarbons in an Addendum to the AQS[10.5], published in February 2003. The Addendum included new provisional objectives for particulates in addition to existing objectives within the 2000 Strategy.

10.2.7 The current UK AQS[10.6] was published in July 2007 and updates the original strategy to set out new objectives for local authorities in undertaking their local air quality management duties. The provisional objectives for PM_{10} are removed from the current AQS. Objectives in the current AQS are in some cases more onerous than the limit values set out within the relevant EU Directives, Daughter Directives and the Air Quality Standards Regulations 2007. In addition, objectives have been established for a wider range of pollutants.

10.2.8 It is expected that local air quality management in the UK will be assessed and controlled under the AQS for the foreseeable future. For this reason it is appropriate to use the objective levels specified under the current UK AQS for the purposes of an air quality assessment of this type. The objectives set out in the current UK AQS, relevant to this assessment, are summarised in Table 10.1.

Table 10.1 Summary of Relevant Air Quality Criteria

Pollutant	Averaging Period	Objectives / Limit Values	Not to be Exceeded More Than	Target Date
Nitrogen Dioxide (NO_2)	1 hour	200 $\mu g.m^{-3}$	18 times per calendar year	31.12.2005 (a) 01.01.2010 (b)
	Annual	40 $\mu g.m^{-3}$	-	31.12.2005 (a) 01.01.2010 (b)
Particulate Matter (PM_{10})	24 hour	50 $\mu g.m^{-3}$	35 times per calendar year	31.12.2004 (a)
	Annual	40 $\mu g.m^{-3}$	-	31.12.2004 (a)
Particulate Matter ($PM_{2.5}$)(c)	Annual	Target of 15% reduction in concentrations at urban background locations	-	Between 2010 and 2020 (a)
	Annual	25 $\mu g.m^{-3}$	-	2020 (a)

(a) Target date set in UK Air Quality Strategy 2007

(b) Target date set in Air Quality Standards (England) Regulations 2007

(c) Objectives set in UK Air Quality Strategy 2007 only

National Planning Policy

10.2.9 Policy Guidance Local Air Quality Management LAQM.PG(03)[10.7] issued under Part IV of the Environment Act 1995, is designed to help local authorities with their local air quality management duties. The guidance requires that local authorities integrate air quality considerations into the planning process at the earliest possible stage. As a result, the land use planning system is integral to improving air quality.

10.2.10 Policy Guidance: Addendum LAQM.PGA(05)[10.8] which supplements LAQM.PG(03) has been issued to assist local authorities with the integration of air quality action plans into local transport plans. The guidance applies to all English local authorities, (with the exception of London authorities, which have different arrangements for transport planning – see below) both with and without AQMAs. This common approach to air quality will provide benefits such as raising the profile of air quality in transport planning, and increasing communication across local authority departments.

10.2.11 Planning Policy Statement 23 - Planning and Pollution Control (PPS23) [10.9] offers guidance to local authorities on the relationship between controls over development under planning law, and under pollution control legislation. PPS23 states that there are UK air quality standards for certain air pollutants that have been initiated by European Directives.

10.2.12 PPS23 replaces Planning Policy Guidance 23 (PPG23) and is intended to complement the pollution control framework under the Pollution Prevention and Control Act 1999 and the Environmental Permitting Regulations 2007 which replaced the Pollution Prevention and Control Regulations 2000 in April 2008. It updates the existing guidance and takes into account the AQS, the system of LAQM under Part IV of the Environment Act 1995 and climate change. PPS23 sets out those circumstances where air quality may be a material issue for planning applications and provides guidance to

planning authorities on making these decisions. It states that air quality is likely to be particularly important where:

- where the development is proposed inside, or adjacent to, an AQMA as designated under Part IV of the Environment Act 1995;

- where the development could in itself result in the designation of an AQMA; and

- where to grant planning permission would conflict with, or render unworkable, elements of a local authority's Air Quality Action Plan (AQAP).

10.2.13 However, not all planning applications for developments inside or adjacent to AQMAs should be refused if developments would result in a deterioration of local air quality. Local Planning Authorities (LPAs), transport authorities and pollution control authorities should explore the possibility of securing mitigation measures that would allow the proposal to proceed. Road transport is recognised as a significant contributor to poor local air quality, particularly in urban areas. LPAs can limit this source by ensuring that developments encourage more sustainable travel choices. All applications should be supported by such information as is necessary to allow a full consideration of the impact of the proposal on the air quality of the area.

10.2.14 When considering planning applications, which may raise issues concerning ambient air quality, planning authorities should bear in mind the following:

- air quality within AQMAs is subject to local variation, e.g. increases are likely along heavily trafficked roads. Air quality assessment at the proposed development site can clarify its position within the AQMA and where possible may result in less onerous mitigation than the AQMA average might otherwise suggest;

- where developments include housing, hospitals, schools, nurseries or elderly persons homes are within or close to an AQMA the LPA needs to consider the location of windows and doors in relation to the local exposure source;

- emissions from point sources may be more easily controlled and mitigated than an increase in diffuse pollution from vehicles associated with the new development. However, changing travel patterns may alter overall emissions;

- any air quality assessment for a particular development should as far as possible take account of congestion predictions, particularly at exits and entrances; and

- air quality deterioration may be cumulative, therefore, LPAs will need to consider the effects of multiple developments, and effects of additional load from further development proposals.

10.2.15 In the context of the proposed Scheme, air quality may be a material consideration if the proposed site is likely to extend the AQMA, therefore introducing sensitive receptors into an area of poor air quality.

Regional Policy Guidance – The London Plan

10.2.16 The Mayor of London is responsible for all strategic planning in London. Amongst the Mayor's duties is the requirement to develop a Spatial Development Strategy for London known as the London Plan[10.10]. The current version of the London Plan was published in February 2008 and incorporates and consolidates alterations made to the original plan, published in 2004. The plan acts as an integrating framework for a set of strategies which includes improving air quality. The Mayor's Air Quality Strategy[10.11] sets out policies and proposals to improve London's air quality to the point where air pollution no longer poses a significant risk to human health.

10.2.17 In London, the 2005 annual mean NO_2 objective and the 2004 daily mean PM_{10} objective are unlikely to be met in locations close to the main road network. The AQS objectives for all other pollutants are likely to be met in all London locations. Road traffic emissions in London are the major source of the pollutants of concern, accounting for an estimated 60% of NO_2 emissions and 70% of PM_{10} emissions. The strategy focuses on improving air quality in London by reducing the volume of traffic and emissions from individual vehicles.

10.2.18 A Low Emission Zone (LEZ) for London was introduced under the strategy on 4 February 2008. All roads within Greater London, excluding those parts of the M25 located within the Greater London boundary, are included within the LEZ. The scheme currently affects lorries, motor caravans and horse boxes weighing more than 12 tonnes. On 7 July 2008, the scheme was extended to include lorries, motor caravans and horse boxes weighing more than 3.5 tonnes and buses or coaches, with more than 8 seats, weighing more than 5 tonnes. Further vehicle categories and weights will be affected as the scheme is extended on 4 October 2010. Vehicles meeting the required emissions standards for the LEZ can be driven within the LEZ free of charge. However, operators of vehicles not meeting the required emissions standards are subject to a daily charge.

Local Policy – Local Development Framework for the London Borough of Ealing

10.2.19 The Local development framework (LDF) is the council's emerging framework for spatial planning and property development in Ealing. It includes the Statutory Unitary Development Plan (UDP) - plan for the environment. The LB Ealing adopted the current UDP on 12th October 2004[(10.12)]. The plan sets out the framework within which the council makes decisions relating to planning application and contains policies guiding land use and development until 2017. Policy 2.6 of the UDP relates to air quality and states the following:

''The Council will seek reductions in the level of the air pollutants referred to in the National Air Quality Strategy, and will seek to achieve the statutory limits and consider the tolerability of any increased air pollution when considering proposals for development.

Development proposals will be considered for their effect on air quality and the exposure of people to air pollutants. A formal Air Quality Assessment will be required where there is the potential for significant increases in air pollutants. Permission will be refused where development hinders the achievement of local air quality objectives, or there is likely to be a significant increase in air pollutants. Developments will not be permitted in areas where air quality objectives are not currently being achieved, unless the effects on people can be demonstrated as acceptable in relation to air quality objectives.

The cumulative effect of individual developments will be taken into account, both in terms of impact and remedial measures.''

Supplementary Planning Guidance (SPG) for the London Borough of Ealing

10.2.20 Supplementary planning guidance (SPG)[(10.13)] has been developed to provide clarification in certain topics, areas and sites. SPG 3 is the planning guidance for air quality and is currently available as a draft copy. Public consultation on the draft guidance was completed on 19 October 2007. The key aims within the draft SPG 3 are:

"To identify those circumstances when an air quality assessment will be required to accompany a development proposal.

To provide technical guidance on the process of air quality assessments.

To provide guidance with regard to the circumstances in which air quality conditions and S106 planning obligations will be sought in accordance with national guidance and Ealing's UDP policies for air quality. This guidance aims to ensure that air quality is considered in sufficient depth, to help minimise the potential impacts."

Local Policies for Neighbouring Boroughs

Local Policy – Unitary Development Plan for the London Borough of Hillingdon

10.2.21 The Hillingdon Unitary Development Plan [10.14] (UDP) was adopted in September 1998. The UDP sets out the strategic and local framework for guiding future in the borough. The document contains planning policies to provide guidance for the development of land and transport for 10 years following its adoption. Over the next few years the UDP will be replaced by a Local Development Frameworks (LDF).

Policy OE6 of the UDP which relates to air quality states that;

"The local planning authority taking account of advice from the Environment Agency and other appropriate bodies will not normally grant planning permission for proposals which are likely to result in the pollution of air, land or water areas including lakes, rivers, canals and groundwater."

Local Policy – Unitary Development Plan for the London Borough of Hounslow

10.2.22 The major Planning Policy document for Hounslow is currently the Unitary Development Plan (UDP)[10.15] adopted in 2003. This sets out the planning policies that will guide sustainable social, economic and physical development of the whole borough. The new LDF will replace the UDP within the next three years. In September 2007 the Council updated the UDP and identified those policies within the UDP it wished to save. Policy ENV - P.1.6 policy within the updated UDP relates to air quality:

"Detailed consideration will be given to air pollution matters when considering development proposals, will continue to monitor air quality and will seek reductions in the levels of specific airborne pollutants, particularly pollution caused by road and air transport where possible, in line with EC guidelines, directives, and the air quality standards and objectives as stated in the most current air quality regulations and the Council's Air Quality Review and Assessment and Air Quality Action Plan.

All developments, which are potentially polluting will require a detailed air quality assessment. Developments requiring such assessments will include those which (significantly) increase the number of vehicle trips, polluting industrial activities, incineration, energy generation projects and activities which increase the emissions from Heathrow Airport that are likely to have an impact on areas within the Borough.

Where the introduction of a new development, or change of use, will cause the air quality objective to be approached or exceeded, the Council will consider the effect on air quality and, if significant, will seek mitigation measures to reduce the potential impact on air quality."

10.3 Methodology & Significance Criteria

Overview

10.3.1 The approach to this air quality assessment includes the key elements listed below, and follows UK Government guidance (LAQM.TG03)[10.16] on the assessment of local air quality:

- consideration of relevant Air Quality Review and Assessment (R&A) documents;
- assessment of existing local air quality conditions through a review of available air quality monitoring data for the area;

- qualitative assessment of the effect of the construction phase on local air quality. Appropriate mitigation measures required to prevent, reduce or offset the effects are identified using the London Best Practice Guide (BPG); and

- quantitative assessment of the effect on local air quality from traffic flows from the proposed Scheme and emissions from stacks associated with energy provision in the first fully operational year, 2025, utilising an advanced dispersion model.

Summary of Key Pollutants

10.3.2 The key emissions associated with roads in the context of local air quality and health impacts are nitrogen dioxide (NO_2) and particles (as PM_{10}). Emissions of total nitrogen oxides (NO_x) from motor vehicle exhausts, the energy centre and the Blue NG energy scheme comprise nitric oxide (NO) and NO_2. NO oxidises in the atmosphere to form NO_2, NO_x can affect sensitive vegetation directly and contribute to regional acid deposition.

10.3.3 In addition to these pollutants, motor vehicles also emit carbon monoxide, unburned hydrocarbons and various greenhouse gases including carbon dioxide (CO_2). However, the air quality modelling in this assessment is limited to the key traffic-related pollutants, NO_2 and PM_{10}.

Construction Phase

10.3.4 Construction of the proposed Scheme will have associated construction traffic, comprising contractors' vehicles and Heavy Goods Vehicles (HGVs), diggers, and other diesel-powered vehicles. This will result in emissions of nitrogen oxides, particles and other combustion-related pollutants. The operation of these vehicles will be localised. Assuming standard levels of maintenance, emissions of combustion-related pollutants from the construction phase are expected to be negligible in terms of the effect on local air quality.

10.3.5 A Best Practice Guide (BPG) on the control of dust and emissions from construction and demolition has been produced by the Mayor of London, in association with the Air Pollution Planning and the Local Environment (APPLE) working group, comprising participants from the Greater London Authority and the Association of London[10.17].

10.3.6 The BPG is designed to inform the planning process and assist developers in understanding the methods to control dust and emissions from construction and demolition activities. The approach set out within the BPG has been adopted for this assessment as it represents the most comprehensive and robust guidance currently available.

Operational Assessment

Modelled Scenarios

10.3.7 Modelling has been undertaken for the following scenarios:

- Baseline 2009 – Conditions in the year during which construction will commence;

- Without Development – First fully operational year, 2025, without the proposed Scheme;

- With Development - First fully operational year, 2025, with the proposed Scheme and a standalone energy centre; and

- With Development - First fully operational, year, 2025, with the Scheme and the Blue NG facility.

Vehicles on the Local Road Network

Model Selection

10.3.8 A detailed dispersion modelling approach has been used for the quantitative assessment of the traffic-related pollutants, NO_2 and PM_{10}, on existing and proposed residential receptors.

10.3.9 The air quality effects associated with the changes in traffic flow characteristics on the local road network have been assessed using ADMS-Roads, a version of the Atmospheric Dispersion Modelling System (ADMS), which is a PC-based model representing dispersion of pollutants from point, line and area sources. This is a formally validated model, developed in the United Kingdom (UK) by Cambridge Environmental Research Consultants Ltd (CERC) and widely used in the UK and internationally for regulatory purposes.

Model Verification

10.3.10 In recent years, it has become best practice to compare and correct road related model predictions for the existing conditions with that of available roadside continuous monitoring or collocated diffusion tube monitoring data.

10.3.11 The method used within this assessment is consistent with the verification process set out in LAQM.TG03. Annual mean monitored NO_x road contributions have been compared with annual mean modelled NO_x road contributions. An adjustment factor has been determined based on the relationship between the monitored and modelled contributions and applied to predicted concentrations.

10.3.12 LAQM.TG03 recommends that model verification for hourly mean predictions is only undertaken where detailed daily traffic patterns are available. Consequently, the model verification and adjustment for this assessment has been limited to the consideration of annual mean NO_x/NO_2 concentrations.

10.3.13 The final step of the model verification process requires an appropriate method for determining the proportion of NO_x converted to NO_2 to be established. Appendix 10.2 describes the latest conversion method based on the results of recent monitoring.

10.3.14 The model verification undertaken for this assessment is summarised in Appendix 10.3.

Emissions from Road Traffic

10.3.15 Dispersion models require the user to input a variety of data that are used in the calculations. These include data on traffic flows, speeds, and vehicle fleet composition. Traffic data were provided by Savell Bird and Axon (traffic consultants).

10.3.16 Modelled contributions of NO_2 and PM_{10} from road traffic have been combined with urban background concentrations and compared to relevant air quality criteria.

Rail Movements

10.3.17 Current local air quality management guidance[10.16] for local authorities states that:

"NO_x emissions from railways will only be associated with diesel trains. Emissions are unlikely to have any significant impact alongside railway tracks, but there is the potential for problems to occur in close proximity to large numbers of stationary, idling engines, for example at depot or terminus. The impact is unlikely to extend beyond a distance of about 50 metres" and *"Whilst diesel*

locomotives and coal fired steam engines emit PM_{10} there is no evidence to suggest that there is any risk of the 24-hour or annual mean objectives being exceeded in 2004 or 2010. No further assessment is required."

10.3.18 The nearest façade of the proposed development is more than 50 m from the nearest depot or terminus, therefore, the guidance states that emissions of NO_2 and PM_{10} associated with locomotives need not be considered. However, it has been requested that rail emissions are included within this assessment.

Emissions from Diesel Train Movements

10.3.19 Estimated diesel train movements on the Great Western Main Line (GWML) railway have been included in the ADMS-Roads model. Forecast diesel train movements on the GWML associated with the Crossrail project have been included in the 'With Development' predictions.

10.3.20 Emission factors for the relevant train types have been obtained from the outputs of the rail and road emissions modelling undertaken on behalf of the Strategic Rail Authority.

10.3.21 A comparison of the modelled results with the predictions made by another, more extensive study, has been undertaken. The conclusions of this comparison are presented in Appendix 10.4.

Energy Provision

Model Selection

10.3.22 Emissions from stacks associated with the proposed energy schemes have been modelled using ADMS 4, a version of ADMS representing dispersion of pollutants from elevated point sources.

10.3.23 ADMS comprises a number of individual modules each representing one of the processes contributing to dispersion or an aspect of data input and output. Amongst the features of ADMS are:

- an up-to-date dispersion model in which the boundary layer structure is characterised by the height of the boundary layer and the Monin-Obukhov length, a length scale dependent on the friction velocity and the heat flux at the surface;
- a number of complex modules including the effects of plume rise, concentration fluctuations and buildings; and
- a facility to calculate long-term averages of hourly mean concentrations and percentiles of hourly mean concentrations.

10.3.24 Modelled concentrations of NO_x and PM_{10} from the energy centre, predicted using ADMS 4, have been combined with road and rail related contributions and urban background concentrations of the 'With Development' scenario. The total concentration has then been compared to relevant air quality criteria.

10.3.25 There are various techniques available for estimating the portion of the NO_x that is converted to NO_2. For the purposes of the assessment of the stack emissions, a 70% conversion of NO_x to NO_2 has been assumed for annual mean NO_2 concentrations, which is considered to be realistic and not overly conservative. The predicted annual mean NO_x contribution associated with the roads network has been converted to an annual mean NO_2 concentration using the relationship described within the Air Quality ES Chapter and combined with the annual mean NO_2 contribution estimated for the energy scheme.

10.3.26 For the calculation of short-term contributions from the energy scheme to ground level concentrations of NO_2, 35% of the modelled NO_x contribution. The predicted short-term NO_x contribution associated with the roads network has been converted to a short-term NO_2 concentration using the relationship described within the Air Quality ES Chapter and combined with the short-term NO_2 contribution estimated for the energy scheme.

Emissions and Stack Characteristics

10.3.27 For both the energy centre and the Blue NG scheme, emissions will be vented through a stack located at x=512062, y=179724.

10.3.28 The movement of air over and around buildings generates areas of flow circulation, which can lead to increased ground level concentrations in the building wakes. Where building heights are greater than about 30 - 40% of the stack height, downwash effects can be significant. The dimensions of the buildings included within the modelling are listed in Table 10.2.

Table 10.2 Dimensions of Buildings Included Within Dispersion Model

Building	National Grid Reference	Height (m)	Length (m)	Width (m)	Angle from North (^{0})
Gasholder (cylindrical)	511933,179694	95	65 (Diameter)	N/A	N/A
Multi-storey car park (rectangular)	512111,179760	18	113	40	255
Energy centre (rectangular)	512036,179737	18	32	40	255

10.3.29 For the energy centre, heat and power will be provided by a Combined Heat Power (CHP) plant, biomass and gas boilers. Emissions will be released at a height of 42 m above ground level. Emission characteristics are provided in Table 10.3.

Table 10.3 Emissions and Stack Characteristics for the Energy Centre

	Annual Average Equivalent Rating (KW_{th})	NO_x (g/s)	PM_{10} (g/s)
CHP	304	0.037	0.009
Biomass	732	0.110	0.048
Boilers	3,454	0.424	0.011
Total	**4,490**	**0.571**	**0.068**

10.3.30 For the Blue NG scheme, emissions will be released at a height of 55m above ground level. Emission characteristics are provided in Table 10.4.

Table 10.4 Emissions and Stack Characteristics for the Energy Centre

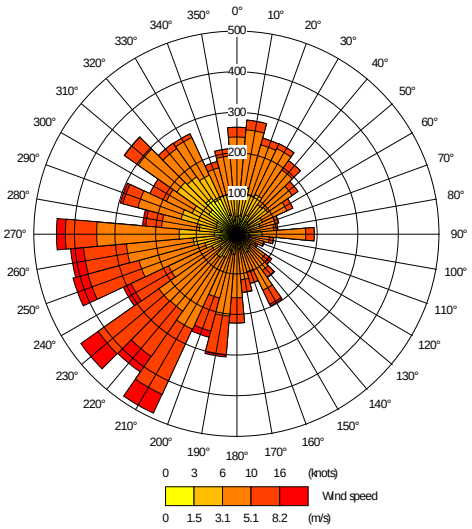
	Annual Average Equivalent Rating (KW_{th})	NO_x (g/s)	PM_{10} (g/s)
Blue NG	Unknown	11.74	2.7

Meteorology

10.3.31 ADMS-Roads require detailed meteorological data as an input. The most representative observing station for the region of the study area is London Heathrow. Dispersion modelling has been undertaken for meteorological data collected during 2005.

10.3.32 Figure 10.1 presents the 2005 windrose of meteorological data for London Heathrow. The windrose shows that the wind direction is predominantly from the west and southwest.

Figure 10.1 Windrose for London Heathrow in 2005



Receptors

10.3.33 ADMS-Roads and ADMS 4 predict the dispersion of pollutants from a number of sources to chosen receptor locations. Sensitive receptors should be selected where the public is regularly present and likely to be exposed over the averaging period of the objective. LAQM.TG(03) provides examples of where the air quality objectives should and should not apply. Relevant exposure locations are summarised in Table 10.5.

Table 10.5 Example of Where Air Quality Objectives Apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, libraries.	Building façades or offices or other places of work where members of the public do not have regular access. Gardens of residential properties. Kerbside sites (as opposed to locations at the buildings façades), or any other location where public exposure is expected to be short-term.
24-hour mean	All locations where the annual mean objective would apply. Gardens of residential properties.	Kerbside sites (as opposed to locations at the buildings façade), or any other location where public exposure is expect to be short-term.
1-hour mean	All locations where the annual and 24 hour mean would apply. Kerbside sites (e.g. pavements of busy shopping streets). Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access

10.3.34 The Scheme comprises residential buildings, community facilities and public amenity spaces. Using the criteria above, the annual mean AQS objectives for NO_2 and PM_{10} apply to the residential and community elements.

10.3.35 Receptors have been selected at locations where changes in pollutant concentrations are anticipated to be greatest in the surrounding area as a result of the Scheme. Modelled receptor details are provided in Table 10.6.

10.3.36 Modelling has also been undertaken for a grid of receptors, in order to determine the environmental suitability of the site for development. However, modelling of both point and line sources means that it is not possible to develop a contour map.

Table 10.6 Modelled Receptor Locations

Receptor	Name	National Grid Reference	
		x	y
1	238 Quebec Road	511111.1	180948.3
2	1 Devonshire Way	510949.2	181031.0
3	59 Cranbourne Way	511068.1	181072.1
4	105 Quebec Road	511153.8	181032.1
5	186 Quebec Road	511290.4	180857.5
6	147a Minet Drive	510689.8	179855.2
7	1 Maypole Court	512627.1	179692.9
8	15 The Green	512567.5	179665.9
9	1 Martin Court	512563.2	179718.4
10	46 Avenue Road	512772.9	179924.9
11	15 Park Avenue	512742.3	179935.0
12	1 South Road	512624.0	179934.7
13	97 South Road(Ph)	512656.0	179960.8
14	4 The Broadway	512811.0	180409.8
15	4 High Street	512850.4	180379.3
16	1 The Broadway	512805.6	180391.0
17	7 The Broadway	512790.2	180396.2
18	16 Andmark Court	512785.4	180304.7
19	93 South Road	512666.6	179974.2
20	152 The Broadway	511405.8	180794.5
21	Guru Nanak Sikh College	511260.6	180117.6
22	Hambrough Primary School	512673.6	180069.3
23	Southall & West London College	512508.9	179987.9
24	87 Avondale Drive	510776.0	180091.2
25	54 Pump Lane	510186.4	179761.3
26	20 Priory Close	510886.8	180647.2
27	87 Minterne Waye	511249.1	181175.8
28	12 Brookside Road	511448.6	180894.5
39	65 Delamere Road	511685.3	180633.4
30	147 Uxbridge Road	512330.1	180459.1
31	4 Lady Margaret Road	512835.2	180463.5
32	54 Green Drive	513444.6	180385.6
33	328 Park Avenue	513742.6	180308.5
34	202 Park Avenue	513477.5	180078.9
35	8 The Crescent	512616.9	179905.5
36	27 Randolph Road	512550.0	179869.8
37	33 Lewis Road	512358.5	179845.2
38	1 North Hyde Gardens	510286.3	178879.8
39	1 Wentworth Court	511311.5	178787.4
40	Kings House	512552.6	179694.8
41	Water Tower	512458.9	179795.3

Short-Term Concentrations

10.3.37 The 99.79th percentile of hourly mean NO_2 concentrations at each receptor has been predicted. If the 99.7th percentile is below 200 µg.m^{-3}, the hourly mean AQS objective of less than 18 exceedences of an hourly mean of 200 µg.m^{-3} is met.

10.3.38 The 90.41st percentile of the daily mean PM_{10} concentration at each receptor has been predicted. If the 90.41st percentile is below 50µg.m^{-3}, the daily mean AQS objective of fewer than 35 exceedences of a daily mean of 50µg.m^{-3} is met.

Construction Effects

10.3.39 In accordance with the BPG, the BPG does not attribute significance to construction effects therefore construction activities have been assessed against the overarching criteria provided in Table 10.7.

Table 10.7 Construction Phase Impact Assessment Significance Criteria

Low Risk
Development of up to 1,000 square metres of land
Development of one property and up to a maximum of ten
Potential for emissions and dust to have an infrequent impact on sensitive receptors
Medium risk sites
Development of between 1,000 and 15,000 square metres of land
Development of between ten to 150 properties
Potential for emissions and dust to have an intermittent or likely impact on sensitive receptors
High risk sites
Development of over 15,000 square metres of land
Development of over 150 properties
Potential for emissions and dust to have significant impact on sensitive receptors

10.3.40 Where risks are identified, mitigation measures are provided which are consistent with the level of risk assessed. The BPG advises that, by evaluating proposed construction and demolition activity, complaints relating to nuisance are likely to be reduced.

Significance Criteria for Operational Effects

10.3.41 A number of approaches can be used to determine whether the potential air quality effects of a Scheme are significant; however, there remains no universally recognised definition of what constitutes 'significance'.

10.3.42 Guidance is available from a range of regulatory authorities and advisory bodies on how best to determine and present the significance of effects within an air quality assessment. It is generally considered good practice that, where possible, an assessment should communicate effects both numerically and descriptively.

10.3.43 Presentation of numerical effects allows comparison with relevant UK AQS objectives. Within this assessment, the following information will be presented for each receptor where pollutant concentrations have been determined:

- Absolute pollutant concentrations 'Without the Development' (at existing receptors);
- Absolute pollutant concentrations 'With the Development' (at existing and proposed receptors); and

- Percentage change in concentrations as a result of the proposed development (at existing receptors).

10.3.44 Where appropriate, the above information will also be provided in relation to the number of days or hours when concentrations are above or below the relevant AQS objective.

10.3.45 In order to ensure that the descriptions of effects used within this report are clear, consistent and in accordance with recent guidance, definitions have been adopted from the National Society for Clean Air (NSCA) Development Control: Planning for Air Quality document[10.18]. Table 10.8 provides descriptors used for changes in NO_2 and PM_{10} concentrations as a result of the proposed Scheme.

Table 10.8 Descriptors for Predicted Contributions as a Percentage of AQS Objectives

Magnitude Descriptor	Predicted Contribution as % of AQS Objective
Very large	Increase/decrease > 25%
Large	Increase/decrease 15 - 25%
Medium	Increase/decrease 10 - 15%
Small	Increase/decrease 5 - 10%
Very Small	Increase/decrease 1-5%
Extremely Small	Increase/decrease < 1%

10.3.46 The magnitude descriptor identified must be considered in the context of existing air quality conditions within the study area in order for the significance of the effect to be determined. The most important aspects to consider are whether existing concentrations are above or below the relevant AQS objective and whether existing receptors are within an AQMA.

10.3.47 For receptors introduced as part of the Scheme, the determination of significance is based on the absolute pollutant concentrations that receptors will be exposed to rather than changes in concentrations.

10.3.48 Table 10.9 provides descriptors for the significance of air quality impacts for new receptors introduced by the Scheme.

Table 10.9 Descriptors for Impact Significance for NO_2 and PM_{10} for New Receptors

Concentrations at New Receptors	Number of Properties Exposed to Concentration			
	0-20	20-100	100-500	>500(a)
Above Standard	Minor adverse	Moderate adverse	Substantial adverse	Very substantial adverse
Below standard but not Well below	Negligible	Negligible	Minor adverse	Minor adverse
Well below standard	Negligible	Negligible	Negligible	Negligible

Notes: 'Well below standard' = <75% of the standard level
Adopted from NSCA guidance [10.18]
[a] Number of properties relevant to proposal

10.3.49 Table 10.10 provides descriptors for the significance of air quality effects based on the magnitude of increase in concentrations as result of the Scheme. The NSCA guidance recognises that professional judgement is required in the interpretation of air quality assessment significance. This is applied within the framework set out in Table 10.10.

Table 10.10 Descriptors for Significance of Change in NO_2 and PM_{10} Concentrations

Absolute Concentrations in Relation to Standard	**Magnitude of Change in Concentrations due to the proposed Scheme**					
	Extremely Small	Very Small	Small	Medium	Large	Very Large
Conflicts with AQAP	Minor adverse	Substantial adverse	Substantial adverse	Very substantial adverse	Very substantial adverse	Very substantial adverse
Above standard without scheme	Minor adverse	Minor adverse	Substantial adverse	Substantial adverse	Very substantial adverse	Very substantial adverse
Below standard without scheme, above with scheme	Minor adverse	Moderate adverse	Substantial adverse	Substantial adverse	Very substantial adverse	Very substantial adverse
Below standard with scheme, but not well below	Negligible	Minor adverse	Minor adverse	Moderate adverse	Moderate adverse	Substantial adverse
Well below standard with scheme	Negligible	Negligible	Minor adverse	Minor adverse	Minor adverse	Moderate adverse

Notes: Adopted from NSCA guidance[10.18]. The NSCA example had been used as a framework for this assessment; however, professional judgment is still required to determine the significance of any change.
'Well below standard' = <75% of the standard level
AQAP = Air Quality Action Plan
Standard = AQS objective

10.4 Baseline Conditions

Overview

10.4.1 Information on background air quality in the UK is usually available from two public sources:

- Each local authority has published the results of its Review and Assessment (R&A) of air quality, with reference to local monitoring and modelling studies, providing a description of air quality at both kerbside and non-kerbside locations.

- The National Air Quality Information Archive (www.airquality.co.uk) includes projections of background (non-kerbside) concentrations for years up to 2010 for each 1 km grid square in the UK.

10.4.2 This information can be supplemented with reference to historical monitoring campaigns undertaken in the study area or by undertaking a study specific monitoring campaign. In the case of this assessment, there is sufficient information available from the National Air Quality Information Archive and the results of R&A's undertaken by the LB Ealing, LB Hillingdon and LB Hounslow.

Local Authority Review and Assessment

10.4.3 LB Ealing has completed Stages 1, 2, 3 and 4 of the R&A process. Following Stage 3, it was concluded that the annual mean objective for NO_2 and the daily mean objective for PM_{10} were likely to be exceeded due to road traffic emissions. Therefore, an AQMA was declared encompassing the whole borough on 14th December 2000.

10.4.4 Monitoring results within Ealing reported in their 2004 Updating and Screening Assessment (USA), 2006 USA and the 2007 Progress Report have further justified the need for the AQMA as concentrations of NO_2 and PM_{10} still remain above the objective in most parts of Ealing.

10.4.5 An Air Quality Action Plan (AQAP) was produced in 2006. It set outs objectives which LB Ealing plans to implement to achieve the Air Quality Strategy (AQS) objectives. The main objectives of the AQAP are to:

- Reduce traffic;
- Reduce the need to travel;
- Promote cleaner technologies and alternative fuels;
- Encourage environmentally friendly forms of transport; and
- Raise awareness on ways to reduce air pollution.

10.4.6 LB Hillingdon designated the area from the Chiltern-Marylebone railway line and then east along the railway line to the southern borough boundary as an AQMA in 2003 due to potential exceedences of the annual mean AQS objective for NO_2.

10.4.7 An AQAP was prepared in June 2004, describing the measures LB Hillingdon intends to implement to reduce levels of NO_2 and PM_{10} in order to meet the AQS objectives. Measures include:

- a series of packages designed to reduce emissions from road transport, for example by switching to cleaner technologies – promoting the use of public transport, cycling and by shifting to freight from road to rail, tackling through traffic and the promotion of cleaner vehicle technology;
- two packages that deal with emissions from specific sources within the Borough, including measures specific to Heathrow Airport and measures concerning local industries and other businesses;
- a package dealing with actions that need to be undertaken by the Council to promote more effective use of resources within the Borough, by improving eco-efficiency of current and future developments, including properties owned or run by the Council; and
- a package covering actions of a more general nature, for example, implementation of the Mayor's Air Quality Strategy in the Borough; Actions to be taken corporately, regionally and in liaison with the Mayor.

10.4.8 An AQAP Progress Report was published in, 2005, 2006 and 2007 and outlines an updated air quality monitoring results and progress with the AQAP, covering the period from 2004 to 2007. Most of the actions described in the plan are either in progress or in the planning phase (e.g., they have been included in the draft Local Implementation Plan (LIP) which deals with improvements to transport within the Borough).

10.4.9 LB Hounslow has also completed the necessary review and assessments of air quality up until the 2006 USA. Following completion of the 2006 USA, the entire borough was declared an AQMA due to potential exceedences of the annual mean AQS objective for NO_2.

Background Monitoring Data and Ambient Air Quality Projections

10.4.10 Urban background monitoring locations measure concentrations away from the local influence of emission sources and are therefore broadly representative of residential areas within large conurbations.

10.4.11 Background continuous air quality monitoring is undertaken in the LB Ealing, LB Hillingdon and LB Hounslow. Background NO_2 diffusion tube monitoring is also undertaken by the LB Ealing at a number of locations. All annual mean background NO_2 concentrations monitored in the LB Ealing and continuously monitored LB Hillingdon and LB Hounslow within 5km of the site are presented in Table 10.11.

10.4.12 PM_{10} concentrations from the continuous monitors in the LB Ealing, LB Hillingdon and LB Hounslow are presented in Table 10.12.

Table 10.11 Monitored Annual Mean NO_2 at Background Locations <5km of the Site (µg.m^{-3})

Borough	Location	DT/ CM	Approximate distance to Site (km)	2005	2006
Ealing	Ealing Town Hall, Uxbridge Road	CM	5.2	39.0	**40.0**
	Blair Peach Primary School, Beaconsfield Road, Southall		0.0	33.0	32.4
Hillingdon	Heathrow Airport, Harlington		3.1	38.0	37.0
	Heathrow Airport, North Apron		3.8	**53.0**	**51.0**
Hounslow	Cranford (suburban site)		2.3	38.0	37.0
Ealing	132 Brent Road, Southall	DT	0.3	**45.1**	-
	2/4 Minterne Avenue		1.5	36.2	34.4
	Blair Peach School		0.0	27.7	33.5
	7 Greenford Avenue, Southall		0.8	35.6	**44.0**
	Jubilee Gardens Library, Jubilee Gardens		1.8	32.3	38.9
	203 Windmill Lane, Greenford		3.0	46.1	**52.4**
	Peal Gardens		4.5	35.8	39.3
	Brent Lodge, Church Road		2.4	27.8	29.4
	Hobbayne First School, Greenford Avenue		3.4	34.8	36.0
	Health Centre, Netheravon Road		3.3	**40.1**	**41.8**
	Ealing Hospital, St Bernards Wing, Uxbridge Road		2.3	**48.0**	**48.6**
	15 Balfour Road		4.2	34.8	35.1
	Ealing Town Hall, New Broadway		5.2	39.2	39.9
Maximum			**5.2**	**53.0**	
Minimum			**0.0**	**27.7**	

Notes: **Bold** - Exceeds the AQS objective, 40 µg.m^{-3}
Diffusion tube results are taken from LB Ealing Progress Report 2007 (bias adjusted)
DT/CM – Diffusion Tube /Continuous Monitor

Table 10.12 Background Annual Mean PM_{10} Continuous Monitoring Data ($\mu g.m^{-3}$)

Borough	Location	Approximate Distance to Site (km)	2005	2006
Ealing	Blair Peach Primary School, Beaconsfield Road, Southall	0.0	23 (5)	*
Hillingdon	Heathrow Airport, Harlington	3.1	25 (3)	26 (10)
	Heathrow Airport, North Apron	3.8	30 (24)	31 (22)
Hounslow	Cranford (suburban site)	2.3	22 (3)	23 (4)
Maximum		**0.0**	**31**	
Minimum		**3.8**	**22**	

Notes: Number of days of daily PM_{10} exceedence shown in parantheses
* Data capture rate 40%

Site Specific Monitoring in 2004

10.4.13 NO_2 concentrations were monitored using diffusion tubes in the area of the Scheme. Gradko diffusion tubes were exposed for six months at six locations starting from June 2004 to November 2004. Diffusion tubes at Sites 1 to 5 monitored background concentrations on the site and the diffusion tube at Site 6 monitored roadside concentrations on the surrounding road network. Monitoring data for the period are detailed in Table 10.3 and on site diffusion tube locations are presented in Figure 10.2.

Figure 10.2 On-site Diffusion Tube Monitoring Locations

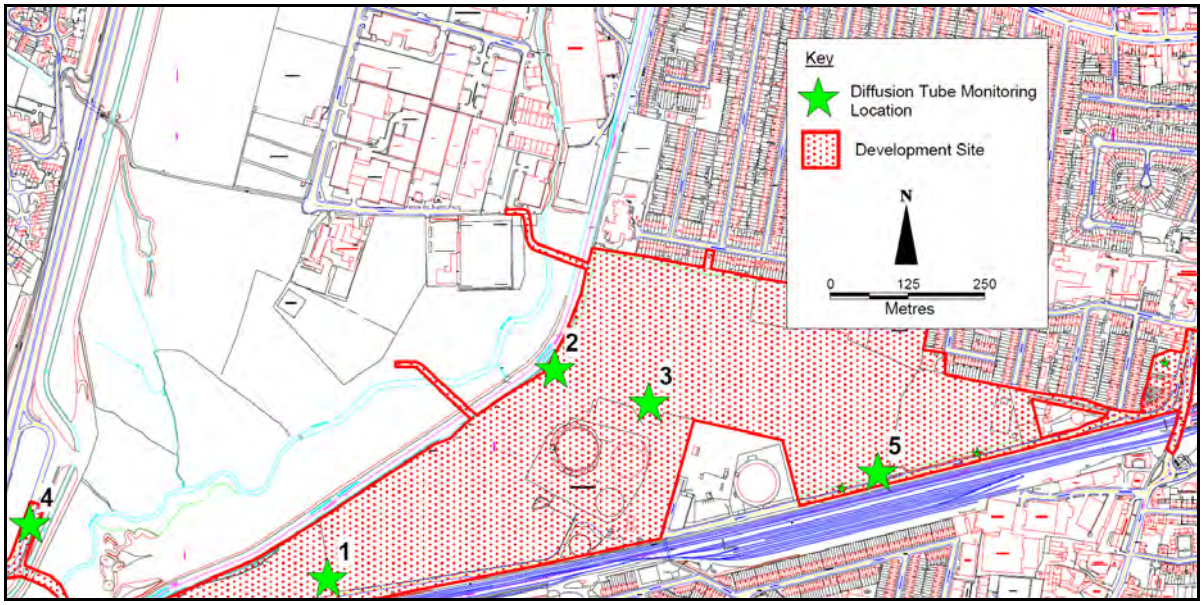


Table 10.13 Monitored NO_2 Concentrations in 2004 (µg.m^{-3})

Site	Onsite/Offsite	National Grid Reference		Unadjusted Period Mean	Annual Mean	Bias Adjusted Annual Mean
		X	y			
1	Onsite	511237	179542	38.3	42.9	41.8
2	Onsite	511604	179878	38.3	42.9	41.8
3	Onsite	511756	179824	36.7	41.0	40.0
4	Access Route	510756	179629	49.6	55.5	54.2
5	Onsite	512126	179712	33.8	37.9	36.9
Onsite Mean Background Concentration				39.3	44.0	42.9
6	Offsite	512160	177881	32.9	36.8	35.9

Notes: Unadjusted period mean has been annualised with a ratio of 1.12 (see Appendix 10.1).
Annual mean has been bias adjusted using the 2004 bias factor of 0.975 for 50% Tea/ Water Gradko tubes using data collated on behalf of DEFRA.

NAQIA Mapped Background Concentrations

10.4.14 The National Air Quality Information Archive (NAQIA) provides estimates of pollution concentrations across the UK at a resolution of 1km^2 for the AQS objective years of the specified pollutant.

10.4.15 Data from this source have been collected for the grid squares of the development area: 511500,179500 and 512500,179500. The mean predicted concentrations are presented in Table 10.14.

Table 10.14 NAQIA Mapped Background Concentrations (µg.m-3)

Year	Estimated Annual Mean Concentration (µg.m^{-3})		
	NO_x	NO_2	PM_{10}
2005	54.3	31.9	25.7
2025	38.1	25.9	21.6

Discussion of Baseline Conditions

10.4.16 Review and Assessment work undertaken by LB Ealing has shown that significant areas of the Borough exceed the AQS objectives for NO_2 and PM_{10}, primarily as a result of road traffic emissions. Site specific NO_2 monitoring undertaken by RPS using diffusion tubes provided an annual mean concentration of 42.9 µg.m^{-3} in 2004, which was broadly consistent with LB Ealing's findings.

10.4.17 Data on background concentrations of NO_2 and PM_{10} from LB Ealing's continuous analyser at Blair Peach Primary School and the NAQIA show very good agreement. Data from the continuous analyser is considered particularly representative as it is directly adjacent to the proposed site.

10.4.18 Monitoring data from the Blair Peach School continuous analsyer have been selected to derive background NO_2 concentrations assumed within the dispersion modelling. NO_x is estimated using the relationship described in Appendix 10.2. Concentrations in 2009 have been predicted using the year adjustment factors available in LAQM.TG03. PM_{10} concentrations provided by the NAQIA are assumed within dispersion modelling and concentrations in the future opening year predicted using the NAQIA factors. For NO_2 and PM_{10}, the concentrations chosen represent the more conservative of the two data sources.

10.4.19 The annual mean background concentrations used within this assessment are provided in Table 10.15.

Table 10.15 Annual Mean Background Concentrations Used In Assessment (µg.m^{-3})

Pollutant	Source	2009	2025
NO_x	Blair Peach School (CM)	48.0	40.7
NO_2	Blair Peach School (CM)	29.5	26.3
PM_{10}	NAQIA	23.9	21.6

Notes: CM - Continuous monitor

10.5 Assessment of Effects

Construction Phase

10.5.1 Nuisance caused by the deposition of dust is likely to be the most significant issue in relation to air quality effects from the construction phase. The Scheme will be built in phases over approximately fifteen years and is anticipated to be completed by 2025. Generally, construction will begin at the eastern end of the site and proceed west over the period.

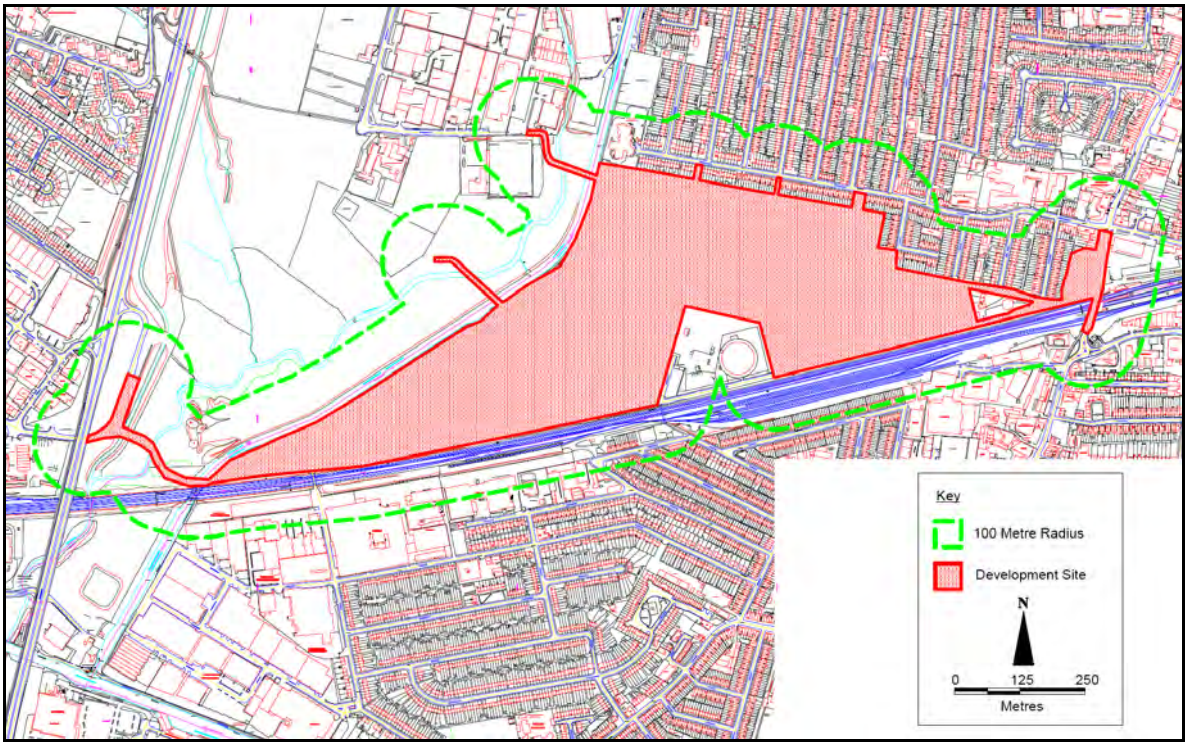
10.5.2 Activities that may cause fugitive dust emissions during construction are as follows:

- site clearance and earthworks;
- handling and disposal of spoil;
- wind-blow from stockpiles of particulate material;
- concrete batching;
- road building;
- movement of vehicles, both on and off site; and
- handling of loose construction materials.

10.5.3 The level and distribution of construction dust emissions will vary according to factors such as the type of dust, duration and location of dust-generating activity, weather conditions and the effectiveness of suppression measures. As detailed in the Methodology and Assessment Criteria section above, the Mayor of London's BPG has been used to assess whether the construction phase is likely to cause significant air quality effects.

10.5.4 It is common practice to use a distance of one hundred metres as the radius within which there is the potential for significant air quality effects from construction activities to occur. Such a radius would encompass a number of existing properties (see Figure 10.2). The majority of these are within one hundred metres of the areas due to be built in Phases 1 to 7 as defined in the indicative Phasing Plan in Figure 6.1, in Chapter 3: Site and Proposed Development. Development of these phases is likely to occur between 2009 and 2014.

Figure 10.3 Proposed Development Area and 100 Metre Radius



10.5.5 The windrose presented in Figure 10.1 shows that the prevailing wind direction at the site is from the south west and, under normal conditions, any fugitive dust emissions from the construction site are likely to be carried toward the existing residential properties to the north east.

10.5.6 The Site is approximately 362,500 m^2 and includes significantly more than 150 properties. There are a number of sensitive receptors within one hundred metres and some sensitive receptors will be introduced during the phased development. Consequently, the Site is concluded to be of 'high risk' of causing potential air quality effects during the construction phase if mitigation measures are not applied.

Operation/Occupation Phase

Nitrogen Dioxide (NO_2)

10.5.7 Table 10.16 summarises the predicted annual mean NO_2 concentrations for the modelled scenarios in 2009 and 'Without the Development' in 2025. Predicted annual mean NO_2 concentrations in 2009 have been compared with estimated monitored annual mean NO_2 concentrations in Appendix 10.3.

10.5.8 The change in annual mean NO_2 concentrations associated with changes in traffic flow characteristics on the local road network and the operation of the standalone energy centre are also shown in Table 10.16.

10.5.9 As a percentage of the AQS objective of 40 $\mu g.m^{-3}$ for NO_2, the greatest increase is 8.6%, predicted at The Water Tower (Receptor 41). 'Without the Development' in 2025, the predicted annual mean NO_2 concentration is 27.91 $\mu g.m^{-3}$ and increases to 31.33 $\mu g.m^{-3}$ 'With the Development'. The main increase is due to the changes in traffic flow characteristics, rather than the operation of the standalone energy centre.

10.5.10 Using the magnitude descriptors set out in Table 10.8, the change in annual mean NO_2 concentrations ranges from extremely small to small. Using the significance descriptors set out in

Table 10.10, the air quality effects are negligible or minor adverse at all receptors, except 15 The Green (Receptor 8) at which the air quality effects are substantial adverse.

10.5.11 The change in annual mean NO_2 concentrations associated with changes in traffic flow characteristics on the local road network and the operation of the Blue NG energy scheme are shown in Table 10.17.

10.5.12 As a percentage of the AQS objective of 40µg.m^{-3} for NO_2, the greatest increase is 17.8%, predicted at The Water Tower (Receptor 41). 'Without the Development' in 2025, the predicted annual mean NO_2 concentration is 27.91 µg.m^{-3} and increases to 35.02 µg.m^{-3} 'With the Development'. The predicted increase is mainly due to the contribution from the Blue NG scheme, however, the increase associated with the changes in vehicle emissions on the local road network is also relatively large in this location.

10.5.13 Using the magnitude descriptors set out in Table 10.8, the change in annual mean NO_2 concentrations ranges from extremely small to large. Using the significance descriptors set out in Table 10.10, the air quality effects are negligible or minor adverse at 29 receptors, moderate adverse at 8 receptors and substantial adverse at 2 receptors.

Table 10.16 Predicted Annual Mean NO_2 Concentrations – Standalone Energy Centre (µg.m^{-3})

		2009	2025						
Rec ID	Receptor Name	Base	Without Dev	Contribution Associated with Changes in Traffic Flow/Rail Characteristics	Stack Contribution – Standalone Energy Centre	With Dev	Development as % of AQS Objective	Magnitude of Change	Significance
1	238 Quebec Road	48.52	40.08	0.30	0.02	40.40	0.8	Extremely Small	Minor Adverse
2	1 Devonshire Way	36.46	31.66	0.17	0.02	31.84	0.5	Extremely Small	Negligible
3	59 Cranbourne Way	38.68	32.99	0.19	0.02	33.20	0.5	Extremely Small	Negligible
4	105 Quebec Road	45.57	37.76	0.29	0.02	38.06	0.8	Extremely Small	Negligible
5	186 Quebec Road	37.57	32.48	0.11	0.02	32.61	0.3	Extremely Small	Negligible
6	147a Minet Drive	37.43	32.03	0.51	0.02	32.56	1.3	Very Small	Minor Adverse
7	1 Maypole Court	40.76	34.77	0.82	0.16	35.75	2.4	Very Small	Minor Adverse
8	15 The Green	47.73	39.88	2.09	0.18	42.15	5.7	Small	Substantial Adverse
9	1 Martin Court	35.99	31.43	3.08	0.20	34.71	8.2	Small	Minor Adverse
10	46 Avenue Road	35.74	31.61	0.90	0.12	32.63	2.5	Very Small	Minor Adverse
11	15 Park Avenue	34.91	30.86	0.84	0.12	31.83	2.4	Very Small	Minor Adverse
12	1 South Road	38.45	33.24	2.51	0.16	35.91	6.7	Small	Minor Adverse
13	97 South Road(Ph)	42.27	35.88	1.90	0.14	37.93	5.1	Small	Minor Adverse
14	4 The Broadway	42.63	36.33	0.73	0.09	37.15	2.1	Very Small	Minor Adverse
15	4 High Street	45.38	38.44	0.62	0.09	39.15	1.8	Very Small	Minor Adverse
16	1 The Broadway	44.89	38.02	0.72	0.09	38.83	2.0	Very Small	Minor Adverse
17	7 The Broadway	44.49	37.78	0.54	0.09	38.42	1.6	Very Small	Minor Adverse
18	16 Andmark Court	37.37	32.28	1.12	0.10	33.51	3.1	Very Small	Minor Adverse
19	93 South Road	38.22	32.92	1.42	0.14	34.48	3.9	Very Small	Minor Adverse
20	152 The Broadway	39.61	34.21	0.17	0.03	34.40	0.5	Extremely Small	Negligible
21	Guru Nanak Sikh College	31.91	28.33	0.16	0.02	28.51	0.5	Extremely Small	Negligible
22	Hambrough Primary Sch	34.46	30.17	0.89	0.14	31.21	2.6	Very Small	Minor Adverse
23	Southall & W London Coll	32.29	28.77	0.41	0.22	29.40	1.6	Very Small	Negligible
24	87 Avondale Drive	43.54	36.28	0.65	0.01	36.94	1.7	Very Small	Minor Adverse
25	54 Pump Lane	34.39	30.10	0.41	0.01	30.52	1.0	Very Small	Minor Adverse

		2009	2025						
Rec ID	**Receptor Name**	**Base**	**Without Dev**	**Contribution Associated with Changes in Traffic Flow/Rail Characteristics**	**Stack Contribution – Standalone Energy Centre**	**With Dev**	**Development as % of AQS Objective**	**Magnitude of Change**	**Significance**
26	20 Priory Close	37.31	31.98	0.27	0.01	32.26	0.7	Extremely Small	Negligible
27	87 Minterne Waye	41.11	34.58	0.22	0.02	34.82	0.6	Extremely Small	Negligible
28	12 Brookside Road	34.80	30.68	0.13	0.02	30.83	0.4	Extremely Small	Negligible
29	65 Delamere Road	35.72	31.27	0.16	0.04	31.47	0.5	Extremely Small	Negligible
30	147 Uxbridge Road	39.75	34.38	0.24	0.10	34.73	0.9	Extremely Small	Negligible
31	4 Lady Margaret Road	37.57	32.42	1.04	0.08	33.55	2.8	Very Small	Minor Adverse
32	54 Green Drive	34.30	30.28	0.19	0.04	30.51	0.6	Extremely Small	Negligible
33	328 Park Avenue	34.78	30.67	0.42	0.03	31.12	1.1	Very Small	Minor Adverse
34	202 Park Avenue	32.36	28.99	0.63	0.05	29.66	1.7	Very Small	Negligible
35	8 The Crescent	37.15	32.19	2.57	0.16	34.93	6.8	Small	Minor Adverse
36	27 Randolph Road	31.79	28.31	1.22	0.20	29.73	3.5	Very Small	Negligible
37	33 Lewis Road	30.44	27.31	1.81	0.42	29.54	5.6	Small	Minor Adverse
38	1 North Hyde Gardens	40.64	34.53	0.17	0.01	34.71	0.5	Extremely Small	Negligible
39	1 Wentworth Court	45.23	37.94	0.12	0.04	38.10	0.4	Extremely Small	Negligible
40	Kings House	36.63	31.86	2.49	0.20	34.55	6.7	Small	Minor Adverse
41	Water Tower	31.14	27.91	3.13	0.29	31.33	8.6	Small	Minor Adverse
Maximum		**48.52**	**40.08**	**3.13**	**0.42**	**42.15**	**8.6**	**Small**	**Substantial Adverse**
Minimum		**30.44**	**27.31**	**0.11**	**0.01**	**28.51**	**0.3**	**Extremely Small**	**Negligible**

Table 10.17 Predicted Annual Mean NO_2 Concentrations – Blue NG Energy Scheme (µg.m^{-3})

		2025						
Rec ID	**Receptor Name**	**Without Dev**	**Contribution Associated with Changes in Traffic Flow/Rail Characteristics**	**Stack Contribution – Blue NG Energy Scheme**	**With Dev**	**Development as % of AQS objective**	**Magnitude of change**	**Significance**
1	238 Quebec Road	40.08	0.30	0.28	40.67	1.5	Very Small	Minor Adverse
2	1 Devonshire Way	31.66	0.17	0.23	32.06	1.0	Very Small	Minor Adverse
3	59 Cranbourne Way	32.99	0.19	0.27	33.45	1.1	Very Small	Minor Adverse
4	105 Quebec Road	37.76	0.29	0.29	38.34	1.4	Very Small	Minor Adverse
5	186 Quebec Road	32.48	0.11	0.35	32.94	1.2	Very Small	Minor Adverse
6	147a Minet Drive	32.03	0.51	0.28	32.82	2.0	Very Small	Minor Adverse
7	1 Maypole Court	34.77	0.82	2.11	37.70	7.3	Small	Minor Adverse
8	15 The Green	39.88	2.09	2.23	44.20	10.8	Medium	Substantial Adverse
9	1 Martin Court	31.43	3.08	2.66	37.17	14.4	Medium	Moderate Adverse
10	46 Avenue Road	31.61	0.90	1.76	34.28	6.7	Small	Minor Adverse
11	15 Park Avenue	30.86	0.84	1.83	33.53	6.7	Small	Minor Adverse
12	1 South Road	33.24	2.51	2.15	37.90	11.6	Medium	Moderate Adverse
13	97 South Road(Ph)	35.88	1.90	1.97	39.76	9.7	Small	Minor Adverse
14	4 The Broadway	36.33	0.73	1.31	38.37	5.1	Small	Minor Adverse
15	4 High Street	38.44	0.62	1.26	40.32	4.7	Very Small	Moderate Adverse
16	1 The Broadway	38.02	0.72	1.33	40.07	5.1	Small	Substantial Adverse
17	7 The Broadway	37.78	0.54	1.35	39.68	4.7	Very Small	Minor Adverse
18	16 Andmark Court	32.28	1.12	1.39	34.80	6.3	Small	Minor Adverse
19	93 South Road	32.92	1.42	1.92	36.26	8.3	Small	Minor Adverse
20	152 The Broadway	34.21	0.17	0.41	34.78	1.4	Very Small	Minor Adverse
21	Guru Nanak Sikh College	28.33	0.16	0.29	28.78	1.1	Very Small	Negligible
22	Hambrough Primary Sch	30.17	0.89	1.70	32.77	6.5	Small	Minor Adverse
23	Southall & W London Coll	28.77	0.41	2.22	31.40	6.6	Small	Minor Adverse
24	87 Avondale Drive	36.28	0.65	0.21	37.14	2.2	Very Small	Minor Adverse
25	54 Pump Lane	30.10	0.41	0.20	30.71	1.5	Very Small	Minor Adverse

		2025						
Rec ID	**Receptor Name**	**Without Dev**	**Contribution Associated with Changes in Traffic Flow/Rail Characteristics**	**Stack Contribution – Blue NG Energy Scheme**	**With Dev**	**Development as % of AQS objective**	**Magnitude of change**	**Significance**
26	20 Priory Close	31.98	0.27	0.19	32.44	1.2	Very Small	Minor Adverse
27	87 Minterne Waye	34.58	0.22	0.29	35.09	1.3	Very Small	Minor Adverse
28	12 Brookside Road	30.68	0.13	0.39	31.19	1.3	Very Small	Minor Adverse
29	65 Delamere Road	31.27	0.16	0.53	31.96	1.7	Very Small	Minor Adverse
30	147 Uxbridge Road	34.38	0.24	1.46	36.09	4.3	Very Small	Minor Adverse
31	4 Lady Margaret Road	32.42	1.04	1.24	34.71	5.7	Small	Minor Adverse
32	54 Green Drive	30.28	0.19	0.63	31.10	2.0	Very Small	Minor Adverse
33	328 Park Avenue	30.67	0.42	0.54	31.62	2.4	Very Small	Minor Adverse
34	202 Park Avenue	28.99	0.63	0.73	30.34	3.4	Very Small	Minor Adverse
35	8 The Crescent	32.19	2.57	2.32	37.08	12.2	Medium	Moderate Adverse
36	27 Randolph Road	28.31	1.22	2.84	32.38	10.2	Medium	Moderate Adverse
37	33 Lewis Road	27.31	1.81	4.22	33.34	15.1	Large	Moderate Adverse
38	1 North Hyde Gardens	34.53	0.17	0.21	34.91	0.9	Extremely Small	Negligible
39	1 Wentworth Court	37.94	0.12	0.56	38.62	1.7	Very Small	Minor Adverse
40	Kings House	31.86	2.49	2.47	36.82	12.4	Medium	Moderate Adverse
41	Water Tower	27.91	3.13	3.98	35.02	17.8	Large	Moderate Adverse
Maximum		**40.08**	**3.13**	**4.22**	**44.20**	**17.8**	**Large**	**Substantially Adverse**
Minimum		**27.31**	**0.11**	**0.19**	**28.78**	**0.9**	**Extremely Small**	**Negligible**

Table 10.18 Predicted 99.97th Percentile of Hourly Mean NO_2 Concentrations – Standalone Energy Centre (µg.m^{-3})

		2009	2025						
Rec ID	Receptor Name	Base	Without Dev	Contribution Associated with Changes in Traffic Flow/Rail Characteristics	Stack Contribution – Standalone Energy Centre	With Dev	Development as % of AQS Objective	Magnitude of Change	Significance
1	238 Quebec Road	91.68	76.61	0.51	0.41	77.53	0.5	Extremely Small	Negligible
2	1 Devonshire Way	76.52	65.85	0.56	0.38	66.79	0.5	Extremely Small	Negligible
3	59 Cranbourne Way	84.04	70.69	0.53	0.36	71.59	0.4	Extremely Small	Negligible
4	105 Quebec Road	85.30	71.53	0.48	0.37	72.38	0.4	Extremely Small	Negligible
5	186 Quebec Road	76.12	65.69	0.22	0.40	66.31	0.3	Extremely Small	Negligible
6	147a Minet Drive	80.47	68.00	1.72	0.39	70.11	1.1	Very Small	Negligible
7	1 Maypole Court	81.79	69.86	1.63	2.04	73.52	1.8	Very Small	Negligible
8	15 The Green	85.39	72.47	4.02	1.94	78.43	3.0	Very Small	Negligible
9	1 Martin Court	78.41	67.60	8.14	4.00	79.74	6.1	Small	Minor Adverse
10	46 Avenue Road	72.45	64.18	2.64	1.89	68.70	2.3	Very Small	Negligible
11	15 Park Avenue	70.88	62.70	2.46	2.40	67.57	2.4	Very Small	Negligible
12	1 South Road	79.20	68.02	7.07	2.75	77.84	4.9	Very Small	Negligible
13	97 South Road(Ph)	80.59	68.99	3.83	2.15	74.98	3.0	Very Small	Negligible
14	4 The Broadway	85.54	72.88	1.46	0.66	75.00	1.1	Very Small	Negligible
15	4 High Street	85.92	73.18	0.94	0.70	74.82	0.8	Extremely Small	Negligible
16	1 The Broadway	86.13	73.44	1.14	0.69	75.27	0.9	Extremely Small	Negligible
17	7 The Broadway	85.86	73.33	0.92	0.68	74.93	0.8	Extremely Small	Negligible
18	16 Andmark Court	76.08	65.64	2.46	0.75	68.84	1.6	Very Small	Negligible
19	93 South Road	74.01	64.19	3.12	1.85	69.16	2.5	Very Small	Negligible
20	152 The Broadway	78.18	67.51	0.26	0.47	68.25	0.4	Extremely Small	Negligible
21	Guru Nanak Sikh College	64.16	57.00	0.29	0.56	57.85	0.4	Extremely Small	Negligible
22	Hambrough Primary Sch	70.08	61.28	2.03	1.03	64.35	1.5	Very Small	Negligible
23	Southall & W London Coll	65.37	58.23	1.33	1.41	60.98	1.4	Very Small	Negligible
24	87 Avondale Drive	94.56	77.87	1.64	0.38	79.88	1.0	Very Small	Negligible
25	54 Pump Lane	69.79	60.97	0.93	0.28	62.18	0.6	Extremely Small	Negligible

		2009	2025						
Rec ID	**Receptor Name**	**Base**	**Without Dev**	**Contribution Associated with Changes in Traffic Flow/Rail Characteristics**	**Stack Contribution – Standalone Energy Centre**	**With Dev**	**Development as % of AQS Objective**	**Magnitude of Change**	**Significance**
26	20 Priory Close	81.52	68.80	0.61	0.40	69.81	0.5	Extremely Small	Negligible
27	87 Minterne Waye	78.86	66.89	0.38	0.37	67.64	0.4	Extremely Small	Negligible
28	12 Brookside Road	70.12	61.71	0.25	0.48	62.43	0.4	Extremely Small	Negligible
29	65 Delamere Road	71.55	62.61	0.41	0.62	63.64	0.5	Extremely Small	Negligible
30	147 Uxbridge Road	77.25	67.14	0.41	0.89	68.44	0.7	Extremely Small	Negligible
31	4 Lady Margaret Road	74.76	64.58	1.89	0.62	67.09	1.3	Very Small	Negligible
32	54 Green Drive	66.97	59.32	0.44	0.43	60.19	0.4	Extremely Small	Negligible
33	328 Park Avenue	67.98	60.15	0.92	0.89	61.96	0.9	Extremely Small	Negligible
34	202 Park Avenue	66.79	59.80	1.91	0.92	62.62	1.4	Very Small	Negligible
35	8 The Crescent	78.81	67.76	5.63	2.99	76.39	4.3	Very Small	Negligible
36	27 Randolph Road	65.15	58.00	3.60	3.30	64.90	3.4	Very Small	Negligible
37	33 Lewis Road	61.09	54.94	4.83	5.59	65.35	5.2	Small	Minor Adverse
38	1 North Hyde Gardens	87.17	72.92	0.61	0.31	73.85	0.5	Extremely Small	Negligible
39	1 Wentworth Court	87.97	73.94	0.32	0.69	74.95	0.5	Extremely Small	Negligible
40	Kings House	79.59	68.36	7.65	2.41	78.42	5.0	Small	Minor Adverse
41	Water Tower	64.34	57.65	6.17	4.30	68.11	5.2	Small	Minor Adverse
42	2 The Crescent	62.25	55.88	5.31	4.37	65.56	4.8	Very Small	Negligible
Maximum		**94.56**	**77.87**	**8.14**	**5.59**	**79.88**	**6.1**	**Small**	**Minor Adverse**
Minimum		**61.09**	**54.94**	**0.22**	**0.28**	**57.85**	**0.3**	**Extremely Small**	**Negligible**

Table 10.19 Predicted 99.97th Percentile of Hourly Mean NO_2 Concentrations – Blue NG Energy Scheme (µg.m^{-3})

		2025						
Rec ID	**Receptor Name**	**Without Dev**	**Contribution Associated with Changes in Traffic Flow/Rail Characteristics**	**Stack Contribution – Blue NG Energy Scheme**	**With Dev**	**Development as % of AQS Objective**	**Magnitude of Change**	**Significance**
1	238 Quebec Road	76.61	0.51	5.14	82.26	2.8	Very Small	Negligible
2	1 Devonshire Way	65.85	0.56	4.84	71.24	2.7	Very Small	Negligible
3	59 Cranbourne Way	70.69	0.53	4.51	75.73	2.5	Very Small	Negligible
4	105 Quebec Road	71.53	0.48	4.44	76.45	2.5	Very Small	Negligible
5	186 Quebec Road	65.69	0.22	5.35	71.26	2.8	Very Small	Negligible
6	147a Minet Drive	68.00	1.72	5.96	75.68	3.8	Very Small	Negligible
7	1 Maypole Court	69.86	1.63	27.11	98.60	14.4	Medium	Minor Adverse
8	15 The Green	72.47	4.02	29.90	106.39	17.0	Large	Minor Adverse
9	1 Martin Court	67.60	8.14	37.13	112.87	22.6	Large	Minor Adverse
10	46 Avenue Road	64.18	2.64	25.39	92.20	14.0	Medium	Minor Adverse
11	15 Park Avenue	62.70	2.46	31.17	96.33	16.8	Large	Minor Adverse
12	1 South Road	68.02	7.07	37.43	112.51	22.2	Large	Minor Adverse
13	97 South Road(Ph)	68.99	3.83	30.44	103.27	17.1	Large	Minor Adverse
14	4 The Broadway	72.88	1.46	7.72	82.06	4.6	Very Small	Negligible
15	4 High Street	73.18	0.94	8.00	82.12	4.5	Very Small	Negligible
16	1 The Broadway	73.44	1.14	7.99	82.57	4.6	Very Small	Negligible
17	7 The Broadway	73.33	0.92	7.88	82.13	4.4	Very Small	Negligible
18	16 Andmark Court	65.64	2.46	8.71	76.81	5.6	Small	Minor Adverse
19	93 South Road	64.19	3.12	25.48	92.79	14.3	Medium	Minor Adverse
20	152 The Broadway	67.51	0.26	6.56	74.33	3.4	Very Small	Negligible
21	Guru Nanak Sikh College	57.00	0.29	8.10	65.39	4.2	Very Small	Negligible
22	Hambrough Primary Sch	61.28	2.03	11.44	74.75	6.7	Small	Minor Adverse
23	Southall & W London Coll	58.23	1.33	15.48	75.04	8.4	Small	Minor Adverse
24	87 Avondale Drive	77.87	1.64	5.24	84.74	3.4	Very Small	Negligible
25	54 Pump Lane	60.97	0.93	4.99	66.89	3.0	Very Small	Negligible

		2025						
Rec ID	**Receptor Name**	**Without Dev**	**Contribution Associated with Changes in Traffic Flow/Rail Characteristics**	**Stack Contribution – Blue NG Energy Scheme**	**With Dev**	**Development as % of AQS Objective**	**Magnitude of Change**	**Significance**
26	20 Priory Close	68.80	0.61	5.24	74.65	2.9	Very Small	Negligible
27	87 Minterne Waye	66.89	0.38	5.14	72.41	2.8	Very Small	Negligible
28	12 Brookside Road	61.71	0.25	6.11	68.07	3.2	Very Small	Negligible
29	65 Delamere Road	62.61	0.41	7.88	70.90	4.1	Very Small	Negligible
30	147 Uxbridge Road	67.14	0.41	9.99	77.54	5.2	Small	Minor Adverse
31	4 Lady Margaret Road	64.58	1.89	7.02	73.49	4.5	Very Small	Negligible
32	54 Green Drive	59.32	0.44	6.96	66.71	3.7	Very Small	Negligible
33	328 Park Avenue	60.15	0.92	14.18	75.25	7.5	Small	Minor Adverse
34	202 Park Avenue	59.80	1.91	10.76	72.47	6.3	Small	Minor Adverse
35	8 The Crescent	67.76	5.63	35.41	108.81	20.5	Large	Minor Adverse
36	27 Randolph Road	58.00	3.60	37.18	98.79	20.4	Large	Minor Adverse
37	33 Lewis Road	54.94	4.83	58.47	118.23	31.6	Very Large	Moderate Adverse
38	1 North Hyde Gardens	72.92	0.61	4.33	77.86	2.5	Very Small	Negligible
39	1 Wentworth Court	73.94	0.32	6.89	81.15	3.6	Very Small	Negligible
40	Kings House	68.36	7.65	31.61	107.61	19.6	Large	Minor Adverse
41	Water Tower	57.65	6.17	65.52	129.33	35.8	Very Large	Moderate Adverse
Maximum		**77.87**	**8.14**	**65.52**	**129.33**	**35.8**	**Very Large**	**Moderate Adverse**
Minimum		**54.94**	**0.22**	**4.33**	**65.39**	**2.5**	**Very Small**	**Negligible**

10.5.14 Table 10.18 summarises the predicted 99.79th percentile of hourly mean NO_2 concentrations for the modelled scenarios in 2009 and 'Without the Development' in 2025.

10.5.15 The change in the predicted 99.79th percentile of hourly mean NO_2 concentrations associated with changes in traffic flow characteristics on the local road network and the operation of the standalone energy centre are also shown in Table 10.16.

10.5.16 Using the magnitude descriptors set out in Table 10.8 , the change in predicted 99.79th percentile of hourly mean NO_2 concentrations ranges from extremely small to small. Using the significance descriptors set out in Table 10.10, the air quality effects are negligible or slight adverse at all receptors.

10.5.17 The change in 99.79th hourly mean NO_2 concentrations associated with changes in traffic flow characteristics on the local road network and the operation of the Blue NG energy scheme are shown in Table 10.19.

10.5.18 Using the magnitude descriptors set out in Table 10.8, the change in predicted 99.79th percentile of hourly mean NO_2 concentrations ranges from very small to very large. Using the significance descriptors set out in Table 10.10, the air quality effects are negligible to moderate adverse.

Residential Suitability

10.5.19 The annual mean NO_2 concentration and the 99.79th percentile of hourly mean NO_2 concentrations have been predicted for a grid of receptors encompassing the Site. With the standalone energy centre, the maximum predicted annual mean NO_2 concentrations for all grid locations within the site is 33 $\mu g.m^{-3}$. Using the NSCA definition given in the footnote to Table 10.9, this is below but not well below (0.75 * 40 $\mu g.m^{-3}$ = 30 $\mu g.m^{-3}$) the AQS annual mean objective of 40 $\mu g.m^{-3}$. The maximum predicted 99.79th percentile of hourly mean NO_2 concentration for all grid locations within the site is 70.24 $\mu g.m^{-3}$ which is well below (0.75 * 200 = 150 $\mu g.m^{-3}$) the AQS hourly mean value objective of 200 $\mu g.m^{-3}$. With the standalone energy centre, the air quality effects are minor adverse.

10.5.20 With the Blue NG scheme, the maximum predicted annual mean NO_2 concentrations for all grid locations within the site is 38 $\mu g.m^{-3}$. Using the NSCA definition given in the footnote to Table 10.9, this is below but not well below (0.75 * 40 $\mu g.m^{-3}$ = 30 $\mu g.m^{-3}$) the AQS annual mean objective of 40 $\mu g.m^{-3}$. The maximum predicted 99.79th percentile of hourly mean NO_2 concentration for all grid locations within the site is 180.04 $\mu g.m^{-3}$ this is below but not well below (0.75 * 200 = 150 $\mu g.m^{-3}$) the AQS hourly mean value objective of 200 $\mu g.m^{-3}$. With the Blue NG scheme, the air quality effects are minor adverse.

Particulates (PM_{10})

10.5.21 Table 10.20 summarises the predicted annual mean PM_{10} concentrations for the modelled scenarios in 2009 and 'Without the Development' in 2025.

10.5.22 The change in annual mean PM_{10} concentrations associated with changes in traffic flow characteristics on the local road network and the operation of the standalone energy centre are also shown in Table 10.20.

10.5.23 As a percentage of the AQS objective of 40$\mu g.m^{-3}$ for PM_{10}, the greatest increase is 0.8%, predicted at 33 Lewis Road (Receptor 37). 'Without the Development' in 2025, the predicted annual mean PM_{10} concentration is 21.66 $\mu g.m^{-3}$ and increases to 21.84 $\mu g.m^{-3}$ 'With the Development'. The main increase is due to the operation of the standalone energy centre rather than changes in traffic flow characteristics.

10.5.24 Using the magnitude descriptors set out in Table 10.9 the change in annual mean PM_{10} concentrations is extremely small. Using the significance descriptors set out in Table 10.10, the air quality effects are negligible at all receptors.

10.5.25 The change in annual mean PM_{10} concentrations associated with changes in traffic flow characteristics on the local road network and the operation of the Blue NG energy scheme are shown in Table 10.20.

10.5.26 As a percentage of the AQS objective of 40µg.m^{-3} for PM_{10}, the greatest increase is 3.7%, predicted at The Water Tower (Receptor 41). 'Without the Development' in 2025, the predicted annual mean NO_2 concentration is 21.70 µg.m^{-3} and increases to 23.17 µg.m^{-3} 'With the Development'. The main increase is due to the emissions associated with the Blue NG stack rather than changes in traffic flow characteristics.

10.5.27 Using the magnitude descriptors set out in Table 10.9, the change in annual mean PM_{10} concentration ranges from extremely to very small. Using the significance descriptors set out in Table 10.10, the air quality effects are negligible at all receptors.

Table 10.20 Predicted Annual Mean PM_{10} Concentrations – Standalone Energy Centre ($\mu g.m^{-3}$)

		2009	2025						
Rec ID	Receptor Name	Base	Without dev	Contribution associated with changes in traffic flow/rail characteristics	Stack contribution – standalone energy centre	With dev	Development as % of AQS Objective	Magnitude of change	Significance
1	238 Quebec Road	24.66	22.14	0.01	0.00	22.16	0.0	Extremely Small	Negligible
2	1 Devonshire Way	24.22	21.84	0.01	0.00	21.85	0.0	Extremely Small	Negligible
3	59 Cranbourne Way	24.26	21.85	0.01	0.00	21.86	0.0	Extremely Small	Negligible
4	105 Quebec Road	24.50	22.01	0.01	0.00	22.03	0.0	Extremely Small	Negligible
5	186 Quebec Road	24.27	21.87	0.00	0.00	21.88	0.0	Extremely Small	Negligible
6	147a Minet Drive	24.20	21.80	0.02	0.00	21.83	0.1	Extremely Small	Negligible
7	1 Maypole Court	24.41	21.98	0.05	0.03	22.06	0.2	Extremely Small	Negligible
8	15 The Green	24.72	22.21	0.11	0.04	22.35	0.4	Extremely Small	Negligible
9	1 Martin Court	24.22	21.85	0.15	0.04	22.04	0.5	Extremely Small	Negligible
10	46 Avenue Road	24.24	21.88	0.05	0.02	21.95	0.2	Extremely Small	Negligible
11	15 Park Avenue	24.19	21.84	0.05	0.02	21.91	0.2	Extremely Small	Negligible
12	1 South Road	24.34	21.94	0.12	0.03	22.08	0.4	Extremely Small	Negligible
13	97 South Road(Ph)	24.49	22.04	0.09	0.03	22.16	0.3	Extremely Small	Negligible
14	4 The Broadway	24.53	22.08	0.03	0.02	22.13	0.1	Extremely Small	Negligible
15	4 High Street	24.66	22.18	0.03	0.02	22.23	0.1	Extremely Small	Negligible
16	1 The Broadway	24.64	22.16	0.03	0.02	22.21	0.1	Extremely Small	Negligible
17	7 The Broadway	24.62	22.15	0.03	0.02	22.20	0.1	Extremely Small	Negligible
18	16 Andmark Court	24.26	21.87	0.05	0.02	21.94	0.2	Extremely Small	Negligible
19	93 South Road	24.31	21.91	0.07	0.03	22.00	0.2	Extremely Small	Negligible
20	152 The Broadway	24.39	21.98	0.01	0.01	21.99	0.0	Extremely Small	Negligible
21	Guru Nanak Sikh College	24.03	21.70	0.01	0.00	21.71	0.0	Extremely Small	Negligible
22	Hambrough Primary Sch	24.14	21.78	0.04	0.03	21.85	0.2	Extremely Small	Negligible
23	Southall & W London Coll	24.07	21.74	0.02	0.04	21.80	0.2	Extremely Small	Negligible
24	87 Avondale Drive	24.41	21.94	0.02	0.00	21.97	0.1	Extremely Small	Negligible
25	54 Pump Lane	24.13	21.77	0.02	0.00	21.79	0.1	Extremely Small	Negligible
26	20 Priory Close	24.20	21.81	0.01	0.00	21.82	0.0	Extremely Small	Negligible

		2009	2025						
Rec ID	**Receptor Name**	**Base**	**Without dev**	**Contribution associated with changes in traffic flow/rail characteristics**	**Stack contribution – standalone energy centre**	**With dev**	**Development as % of AQS Objective**	**Magnitude of change**	**Significance**
27	87 Minterne Waye	24.32	21.89	0.01	0.00	21.90	0.0	Extremely Small	Negligible
28	12 Brookside Road	24.17	21.81	0.01	0.00	21.82	0.0	Extremely Small	Negligible
29	65 Delamere Road	24.19	21.83	0.01	0.01	21.84	0.0	Extremely Small	Negligible
30	147 Uxbridge Road	24.37	21.97	0.01	0.02	22.00	0.1	Extremely Small	Negligible
31	4 Lady Margaret Road	24.27	21.87	0.05	0.02	21.94	0.2	Extremely Small	Negligible
32	54 Green Drive	24.14	21.79	0.01	0.01	21.81	0.0	Extremely Small	Negligible
33	328 Park Avenue	24.17	21.81	0.02	0.01	21.84	0.1	Extremely Small	Negligible
34	202 Park Avenue	24.08	21.76	0.04	0.01	21.80	0.1	Extremely Small	Negligible
35	8 The Crescent	24.26	21.88	0.12	0.03	22.03	0.4	Extremely Small	Negligible
36	27 Randolph Road	24.04	21.71	0.06	0.04	21.81	0.2	Extremely Small	Negligible
37	33 Lewis Road	23.98	21.66	0.09	0.08	21.84	0.4	Extremely Small	Negligible
38	1 North Hyde Gardens	24.38	21.95	0.01	0.00	21.96	0.0	Extremely Small	Negligible
39	1 Wentworth Court	24.59	22.10	0.01	0.01	22.12	0.0	Extremely Small	Negligible
40	Kings House	24.24	21.86	0.12	0.04	22.02	0.4	Extremely Small	Negligible
41	Water Tower	24.02	21.70	0.17	0.05	21.92	0.6	Extremely Small	Negligible
Maximum		**24.72**	**22.21**	**0.17**	**0.08**	**22.35**	**0.6**	**Extremely Small**	**Negligible**
Minimum		**23.98**	**21.66**	**0.00**	**0.00**	**21.71**	**0.0**	**Extremely Small**	**Negligible**

Table 10.21 Predicted Annual Mean PM_{10} Concentrations – Blue NG Energy Scheme (µg.m^{-3})

		2025						
Rec ID	Receptor Name	Without Dev	Contribution associated with changes in traffic flow/rail characteristics	Stack contribution – Blue NG energy scheme	With Dev	Development as % of AQS objective	Magnitude of change	Significance
1	238 Quebec Road	22.14	0.01	0.10	22.25	0.3	Extremely Small	Negligible
2	1 Devonshire Way	21.84	0.01	0.08	21.92	0.2	Extremely Small	Negligible
3	59 Cranbourne Way	21.85	0.01	0.09	21.95	0.2	Extremely Small	Negligible
4	105 Quebec Road	22.01	0.01	0.10	22.12	0.3	Extremely Small	Negligible
5	186 Quebec Road	21.87	0.00	0.12	22.00	0.3	Extremely Small	Negligible
6	147a Minet Drive	21.80	0.02	0.09	21.92	0.3	Extremely Small	Negligible
7	1 Maypole Court	21.98	0.05	0.69	22.72	1.8	Very Small	Negligible
8	15 The Green	22.21	0.11	0.73	23.04	2.1	Very Small	Negligible
9	1 Martin Court	21.85	0.15	0.88	22.87	2.6	Very Small	Negligible
10	46 Avenue Road	21.88	0.05	0.58	22.51	1.6	Very Small	Negligible
11	15 Park Avenue	21.84	0.05	0.60	22.48	1.6	Very Small	Negligible
12	1 South Road	21.94	0.12	0.70	22.76	2.1	Very Small	Negligible
13	97 South Road(Ph)	22.04	0.09	0.65	22.78	1.8	Very Small	Negligible
14	4 The Broadway	22.08	0.03	0.43	22.55	1.2	Very Small	Negligible
15	4 High Street	22.18	0.03	0.42	22.63	1.1	Very Small	Negligible
16	1 The Broadway	22.16	0.03	0.44	22.64	1.2	Very Small	Negligible
17	7 The Broadway	22.15	0.03	0.45	22.62	1.2	Very Small	Negligible
18	16 Andmark Court	21.87	0.05	0.46	22.38	1.3	Very Small	Negligible
19	93 South Road	21.91	0.07	0.63	22.60	1.7	Very Small	Negligible
20	152 The Broadway	21.98	0.01	0.14	22.12	0.4	Extremely Small	Negligible
21	Guru Nanak Sikh College	21.70	0.01	0.10	21.80	0.3	Extremely Small	Negligible
22	Hambrough Primary Sch	21.78	0.04	0.56	22.38	1.5	Very Small	Negligible
23	Southall & W London Coll	21.74	0.02	0.73	22.48	1.9	Very Small	Negligible
24	87 Avondale Drive	21.94	0.02	0.07	22.04	0.2	Extremely Small	Negligible
25	54 Pump Lane	21.77	0.02	0.07	21.86	0.2	Extremely Small	Negligible
26	20 Priory Close	21.81	0.01	0.07	21.88	0.2	Extremely Small	Negligible

		2025						
Rec ID	**Receptor Name**	**Without Dev**	**Contribution associated with changes in traffic flow/rail characteristics**	**Stack contribution – Blue NG energy scheme**	**With Dev**	**Development as % of AQS objective**	**Magnitude of change**	**Significance**
27	87 Minterne Waye	21.89	0.01	0.10	21.99	0.3	Extremely Small	Negligible
28	12 Brookside Road	21.81	0.01	0.13	21.95	0.3	Extremely Small	Negligible
29	65 Delamere Road	21.83	0.01	0.18	22.01	0.5	Extremely Small	Negligible
30	147 Uxbridge Road	21.97	0.01	0.48	22.46	1.2	Very Small	Negligible
31	4 Lady Margaret Road	21.87	0.05	0.41	22.33	1.1	Very Small	Negligible
32	54 Green Drive	21.79	0.01	0.21	22.01	0.5	Extremely Small	Negligible
33	328 Park Avenue	21.81	0.02	0.18	22.01	0.5	Extremely Small	Negligible
34	202 Park Avenue	21.76	0.04	0.24	22.03	0.7	Extremely Small	Negligible
35	8 The Crescent	21.88	0.12	0.76	22.76	2.2	Very Small	Negligible
36	27 Randolph Road	21.71	0.06	0.93	22.70	2.5	Very Small	Negligible
37	33 Lewis Road	21.66	0.09	1.38	23.13	3.7	Very Small	Negligible
38	1 North Hyde Gardens	21.95	0.01	0.07	22.03	0.2	Extremely Small	Negligible
39	1 Wentworth Court	22.10	0.01	0.18	22.30	0.5	Extremely Small	Negligible
40	Kings House	21.86	0.12	0.81	22.79	2.3	Very Small	Negligible
41	Water Tower	21.70	0.17	1.31	23.17	3.7	Very Small	Negligible
Maximum		**22.21**	**0.17**	**1.38**	**23.17**	**3.7**	**Very Small**	**Negligible**
Minimum		**21.66**	**0.00**	**0.07**	**21.80**	**0.2**	**Extremely Small**	**Negligible**

Table 10.22 Predicted 90.41st Percentile of Daily Mean PM_{10} Concentrations – Standalone Energy Centre (µg.m^{-3})

		2009	2025						
Rec ID	Receptor Name	Base	Without Dev	Contribution associated with changes in traffic flow/rail characteristics	Stack Contribution – Standalone Energy Centre	With Dev	Development as % of AQS Objective	Magnitude of Change	Significance
1	238 Quebec Road	49.12	44.15	0.02	0.01	44.18	0.1	Extremely Small	Negligible
2	1 Devonshire Way	48.38	43.64	0.01	0.01	43.66	0.1	Extremely Small	Negligible
3	59 Cranbourne Way	48.53	43.71	0.01	0.01	43.73	0.1	Extremely Small	Negligible
4	105 Quebec Road	48.85	43.92	0.02	0.01	43.96	0.1	Extremely Small	Negligible
5	186 Quebec Road	48.47	43.70	0.01	0.02	43.73	0.1	Extremely Small	Negligible
6	147a Minet Drive	48.46	43.65	0.05	0.01	43.71	0.1	Extremely Small	Negligible
7	1 Maypole Court	48.87	44.00	0.09	0.10	44.18	0.5	Extremely Small	Negligible
8	15 The Green	49.18	44.23	0.23	0.12	44.58	0.9	Extremely Small	Negligible
9	1 Martin Court	48.46	43.71	0.31	0.12	44.14	1.1	Extremely Small	Negligible
10	46 Avenue Road	48.39	43.69	0.09	0.06	43.85	0.4	Extremely Small	Negligible
11	15 Park Avenue	48.30	43.61	0.08	0.07	43.76	0.4	Extremely Small	Negligible
12	1 South Road	48.63	43.84	0.23	0.08	44.15	0.8	Extremely Small	Negligible
13	97 South Road(Ph)	48.82	43.95	0.16	0.08	44.19	0.6	Extremely Small	Negligible
14	4 The Broadway	48.85	44.01	0.05	0.06	44.11	0.3	Extremely Small	Negligible
15	4 High Street	49.25	44.31	0.06	0.06	44.43	0.3	Extremely Small	Negligible
16	1 The Broadway	49.20	44.27	0.06	0.06	44.38	0.3	Extremely Small	Negligible
17	7 The Broadway	49.19	44.27	0.04	0.06	44.36	0.2	Extremely Small	Negligible
18	16 Andmark Court	48.48	43.71	0.10	0.06	43.87	0.4	Extremely Small	Negligible
19	93 South Road	48.51	43.73	0.12	0.08	43.93	0.5	Extremely Small	Negligible
20	152 The Broadway	48.67	43.87	0.01	0.02	43.90	0.1	Extremely Small	Negligible
21	Guru Nanak Sikh College	48.05	43.39	0.01	0.02	43.41	0.1	Extremely Small	Negligible
22	Hambrough Primary Sch	48.25	43.54	0.07	0.08	43.69	0.4	Extremely Small	Negligible
23	Southall & W London Coll	48.09	43.44	0.04	0.13	43.61	0.4	Extremely Small	Negligible
24	87 Avondale Drive	48.90	43.94	0.05	0.01	44.00	0.2	Extremely Small	Negligible
25	54 Pump Lane	48.21	43.50	0.04	0.01	43.54	0.1	Extremely Small	Negligible
26	20 Priory Close	48.50	43.68	0.02	0.01	43.71	0.1	Extremely Small	Negligible

		2009	2025						
Rec ID	**Receptor Name**	**Base**	**Without Dev**	**Contribution associated with changes in traffic flow/rail characteristics**	**Stack Contribution – Standalone Energy Centre**	**With Dev**	**Development as % of AQS Objective**	**Magnitude of Change**	**Significance**
27	87 Minterne Waye	48.56	43.71	0.01	0.01	43.74	0.1	Extremely Small	Negligible
28	12 Brookside Road	48.27	43.57	0.01	0.02	43.60	0.1	Extremely Small	Negligible
29	65 Delamere Road	48.34	43.61	0.01	0.03	43.65	0.1	Extremely Small	Negligible
30	147 Uxbridge Road	48.76	43.95	0.02	0.06	44.03	0.2	Extremely Small	Negligible
31	4 Lady Margaret Road	48.45	43.68	0.08	0.05	43.82	0.3	Extremely Small	Negligible
32	54 Green Drive	48.25	43.56	0.02	0.02	43.60	0.1	Extremely Small	Negligible
33	328 Park Avenue	48.31	43.61	0.04	0.02	43.66	0.1	Extremely Small	Negligible
34	202 Park Avenue	48.18	43.52	0.07	0.02	43.62	0.2	Extremely Small	Negligible
35	8 The Crescent	48.57	43.78	0.21	0.09	44.08	0.8	Extremely Small	Negligible
36	27 Randolph Road	48.06	43.41	0.11	0.10	43.62	0.5	Extremely Small	Negligible
37	33 Lewis Road	47.95	43.32	0.16	0.23	43.71	1.0	Extremely Small	Negligible
38	1 North Hyde Gardens	48.67	43.84	0.01	0.01	43.86	0.1	Extremely Small	Negligible
39	1 Wentworth Court	49.18	44.21	0.01	0.03	44.26	0.1	Extremely Small	Negligible
40	Kings House	48.54	43.76	0.27	0.13	44.16	1.0	Extremely Small	Negligible
41	Water Tower	48.02	43.38	0.27	0.15	43.80	1.0	Extremely Small	Negligible
Maximum		**49.25**	**44.31**	**0.31**	**0.23**	**44.58**	**1.1**	**Very Small**	**Negligible**
Minimum		**47.95**	**43.32**	**0.01**	**0.01**	**43.41**	**0.1**	**Extremely Small**	**Negligible**

Table 10.23 Predicted 90.41st Percentile of Daily Mean PM_{10} Concentrations – Blue NG Energy Scheme ($\mu g.m^{-3}$)

		2025						
Rec ID	Receptor Name	Without Dev	Contribution associated with changes in traffic flow/rail characteristics	Stack Contribution – Blue NG Energy Scheme	With Dev	Development as % of AQS Objective	Magnitude of Change	Significance
1	238 Quebec Road	44.15	0.02	0.36	44.53	0.8	Extremely Small	Negligible
2	1 Devonshire Way	43.64	0.01	0.32	43.97	0.7	Extremely Small	Negligible
3	59 Cranbourne Way	43.71	0.01	0.33	44.05	0.7	Extremely Small	Negligible
4	105 Quebec Road	43.92	0.02	0.36	44.30	0.8	Extremely Small	Negligible
5	186 Quebec Road	43.70	0.01	0.43	44.14	0.9	Extremely Small	Negligible
6	147a Minet Drive	43.65	0.05	0.42	44.11	0.9	Extremely Small	Negligible
7	1 Maypole Court	44.00	0.09	2.23	46.31	4.6	Very Small	Minor Adverse
8	15 The Green	44.23	0.23	2.48	46.94	5.4	Small	Minor Adverse
9	1 Martin Court	43.71	0.31	2.84	46.86	6.3	Small	Minor Adverse
10	46 Avenue Road	43.69	0.09	1.78	45.56	3.7	Very Small	Minor Adverse
11	15 Park Avenue	43.61	0.08	1.78	45.47	3.7	Very Small	Minor Adverse
12	1 South Road	43.84	0.23	2.08	46.15	4.6	Very Small	Minor Adverse
13	97 South Road(Ph)	43.95	0.16	1.88	45.99	4.1	Very Small	Minor Adverse
14	4 The Broadway	44.01	0.05	1.38	45.43	2.8	Very Small	Minor Adverse
15	4 High Street	44.31	0.06	1.35	45.72	2.8	Very Small	Minor Adverse
16	1 The Broadway	44.27	0.06	1.39	45.72	2.9	Very Small	Minor Adverse
17	7 The Broadway	44.27	0.04	1.42	45.72	2.9	Very Small	Minor Adverse
18	16 Andmark Court	43.71	0.10	1.52	45.32	3.2	Very Small	Minor Adverse
19	93 South Road	43.73	0.12	1.81	45.66	3.9	Very Small	Minor Adverse
20	152 The Broadway	43.87	0.01	0.48	44.36	1.0	Extremely Small	Negligible
21	Guru Nanak Sikh College	43.39	0.01	0.38	43.78	0.8	Extremely Small	Negligible
22	Hambrough Primary Sch	43.54	0.07	1.68	45.29	3.5	Very Small	Minor Adverse
23	Southall & W London Coll	43.44	0.04	2.16	45.64	4.4	Very Small	Minor Adverse
24	87 Avondale Drive	43.94	0.05	0.28	44.27	0.7	Extremely Small	Negligible
25	54 Pump Lane	43.50	0.04	0.27	43.80	0.6	Extremely Small	Negligible
26	20 Priory Close	43.68	0.02	0.26	43.96	0.6	Extremely Small	Negligible

		2025						
Rec ID	**Receptor Name**	**Without Dev**	**Contribution associated with changes in traffic flow/rail characteristics**	**Stack Contribution – Blue NG Energy Scheme**	**With Dev**	**Development as % of AQS Objective**	**Magnitude of Change**	**Significance**
27	87 Minterne Waye	43.71	0.01	0.35	44.08	0.7	Extremely Small	Negligible
28	12 Brookside Road	43.57	0.01	0.44	44.03	0.9	Extremely Small	Negligible
29	65 Delamere Road	43.61	0.01	0.66	44.29	1.3	Very Small	Minor Adverse
30	147 Uxbridge Road	43.95	0.02	1.59	45.57	3.2	Very Small	Minor Adverse
31	4 Lady Margaret Road	43.68	0.08	1.30	45.07	2.8	Very Small	Minor Adverse
32	54 Green Drive	43.56	0.02	0.64	44.21	1.3	Very Small	Minor Adverse
33	328 Park Avenue	43.61	0.04	0.54	44.18	1.1	Very Small	Minor Adverse
34	202 Park Avenue	43.52	0.07	0.74	44.33	1.6	Very Small	Minor Adverse
35	8 The Crescent	43.78	0.21	2.29	46.28	5.0	Small	Minor Adverse
36	27 Randolph Road	43.41	0.11	2.84	46.35	5.9	Small	Minor Adverse
37	33 Lewis Road	43.32	0.16	4.32	47.80	9.0	Small	Minor Adverse
38	1 North Hyde Gardens	43.84	0.01	0.26	44.11	0.5	Extremely Small	Negligible
39	1 Wentworth Court	44.21	0.01	0.75	44.97	1.5	Very Small	Minor Adverse
40	Kings House	43.76	0.27	2.61	46.64	5.8	Small	Minor Adverse
41	Water Tower	43.38	0.27	3.93	47.58	8.4	Small	Minor Adverse
Maximum		**44.21**	**0.31**	**4.32**	**47.58**	**9.0**	**Small**	**Slight Adverse**
Minimum		**43.32**	**0.01**	**0.26**	**43.78**	**0.5**	**Extremely Small**	**Negligible**

10.5.28 Table 10.22 summarises the predicted 90.41st percentile of daily mean PM_{10} concentrations for the modelled scenarios in 2009 and 'Without the Development' in 2025.

10.5.29 The change in the predicted 90.41st percentile of daily mean PM_{10} concentrations associated with changes in traffic flow characteristics on the local road network and the operation of the standalone energy centre are also shown in Table 10.22.

10.5.30 Using the magnitude descriptors set out in Table 10.9, the change in predicted 90.41st percentile of daily mean PM_{10} concentrations is extremely small at all receptors. Using the significance descriptors set out in Table 10.10 the air quality effects are negligible at all receptors.

10.5.31 The change in 90.41st daily mean PM_{10} concentrations associated with changes in traffic flow characteristics on the local road network and the operation of the Blue NG energy scheme are shown in Table 10.23.

10.5.32 Using the magnitude descriptors set out in Table 10.8, the change in predicted 90.41st daily mean PM_{10} concentrations ranges from extremely small to small. Using the significance descriptors set out in Table 10.10, the air quality effects are negligible or slight adverse at all receptors.

Residential Suitability

10.5.33 The annual mean PM_{10} concentration and the 90.41st percentile of daily mean PM_{10} concentrations have been predicted for a grid of receptors encompassing the Site. With the standalone energy centre, the predicted annual mean PM_{10} concentrations for all grid locations within the site are below the AQS annual mean objective of 40 $\mu g.m^{-3}$. The predicted 90.41st percentile of daily mean PM_{10} concentration for all grid locations within the site are below the AQS daily mean value objective of 50 $\mu g.m^{-3}$. With the standalone energy centre, the air quality effects are negligible.

10.5.34 With the Blue NG scheme, the predicted annual mean PM_{10} concentrations for all grid locations within the site are below the AQS annual mean objective of 40 $\mu g.m^{-3}$. The predicted 90.41st percentile of daily mean PM_{10} concentration for grid locations within the site is above the AQS daily mean value objective of 50 $\mu g.m^{-3}$ at two grid points. These grid points are at the façade of the block known as HS.09 which is the proposed cinema. As users of the cinema will not be present outside the building for the entirety of the averaging period of 24 hours, this location is not deemed relevant exposure and predictions at these points can be disregarded.

10.5.35 Excluding these two grid points, the predicted 90.41st percentile ranges from 43.34 $\mu g.m^{-3}$ to 49.95 $\mu g.m^{-3}$, below but not well below the objective of 50 $\mu g.m^{-3}$. The residential suitability of the Site is, at worst, minor adverse.

$PM_{2.5}$

10.5.36 Emission datasets for $PM_{2.5}$ are not readily available as part of the toolkit provided to Local Planning Authorities for R&A purposes. Therefore, it is not possible to predict $PM_{2.5}$ concentrations to allow a direct comparison with the latest objectives for this pollutant.

10.5.37 The reduction target of 15% applies at urban background locations away from the local influence of emission sources and applies to ambient concentrations only. The purpose of this assessment is to determine the effects of the proposed development on road related contributions to pollutant concentrations. Air quality effects associated with the proposed development will have a negligible effect on ambient concentrations and the local authority's ability to meet this objective.

10.5.38 Few sets of concurrent PM_{10} and $PM_{2.5}$ data exist in the UK. However, data for four sites in the UK are reported in Sources of Particulate Matter in Urban Areas: TRAMAQ Project UG 250[(10.20)]. The key findings of this report are that 'the relative contribution of fine ($PM_{2.5}$) and coarse (PM_{10} - $PM_{2.5}$)

particles to the PM_{10} is variable between sites, but very approximately in the ratio of 2:1 fine to coarse particles.' This suggests that $PM_{2.5}$ concentrations in urban areas are very approximately two-thirds of PM_{10} concentrations.

10.5.39 For this assessment, the maximum predicted annual mean PM_{10} concentrations in 2025 with the standalone energy centre is 22.35 $\mu g.m^{-3}$. Therefore, the maximum predicted annual mean $PM_{2.5}$ concentration in 2025 is very approximately 22.35 *2/3 = 14.9 $\mu g.m^{-3}$, below the AQS objective of 25 $\mu g.m^{-3}$ required to be met by 2020.

10.5.40 The maximum predicted annual mean PM_{10} concentrations in 2025 with the Blue NG stack is 23.36 $\mu g.m^{-3}$. Therefore, the maximum predicted annual mean $PM_{2.5}$ concentration in 2025 is very approximately 23.36 *2/3 = 15.57 $\mu g.m^{-3}$, below the AQS objective of 25 $\mu g.m^{-3}$ required to be met by 2020.

Summary of Results

10.5.41 With the standalone energy centre, the operational effects of the Scheme on the existing environment generally range from negligible to minor adverse. The increase in pollutant concentrations is mainly due to increased vehicle emissions associated with changes in traffic flow characteristics rather than emissions from the standalone energy centre. The significance of effects for environmental suitability is minor adverse.

10.5.42 With the Blue NG scheme, the operational effects of the Scheme on the existing environment generally range from minor to moderate adverse. The increase in pollutant concentrations is attributable to both emissions from the Blue NG scheme, and increased vehicle emissions associated with changes in traffic flow characteristics. The significance of effects for environmental suitability is minor adverse.

10.6 Mitigation and Enhancement

Construction Phase

10.6.1 The London Best Practice Guide (BPG) provides best practice mitigation measures based on the level of risk identified at construction sites. The mitigation measures provided below are applicable for consideration to the proposed development site which has been identified as being of 'high risk' of causing air quality effects during the construction phase:

Site Planning

- Erect solid barriers to site boundary;
- No bonfires;
- Plan site layout–machinery and dust causing activities should be located away from sensitive receptors;
- Site personnel to be fully trained;
- Trained and responsible manager on site during working times to maintain logbook and carry out site inspections;
- Hard surface site haul routes;

- Use nearby rail or waterways to transport to / from Site; and

- Put in place dust real-time monitors across site (these can be useful in some circumstances but should not replace visual inspection and proactive preventative control measures).

Construction Traffic

- All vehicles to switch off engines – no idling vehicles;

- Effective vehicle cleaning and specific fixed wheel washing on leaving site and damping down of haul routes;

- All loads entering and leaving site to be covered;

- No site runoff of water / mud;

- On-road vehicles to comply to set emission standards;

- Non Road Mobile Machinery (NRMM) to use ultra low sulphur diesel (ULSD) where available and be fitted with appropriate exhaust after-treatment from the approved list (where appropriate);

- On-road vehicles to comply with the requirements of a possible future Low Emission Zone (LEZ) as a minimum;

- Minimise movement of construction traffic around site; and

- Hard surfacing and effective cleaning of haul routes and appropriate speed limit around site.

Demolition Works

- Use water as dust suppressant;

- Cutting equipment to use water as suppressant or suitable local extract ventilation;

- Use enclosed chutes and covered skips; and

- Wrap building to be demolished.

- Site Activities

- Minimise dust generating activities;

- Use water as dust suppressant where applicable;

- Cover, seed or fence stockpiles to prevent wind whipping;

- Re-vegetate earthworks and exposed areas; and

- If applicable, ensure concrete crusher or concrete batcher has Permit to operate.

10.6.2 Continuous site monitoring of particulate matter during construction will provide valuable information for ensuring that the measures implemented are controlling the dust and emissions generated. The scale, nature and location of the monitoring would be agreed with LB Ealing prior to the commencement of construction works.

10.6.3 Effective implementation of the measures set out above will help to reduce the effect of construction activities to medium or low risk.

Operational/Occupational Phase

10.6.4 With the standalone energy centre, the increase in pollutant concentrations does not lead to a breach of the AQS objectives. Receptors are not introduced to pollutant concentrations in excess of the AQS objectives for any pollutant. Consequently, the impacts are considered to be a low priority consideration and mitigation measures will be implemented to further reduce effects, such as:

- Traffic management measures;
- The provision of secure cycle parking;
- Managing the use of parking spaces;
- Appropriate ventilation provision and design would be implemented to further reduce any air quality effects;
- Tree planting, and
- Monitoring of air quality in line with Borough Air Quality Action Plan.

10.6.5 With the Blue NG scheme, the increase in pollutant concentrations does lead to a breach of the AQS objectives at some isolated locations, however specific mitigation measures would be required to remove the overriding effects.

10.6.6 The facility will employ 'Best in Class' technology in order to minimise emissions. In terms of NO_2 emissions, Selective Catalytic Reduction (SCR) will be used which will significantly abate NO_2 emissions. Specialist fuel valve technology will also be utilised in order to reduce particulate emissions from the installation. Carbon filtration techniques are available, if deemed necessary, in order to minimise emissions from fuel storage tank venting. Regular maintenance to optimise the performance of the engines will be carried out in order to minimise emissions.

10.6.7 At all other locations, the increase in pollutant concentrations does not lead to a breach of the AQS objectives. Therefore, mitigation measures as outlined above would be implemented to further reduce the effects.

10.7 Residual Effects

10.7.1 Table 10.24 summarises the potential residual effects associated with the proposed Scheme. Due to the length of the construction period, potential effects associated with this phase have been included within this section. Any effects associated with the construction phase will cease in 2025 upon completion of the proposed Scheme.

Table 10.24 Residual Air Quality Effects

Environmental topic	Impact identified	Significance	Mitigation measure	Residual Effect	Residual significance
Air Quality	Construction Phase Emissions	High Risk	As per London BPG	Low risk	Negligible
	Operational Phase – Standalone Energy Centre	Minor Adverse	General	Minor Adverse	Minor Adverse
	Operational Phase – Blue NG Scheme	Minor to Moderate Adverse	Best in Class technology and Selective Catalytic Reduction and if necessary Carbon Filtration techniques.	Minor Adverse	Minor Adverse

References

10.1 Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management.

10.2 Council Directive 2008/50/EC of 21May 2008 on ambient air quality and cleaner air for Europe.

10.3 Defra, The Air Quality Standards Regulations 2007

10.4 Defra (2000). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Working Together for Clean Air.

10.5 Defra (2003). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Working Together for Clean Air - Addendum.

10.6 Defra (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Working Together for Clean Air.

10.7 Defra (2006) Part IV of the Environment Act 1995. Local Air Quality Management, Policy Guidance, LAQM.PG(03).

10.8 DEFRA (2005) Policy Guidance: Addendum LAQM.PGA(05).

10.9 ODP, 2004, Planning Policy Statement 23: Planning and Pollution Control.

10.10 GLA, 2008, The London Plan – Spatial Development Strategy for Greater London.

10.11 GLA, 2002, The Mayor's Air Quality Strategy

10.12 LB Ealing (2004) Local Policy – Unitary Development Plan for London Borough of Ealing

10.13 LB Ealing (2005) Supplementary Planning Guidance (SPG) for London Borough of Ealing.

10.14 LB Hillingdon Planning Services (1998) Hillingdon Unitary Development Plan

10.15 LB Hounslow (2003) Hounslow Unitary Development Plan

10.16 Defra (2003) Local Air Quality Management – Technical Guidance TG(03)

10.17 Mayor of London, (2006), The Control of Dust and Emissions from Construction and Demolition, Best Practice Guidance.

10.18 NSCA (2006) Development Control: Planning for Air Quality.

10.19 AEAT (2005) The contribution of rail diesel exhaust emissions to local air quality

10.20 ERM, 2002, Sources of Particulate Matter in Urban Areas: TRAMAQ Project UG 250

11 TOWNSCAPE AND VISUAL EFFECTS

11.1 Introduction

11.1.1 This chapter describes the existing townscape and visual context at the Site and identifies potential townscape and visual effects that would arise from the implementation of the proposed Scheme, including effects upon the setting of a nearby Conservation Area and a Listed Building.

11.1.2 This chapter has been prepared to:

- Describe the baseline conditions prevailing for townscape and views before development;
- Assess the likely impacts of the proposed Scheme comprising the illustrative masterplan and associated Parameters Plans for the Site, the Pump Lane Link Road, Minet Park Bridge, Springfield Road Bridge and the Eastern Access.

11.1.3 The assessment of townscape and visual effects has been undertaken by RPS Planning and Development (Swindon Office).

11.2 Planning and Legislative Context

National Planning Policy

Planning Policy Statement 1 (PPS1): Delivering Sustainable Development (2005) [1.1]

11.2.1 PPS1 sets out the Government's strategy with regard to the scope and approach of planning authorities to the preparation of regulatory spatial planning documents. It sets out the overarching planning policies on the delivery of sustainable development through the planning system and is to be read in conjunction with other relevant Planning Policy Guidance (PPG) notes and Planning Policy Statements (PPS). See also Chapter 5: Planning Policy Context.

11.2.2 Of particular note with regard to landscape and visual issues is the emphasis on the adoption of a positive and proactive approach to planning and the role of urban design and townscape quality in delivering and maintaining vibrant and sustainable development and better quality of life for all. Paragraph 17 notes that planning policies should seek to protect and enhance the quality, character and amenity value of the countryside and urban areas as a whole, and that a high level of protection be afforded to the most valued townscapes, landscapes, wildlife habitats and natural resources.

11.2.3 Paragraph 27 sets out the general approach that should be adopted when delivering sustainable development, and in particular that planning authorities should seek to "*enhance as well as protect biodiversity, natural habitats, the historic environment and landscape and townscape character*".

11.2.4 The spatial design, arrangement and quality of design of the development is of key importance in establishing a sense of place on presently under-used land, whilst establishing links with the existing urban fabric. These principles of the Scheme are considered in detail in the Design and Access Statement (DAS) (a separate document accompanying the Planning Application), whilst this Townscape and Visual Assessment assesses the proposed Scheme as defined by the Parameter Plans (see Figure 3.4 a-p).

Planning Policy Statement 3 (PPS3) Housing [11.2]

11.2.5 PPS3 sets out the national planning policy framework for delivering the Government's housing objectives.

11.2.6 Paragraph 12 states that good design is fundamental to the development of high quality new housing, which contributes to the creation of sustainable, mixed communities. Reflecting policy in PPS1, Paragraph 13 states that good design should contribute positively to making places better for people and design which is inappropriate in its context, or which fails to take the opportunities available for improving the character and quality of an area and the way it functions, should not be accepted.

Planning Policy Guidance 15 (PPG15): Planning and the Historic Environment (1994) [11.3]

11.2.7 Whilst built heritage is described more fully in Chapter 16 of this ES, it is of relevance with respect to visual and townscape character. PPG15 sets out Government policy with regard to the historic environment, including the treatment of Listed buildings and their setting.

Regional Planning Policy

The London Plan with alterations since 2004 (2008) [11.4]

11.2.8 The London Plan sets out the Mayor's Spatial Development Strategy for Greater London. Chapter 5: Planning Policy and Policy Context of this ES describes general London Plan policies that relate to the Site including the identification and allocation of West Southall within the Hayes/West Drayton/Southall Opportunity Area. The following text considers London Plan policies related to townscape and related issues.

11.2.9 Policy 4B.15, London View Protection Framework of the London Plan designates a series of views within Greater London that are considered to be of strategic importance. More recently, Supplementary Planning Guidance entitled 'London View Management Framework' was published in July 2007, which elaborated on the the London Plan. The Site and its environs do not fall within any of the identified protected view zones; therefore, this policy is not considered further.

11.2.10 Section 4C of the London Plan sets out the Mayor's vision for the establishment and protection of the 'Blue Ribbon Network', which is made up of natural and man-made water bodies within the capital. The Yeading Brook and, in particular, the Grand Union Canal ('the Canal') form elements of the Blue Ribbon Network.

11. 2.11 Policy 4C.1 sets out the strategic importance of the Blue Ribbon Network, and states the requirement for collaboration where land use planning may have an effect upon it. Paragraph 4.99, notes that certain identified 'Opportunity Areas' also include or adjoin parts of the Network, specifically the Hayes/West Drayton/Southall Opportunity Area.

11. 2.12 Policy 4C.17 states that increasing access along and to the Blue Ribbon Network promotes water and waterside uses for the enjoyment and amenity of all. The policy states that new access points should be provided as part of development proposals for Opportunity Areas and Areas for intensification, particularly in areas of deficiency.

11.2.13 Policy 4C.20: Design – Starting from the Water, sets out the Mayor's requirements with respect to the form and appearance of waterside development. The policy notes in particular, that proposed development should "*reflect local character, meet general principles of good urban design and improve the quality of the built environment*".

11.2.14 Policy 4C.21: Design Statements, requires the preparation of an assessment for all major development proposals that covers various aspects of the physical and visual impacts of the

proposal on the water body, including biodiversity and any impacts on river prospects or other locally designated views. Chapter 3 of this ES describes the design of the proposed Scheme, however, aspects of the detailed design, as described in the separate DAS, would be addressed at reserved matters application stage. The potential effects upon biodiversity are addressed respectively in Chapter 14: Ecology.

11.2.15 Policy 4C.22: Structures over and into the Blue Ribbon Network, emphasises the need to justify and assess potential impacts arising from such structures.

Local Planning Policy

Ealing Plan for the Environment (Adopted October 2004) *(11.5)*

11.2.16 Chapter 3 of the 'Ealing Plan' addresses 'Green Space and Natural Environment'. The Council's Strategic Policy 1.3 seeks protection and enhancement of green spaces, biodiversity and nature conservation within the Borough.

11.2.17 Policy 3.1 sets out detailed policy for Major Open Areas and Green Belt. Land adjacent to the Site that is designated as Green Belt, and the Minet Country Park open spaces falls outside the Ealing Borough boundary. However, policy 3.1(6) of the Ealing Plan states that proposed development adjacent to Major Open Areas should not prejudice the purpose, openness or environmental character of that area. The proposed Pump Lane Link Road traverses the Green Belt and also part of Minet Country Park, whereas the Springfield Road Footbridge and Minet Park Footbridge will encroach upon the eastern most extent of the Green Belt.

11.2.18 Table 3A of the Ealing Plan for the Environment: Development adjacent to Metropolitan Areas, notes particular considerations that the Council would normally take into account when considering such applications. However, it should be noted that Supplementary Planning Guidance has been agreed specifically for the Site (see below), which sets out spatial and design objectives for the Site.

11.2. 19 Policy 3.2: Green Corridors and the Waterway Network, applies directly to the Canal and attendant site frontage. It states that development adjoining or affecting the setting of these corridors will be expected to enhance their visual, nature conservation and recreational qualities, and their continuity and inter-visibility. This policy also seeks promotion of amenity and environmental aspects of the Green Corridors, whilst prohibiting adverse effects upon the quality and hydrology of watercourses.

11.2.20 Table 3B of this Policy: River and Waterway Corridors, sets out particular objectives including enhanced environmental and townscape quality, public access and water related recreation; resisting loss of water space and encouraging retention and restoration of historic canal side features.

11.2.21 Policy 3.4(2) of the Ealing Plan seeks the establishment of additional public and community open space where there is a deficiency in open space provision.

11.2.22 Policy 5.5: Residential Design, sets out criteria that seek to deliver good living conditions, architectural quality, integration within its setting and attainment of sustainability objectives. Of particular relevance to townscape and visual issues is 5.5(5) which states a commitment to achieving high quality design and materials in building and external townscape design.

Former Southall Gasworks Development Principles: Supplementary Planning Guidance (2004) *(11.6)*

11.2.23 The Draft Supplementary Planning Guidance was adopted in October 2004 (see Chapter 5: Planning Policy and Policy Context in this ES).

11.2.24 The Guidance sets out a table of 'Development Principles' under a series of topic headings. With regard to the mix of uses, the expectation is noted that the Site will contribute to open space provision and environmental improvement. It is also noted that the redevelopment of the Site is expected to "*compliment and exploit the canal side setting consistent with the principles of the Blue Ribbon Network*" as set out in the London Plan.

11.2.25 With regard to open space, the objectives of the SPG seek creation of private and publicly accessible open space that has good pedestrian and cycle links across the Canal and Yeading Brook to the new Minet Country Park. It also seeks an upgrade of the Minet Country Park whilst making appropriate provision for nature conservation. Overall it seeks to embrace and enhance the canal side setting and access to and along it.

11.2.26 The SPG identifies a number of Urban Design Objectives of direct relevance to townscape and visual issues. These include provision of World-class building and spaces design that responds to and respects surrounding uses, achieved through imaginative building heights and massing, with taller landmark buildings. The Site layout should respond to and enhance views to existing visual features (the gasholder, former Water Tower, the Canal and the strong linear form of surrounding housing).

Hillingdon Unitary Development Plan (1998) *(11.7)*

11.2.27 Part 2, Section 1: Maintaining and Enhancing the Environment, of the Hillingdon UDP sets out the Borough's policy on Green Belt.

11.2.28 Policy OL1 describes development that is considered by Hillingdon to be acceptable within the Green Belt. Polices OL2 to OL7 set out controls on applications for other developments proposed within Green Belt land, each of which is related to new build development. The construction of roads falls outside the descriptions, however, the potential effects of the Springfield Road Footbridge, Minet Country Park Footbridge and Pump Lane Link Road upon the openness of the Green Belt is addressed in the townscape assessment.

11.2.29 The potential visual effect of development adjacent to the Canal is addressed by policy BE32 that seeks a balance between ecology and recreation, by promoting environmental improvements to waterside areas and sympathetic development design that enhance or create views between the development and the watercourse.

11.2.30 The objectives of policy BE34 closely resemble those of policy BE32 which seeks similar objectives, albeit in relation to the Yeading Brook corridor.

11.2.31 Paragraph 5.47 describes the importance of trees and landscaping within the built environment and Policy BE38 requires the retention of topographical and landscape features of merit, and enhancement where appropriate.

Hillingdon - Revised Core Strategy – Preferred Options (2007) *(11.8)*

11.2.32 ES Chapter 5: Planning Policy and Policy Context, sets out the process and background to the replacement of the Hillingdon UDP. Sections 11 and 16 are of particular relevance to the Townscape and Visual assessment insofar as they address Hillingdon's Natural Environment and Built Heritage with preferred policy options related to designated Green Belt (covering much of Minet Country Park), Sites of Nature Conservation Importance (of which the entire Canal network is the largest in London), and Rivers and Canals (including the Canal and Yeading Brook). Trees and landscaping are also noted as important features in both open and built up areas.

11.2.33 Preferred Option CP11 seeks maintenance of the open environment, and it's recreation and amenity value, by protecting the features listed above and other areas of open space that contribute to the quality of the Borough whilst also seeking improvements to the play space provision of open spaces.

11.2.34 Paragraph 11.30 notes that the preferred option is to protect and enhance heritage assets, whilst enabling necessary change, which is relevant to the Site in terms of the heritage of the Canal.

11.2.35 Preferred Option DC 19 -Trees and Landscaping, notes that development proposals will be expected to retain and use topographical and landscape features of merit, provide new planting and landscaping that also enhances biodiversity, and where appropriate incorporate a management scheme of the trees and landscaping.

11.2.36 'Protecting Open Space' is set out in Preferred Option DC21; where the loss of any type of open space will not be permitted. Also, provision should be made for landscaping, planting and future maintenance of open spaces provided.

Hounslow Unitary Development Plan (2003) [11.9]

11.2.37 The boundary of the London Borough of Hounslow lies, at its closest point, some 500m to the south of the Site. Whilst the policies of the Hounslow UDP would not be directly affected, there is some potential for indirect or secondary effects to occur in relation to the Canal and views.

11.2.38 Policy ENV-B.2.8 'Views and Landmarks' seeks to protect identified local views and landmarks within and from the Borough. Whilst none of these would be affected by the proposed development, views from Bull's Bridge and from the vicinity of Osterley Park toward the Site have been addressed by the visual impact assessment (see below).

11.3 Methodology and Significance Criteria

11.3.1 The assessment of the potential effects on townscape and visual issues is based on professional experience and judgement in accordance with best practice guidelines from the Institute of Environmental Management and Assessment and The Landscape Institute (2002) [11.10]. The approach has been summarised in this chapter and the full details of the methodology can be viewed in Appendix 11.1.

Townscape Assessment

11.3.2 A townscape and visual assessment is an analysis of the physical and perceptual attributes of an area. The townscape assessment of the site relates to the effect of development on the townscape resource (for example the general character of an area, or specific elements such as buildings, historic features, established trees and vegetation etc.), whereas the visual assessment is concerned with the effect on visual amenity.

Visual Assessment

11.3.3 The visual assessment has been based on the effects that are likely to result from the implementation of the proposed development. The Assessment has taken the maximum building heights (as outlined in the parameter plans) into consideration. However, the interrelationship between building heights would be dictated by the design principles set out in the DAS, and through other development parameters, such that the maximum heights could not be built-out across the Site.

Basis for Assessment

11.3.4 The effects of the proposed Scheme upon the defined baseline character areas are considered in terms of townscape character and views. The effects on designated townscape resources are also described.

11.3.5 The DAS provides an illustration of the desired development options within the parameters. These have therefore been used to provide a broad understanding of the spatial character of the Scheme. The maximum building heights have been used to generate illustrative comparative views from representative viewpoints around and through/within the site (see Figures 11.5 and 11.5a to 11.5l). The comparative views include:

- Photographs of the existing 2007 view;
- 3-dimensional computer generated images of the proposed Scheme using maximum storey heights; and
- Viewpoint location plan.

11.3.6 The significance of the changes to existing views would vary with the viewers' perception. The loss of local views to landmarks such as the gasholder or the Water Tower is likely to be regarded as 'adverse' but these landmarks may be seen in the context of foreground views of the under-used land of Site. Both aspects have been taken into account in reaching a judgement about the effects of the proposals.

11.3.7 New views would be created within the Site, to and from areas not presently accessible to the public, and are generally considered to be beneficial.

Comparative View Preparation

11.3.8 The Mayor of London's Supplementary Planning Guidance (SPG) London View Management Framework has been developed as a tool for the protection and enhancement of the most important views towards London's historic landmarks designated in the London Plan. In Appendix C of the SPG, 'Accurate Visual Representation' (AVR) is described as a technique which "*shows the location of a proposed development as accurately as possible; it may also illustrate the degree to which the development will be visible, its detailed form or the proposed use of materials*". Whilst the views to, from and within the Site are not as sensitive as those that are the subject of the London View Management Framework, techniques similar to those of AVR have been used in preparing illustrations of the extent to which the proposed development will be seen from potentially sensitive viewpoints identified by all three Local Planning Authorities.

11.3.9 Appendix 11.2 sets out the methodology used to prepare a series of Comparative Views using techniques similar to those described in the SPG, adopted to inform the visual impact assessment of the proposed development.

Evaluation

11.3.10 The evaluation stage applies judgements about the importance of the physical landscape and townscape resources and views, and their sensitivity to change arising from implementation of the Scheme. It takes into account the professional opinion of the assessors, local designations and the opinion of consultees. The assessment applies the following criteria: importance/value, Sensitivity to change; nature of the effects in terms of magnitude/scale and duration; and assessment of significance.

Importance and Sensitivity to Change

11.3.12 The assessment of importance included evaluating individual features, character areas and views to determine their value, assigning greater importance to listed buildings and their setting and identifying those buildings, structures and features which make a positive or negative contribution to the townscape. Importance has then been categorised as; none, very low, low, moderate, high and very high.

11.3.13 Sensitivity to change is described by the LI/IEMA Guidelines (paragraph 7.16) as "*The degree to which a particular landscape type or area can accommodate change arising from a particular development, without detrimental effects on its character*". Sensitivity will vary in accordance with the type and character of changes that are proposed.

Magnitude

11.3.14 No standard methodology exists for the quantification of scale or magnitude. However, the LI/IEMA Guidelines state (paragraph 7.19) magnitude "*is generally based on the scale or degree of change to the landscape resources, the nature of the effect and its duration including whether it is permanent or temporary*".

Assessment of Significance

11.3.15 For the purposes of the assessment, the significance of townscape and visual effects is based on two aspects:

- The receptor – its character, importance or value, and its sensitivity to change;
- The effects – arising from the implementation of the proposed development in terms of magnitude/scale, nature and duration of effect.

11.3.16 The term 'receptor' is used to mean an element or assemblage of elements that would be directly or indirectly affected by the proposed Scheme (paragraph 6.12, LI/IEMA Guidelines).

Level of Significance

11.3.17 Levels of significance used in this assessment are consistent with the generic criteria set out Chapter 2: ES Scope and Methodology in Table 2.5 and reproduced in Table 11.1 below.

Table 11.1 Significance Matrix

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

11.3.18 Greater significance has been attributed to those aspects of the Proposals that meet the townscape and visual objectives set out in the Draft Supplementary Planning Guidance related to the West Southall Site (the SPG is discussed in further detail in Chapter 5: Planning and Policy Context).

Extent of Study Area

11.3.19 The geographical extent of the townscape and visual assessment has been considered at two levels:

- Wider Level – The site does not fall within any of the View Protection policies identified in the London Plan (Policies 4B.15, 4B.16 or 4B.17), or subsequent Supplementary Planning Guidance set out in the London View Management Framework. However, some views would be gained from beyond the local area, particularly toward taller elements of the proposals.

- Local level – The townscape character and visual receptors are assessed in detail for the area within the planning application boundaries and zones that abut them.

Assessment Scenarios

11.3.20 The Scheme would be built out in stages as described in Chapter 6: Construction and Phasing in this ES, please refer to Figure 6.1. The townscape and visual assessment considers four broad stages in order to assess new receptors which will be introduced throughout the build-out of the development.

11.3.21 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 of 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 Scheme 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 proposed development will be operational, this has been assumed to be 2025.

- Principal Assessment Year +15 Years takes into account any changes which may effect the Scheme post completion such as the continued growth of landscaped areas.

Consultations

11.3.22 Chapter 2: EIA Scope and Methodology, outlines the background to consultations conducted with regard to the proposed development. The proposed scope of the landscape/townscape and visual assessment was set out in the EIA Scoping Report issued to Consultees in September 2007 and no comments were made about the approach of the assessment by either LB Ealing and Hillingdon or their consultees.

11.3.23 LB Ealing were contacted by telephone in August 2007 in order to confirm the sensitive viewpoints that may be affected by the proposed Scheme; the Council did not identify any additional viewpoints over and above those considered for the previous 2005 development. These were concerned principally with views from South Road/Southall Station toward the Water Tower and from Minet Country Park in neighbouring Hillingdon.

11.3.24 In August 2007, LB Hillingdon was contacted by telephone. The Council noted that the landscape and visual assessment should address potential impacts both on and off the Site, particularly in relation to Minet Country Park and the Grand Union Canal corridor. This has been completed as part of the landscape and visual assessments, with particular regard to the Canal frontage and the openness of the Green Belt.

11.3.25 LB Hounslow were contacted by telephone and email in August 2007 and noted that locations within Hounslow Borough should also be considered as potential representative landscape and visual receptors. This Council requested, in particular, that potential views from Osterley Park and the M4 motorway corridor be addressed. The assessment has duly considered potential effects upon LB Hounslow.

Tree Survey

11.3.26 The tree survey (see Appendix 14.5) describes individual trees and tree groups that fall within or adjacent to the Main Site, including along the Grand Union Canal towpath in accordance with BS5837 2005: Trees in Relation to Construction - Recommendations.

Assumptions

Design Quality

11.3.27 It has been assumed that there is a firm commitment to providing a high standard of design in the delivery of the scheme. This would be achieved through implementation of the design principles set out in the DAS throughout the detailed design process and subsequent reserved matters applications and other regulatory processes.

Lighting

11.3.28 The assessment also assumes that all roads and access routes would be lit to adoptable standards. Accent lighting would be developed to highlight features of interest and particular townscape merit. It is assumed that light pollution and spillage would be minimised within the context of Heathrow Airport and the amenity of neighbouring users.

11.4 Baseline Conditions

11.4.1 The term 'Baseline' is used to describe the prevailing conditions on and in the vicinity of the Site at the commencement of development works. This may be the equivalent of 'existing conditions' that are recorded during surveys and studies conducted to inform the development design and EIA, often however, development will not begin for several years. For the purposes of this assessment, 2007 is taken as the 'existing' year, and 2009/10 as the Baseline Year.

Designations

11.4.2 Section 11.2 above describes planning allocations and/or policies related to the study area including Green Belt and the Blue Ribbon Network. Land to the west Canal and including part of the Canal is designated as Green Belt.

11.4.3 The Site is not subject to any international, national or regional designations related to particular features of landscape or visual quality or interest.

11.4.4 As noted above, the Canal is designated as a Site of Metropolitan Importance for Nature Conservation in both the Ealing and Hillingdon UDP's (see Chapter 14: Ecology).

Canalside Conservation Area

11.4.5 The eastern part of the Grand Union Canal (that which falls within Ealing) is also designated as a Conservation Area as shown on Map 8 – Conservation within the London Borough of Ealing UDP. The Canalside Conservation Area was designated in 1993 and includes the Paddington Arm and

Canal. The towpath of the Paddington Arm of the Grand Union Canal runs alongside the Site between Spike's Bridge and Bull's Bridge. This part of the Canal is included within the Conservation Area boundary. The Canalside Conservation Area statement identifies that from Bulls Bridge, the Paddington Arm of the canal follows a "*pleasant if largely featureless course as far as Spike's Bridge*".

11.4.6 The Conservation Area does not have a conventional character, but is rather of a linear nature and narrowly defined. The key defining feature is the Canal itself. Whilst the Conservation Area appraisal includes a section on "*special interest*", the report does not identify the reasoning behind the designation. However, it is likely that the Canal was included for its intrinsic historic interest (as part of the area's wider development) and also as a potentially attractive water feature.

Vegetation

11.4.7 A tree survey (December 2005) of individual trees and groups of trees within the proposed planning application boundary was updated in September 2007 and again in February 2008 (see Appendix 14.5).

11.4.8 Mature trees and shrubs within the Site are largely restricted to site boundaries. Blocks of trees and/or shrubs occur along the northwestern boundary immediately to the south of Blair Peach Primary School, the Canal frontage and fringing The Straight to the east of the gasholders. Mature trees and scrub encircle the derelict cricket pitch, with scrub encroaching on the open area of the derelict path.

11.4.9 None of the trees within the Site are subject to a Tree Preservation Order. However, those that fall within the Canal Conservation Area (along the eastern towpath within LB Ealing) are afforded some protection against unauthorized tree works or felling.

11.4.10 The majority of individual trees and tree groups surveyed fall within the categories C (poor) and D (very poor and should be removed). The BS5837 criteria (see Appendix 14.5) note that category 'C' trees may be retained but are not worthy of inclusion in the higher grades of 'A' or 'B'.

11.4.11 Isolated mature street trees exist along residential streets to the north of the Site including Ranelagh Road and West End Road. Mature trees and shrubs occur in the curtilage of the Water Tower, and some self-seeded saplings occur on the South Road bridge embankment along The Crescent.

11.4.12 A remnant hedgerow occurs to the south and east of the Guru Nanak Sikh College off Beaconsfield Road (west), fringing the open sports areas. Mature shrubs and occasional trees fringe the banks of the Yeading Brook. Occasional mature trees also occur along the western bank of the Canal. Extensive scrub occurs within the southern part of Minet Country Park and between the Grand Union Canal and Yeading Brook, cloaking uneven ground where waste tipping has historically occurred (see Chapter 12: Ground Conditions and Chapter 14: Ecology).

Land Use

11.4.13 Land use on site and in the surrounding area is discussed fully in Chapter 3: Site and Proposed Development.

Urban Grain

11.4.14 The topographical development of the Site and land around it is illustrated in Appendix 15: Archaeology and Built Heritage. Small to medium scale, rectilinear urban grain prevails to the north, east and south of the Site related principally to housing estate layouts dating from c.1895 onwards. This urban grain is truncated at the boundaries of the Site and/or the railway line.

11.4.15 The 1935 OS map shows the Site to be comprehensively developed as the gasworks and chemical works together with associated recreational areas. By 1965, the warehouse/workshops appear, creating a large-scale urban grain in a generally southeast/northwest and southwest/northeast rectilinear form.

11.4.16 Closure of the chemical works and contraction of the gasworks site, coupled with site clearance, has progressively reduced the extent of development within the Site since production of the 1965 OS map. At 2007, the vacant land of the Site displays no distinctive urban grain, although the large-scale gasholders and some remnant hard-surfaces are retained.

11.4.17 The open land of the Minet Country Park/Yeading Brook corridor has no discernible urban grain.

Buildings

11.4.18 Buildings within the Site are limited to temporary single storey buildings and two retained warehouses/workshops.

11.4.19 Residential areas to the north, east and south of the Site are predominantly red brick two-storey mixed tenure properties. The only historically noteworthy structure within the Site is the prominent Water Tower at the eastern extremity of the Site (refer to Figure 11.1a: View 4). This structure is on the statutory schedule of buildings of special architectural and historic interest, at Grade II. Chapter 16: Built Heritage discusses the Water Tower further. Two-storey cottages and associated boundary walls fall within the curtilage of the Water Tower and enhance the historic setting for the building.

11.4.20 The Crescent comprises a two-storey residential brick terrace between the Water Tower and South Road (refer to Figure 11.1a: View 6,7,8 and 12), which has been subject to alteration and exhibits disparate façade treatments. Despite the present appearance of The Crescent, it is identified in the UDP as a 'building or façade of group value' (see Heritage Assessment at Appendix 16.1 for further detail).

11.4.21 Residential uses give way to employment uses to the south of the railway, generally to the west of the NGG compound, but also toward the easternmost part of the Site, west of South Road railway bridge.

11.4.22 No permanent buildings occur within Minet Country Park. To the northwest of Minet Country Park, the Guru Nanak Sikh College (refer to Figure 11.1a: View 22) and Yeading FC clubhouse and spectator stand are present to the south of Beaconsfield Road (Hayes). Large-scale industrial units (6 to 8m high) lie to the north of Beaconsfield Road (Hayes).

Open Spaces

11.4.23 The open land within the Site is in private ownership, with no right of access to members of the public, reinforced by airport parking security measures .

11.4.24 A small play area and open space has been created to the north of The Crescent/motor engineering workshop (refer to Figure 11.1a: View 9,10,11 and 12); it is estimated that this is less than 20 years old and exists on a plot of land formerly occupied by buildings.

11.4.25 The Grand Union Canal and towpath form a linear open space, which is publicly accessible. However, the point of access in the vicinity of the Site is restricted to the Bankside frontage area via Uxbridge Road (300-500m to the north) and a pedestrian link from Beaconsfield Road (adjacent to the Blair Peach Primary School). Additional access is gained from Bull's Bridge to the south of the railway.

11.4.26 Minet Country Park forms the main public open space within the study area, as shown on Figure 2.2.

11.4.27 Spencer Street Play Centre is a small public space and equipped children's play area, which lies immediately to the south of the railway adjacent to the pedestrian underpass off The Straight.

Lighting

11.4.28 Generally, levels of ambient night-time lighting are high within the study area, influenced largely by street lighting within the conurbation of Southall, Hayes and Hounslow.

11.4.29 Within the immediate area of Site, localised security lighting is situated within the secure parking area. This comprises temporary columns of approximately 5m tall, set within the car parking ranks.

11.4.30 Tall highway lighting occurs along the Hayes bypass to the west, elevated on embankments or bridge structures for much of its length.

Character Areas

11.4.31 The landscape or townscape characteristics of the study area broadly describe land that has been modified or strongly influenced by current or past development, in keeping with the urban context of Greater London.

11.4.32 The townscape assessment has identified six character areas that fall within or adjacent to the Site as identified at Figure 11.2. Appendix 11.3 describes the character areas in detail including the historic use, land use, landscape features, public access, buildings within the area, spaces and townscape, views from area, baseline character and sense of place, and highlights opportunities for change. Descriptions of the boundaries and designations of the character areas are presented in Table 11.2.

Table 11.2 Boundaries and Designations of Character Areas

Character Area		Boundaries	Designations
1	**Minet Country Park and Yeading Brook Corridor (see Figure 11.2 & 11.3.1)**	The northern boundary is defined by the southern edge of Beaconsfield Road (west of Yeading Brook), and in part also by Uxbridge Road, the eastern boundary defined by the Grand Union Canal towpath, southern boundary defined by the West Coast Main Line railway and western boundary defined by the A312 Hayes Bypass	The area is part in Green Belt and Minet Country Park contains the GUC and the towpath and London Trail. It also comprises part of the Conservation Area.
2	**Large Scale Urban Area (see Figure 11.2 & 11.3.2)**	Three pockets of land fall within this character area description including: Business/Commercial Park off Springfield Road/Beaconsfield Road (Hayes) in which the northern boundary is defined by Uxbridge Road, the eastern boundary defined by the Grand Union Canal towpath, and the southern and western boundaries defined by Minet Country Park; Bull's Bridge Industrial Area in which the northern boundary is formed by the railway, the western boundary by Hayes bypass, and the eastern boundary by residential areas (Character Area 3); and Featherstone Road Industrial Area bounded by the railway to the north, Featherstone Road residential areas to the west and the Green to the east.	Not designated for landscape, heritage or ecological interest
3	**Small Scale Urban (see Figure 11.2 & 11.3.3)**	Two areas fall within this character area including Beaconsfield Road in which the northern extent is undefined beyond	The area includes the former Water Tower Grade II Listed, the Crescent and the eastern part of the GUC

Character Area		Boundaries	Designations
		Uxbridge Road, the eastern boundary is loosely defined by the South Road, Southern boundary defined by the West Southall Site and the western boundary defined by the Grand Union Canal towpath, and Dudley Road bounded to the north by the Railway, the east and west by Character Area 3.	designated as a Conservation Area.
4	**West Southall Site (see Figure 11.2 & 11.3.4)**	The northern extent is defined by housing along southern edge of Beaconsfield Road, the eastern boundary defined by housing off Beaconsfield Road and derelict recreational area, the southern boundary defined by the Paddington-Bristol railway and the western boundary defined by Grand Union Canal towpath.	Designated as an Opportunity Area in the London Plan (2008)
5	**National Grid Gas Compound (see Figure 11.2 & 11.3.5)**	Northern, eastern and western boundary loosely defined by the West Southall Site and the southern boundary defined by The Straight/White Street and the Paddington to Bristol Railway.	Not designated for landscape, heritage or ecological interest
6	**Derelict Cricket Pitch (see Figure 11.2 & 11.3.6)**	Northern extent defined by housing off Beaconsfield Road, the eastern boundary loosely defined by the former Water Tower, the southern boundary defined by The Straight/Paddington-Bristol Railway and the western boundary defined by the West Southall Site.	Not designated for landscape, heritage or ecological interest

Views

11.4.33 The relatively flat topography of the area combined with buildings and tall vegetation, serve to control views from the wider area to the Site. A few exceptions occur where locally elevated positions such as bridges over the M4 motorway and the railway provide longer-distance public views. An example of such a view is from Osterley Lane, approximately 2.5km to the southeast of the Site, from which views are gained of the gasholder. However, ground level features are hidden by intervening hedgerows and buildings.

11.4.34 Figure 11.4 shows the location of key landmarks and typical local views are shown on Figures 11.1 and 11.1a to 11.1i. The gasholder creates the most prominent landscape feature due to its height relative to neighbouring features, and its distinctive colour (refer 11.1a: View 13,15,16 and 17). The gasholder serves as a marker or orientation point, firmly locating the Site within the wider landscape.

11.4.35 No views of noted interest occur from or to LB Hillingdon or LB Hounslow. Views that are considered by LB Ealing to be locally important and of local interest are noted in the Adopted UDP (Adopted October 2004) at Table 10.8. Within the study area there is one view, toward the Site, described as "*25 Southall Railway Bridge, west toward the former Water Tower on The Straight*" (Comparative View in Figure 11.5b).

11.4.36 The visual assessment has considered the general visual context and amenity of the study area. Ground-level views from neighbouring public realm and streets have been identified and assessed. The tall hoardings and security fences that surround the secure parking area, particularly along the Canal frontage, obscure many views from these areas of public realm. Elsewhere, private properties, such as houses along Beaconsfield Road block views. Views are gained from these private properties toward the Site. In such instances, views to the Site focus on and are dominated by the gasholder.

11.4.37 Elevated views towards the Site are gained from roads and footways including South Road Rail Bridge and also the Hayes bypass as it crosses the railway, and from the railway itself.

11.4.38 Informal open access within Minet Country Park permits views in all directions from within the park, including: south towards the railway; west towards the Hayes bypass/Pump Lane junction, and the three high-rise buildings off Avondale Drive; north toward Yeading Football Club/Springfield Road, the Guru Nanak Sikh College and employment uses; and, east toward the Site and the gasholder.

11.5 Assessment of Effects

The Proposed Development

11.5.1 The parameter plans describe and fix the broad scale, massing, urban grain and townscape pattern for the proposed development, and identify principal pedestrian and vehicular routes, areas of open space, urban space and public realm. The parameter plans are presented in Figures 3.4 a-p and described in more detail in Chapter 3: Site and Proposed Development.

11.5.2 The massing would predominantly be between 5 and 8 storeys high (18m and 27m AOD), with an overall height range from 10.5m AOD (3 storeys) up to 74m AOD (13 storeys).

11.5.3 A comprehensive and coordinated scheme of landscape proposals would be implemented across the Site, including hard works and planting to the squares and street tree planting along public thoroughfares. It is anticipated that overall, there will be a net gain in the extent of tree and shrub planting across the Site compared to the baseline situation.

11.5. 4 New views would be created within, from and to the Site. Particular emphasis would be placed on maximising ground level visual links between the Site and Minet Country Park and the Canal.

11.5.5 A more detailed description of Design Principles that have informed the Scheme is given in the Design and Access Statement (DAS) submitted separately with this application.

Potential Effects

Townscape Character

11.5. 6 The temporary land uses and the transitional nature of the Site mean that few established features of landscape or visual merit exist that would be adversely affected by the development.

11.5.7 This weak and indistinct character would be positively affected by re-establishment of a structured urban form. The new high-density urban form would be in contrast to existing, predominantly residential and employment areas within the immediate vicinity. Building heights and massing would be in marked contrast to prevailing low-rise residential and employment development in the vicinity of the Site, with the exception of residential towers off Avondale Drive (c. 13 storeys).

11.5. 8 Urban grain would extend existing north-south patterns of the Beaconsfield Road area southward into the Site. However, the nature and shape of the Site requires a generally east-west grain to promote efficient circulation and land use, establishing a pattern that is distinctive and unique to the development.

11.5. 9 Construction of the Canal footbridges and creation of links to Beaconsfield Road increase townscape permeability and remove existing physical barriers.

11.5.10 Potential effects are minimised by the restriction of maximum heights along the most sensitive edges and the establishment of an ordered urban form that would offset the loss of openness.

Green Belt

11.5.11 Green Belt land to the west would potentially be affected by the proposed Pump Lane Link Road, Springfield Road Footbridge and Minet Country Park Footbridge. Green Belt land indicates a presumption against development; no new buildings are proposed on this land, therefore significant impacts are not considered likely to occur. Appropriate landscape planting proposed as part of the Scheme will aim to blend the routes into their landscape setting, thus promoting visual and landscape continuity and maintaining the perception of openness.

Conservation Areas and Listed Buildings

11.5.12 The western bank of the Canal forms part of the setting of the Canalside Conservation Area and the Grand Union Canal presents itself as a single historic landscape.

11.5.13 Proposed development would be set back by a minimum of 8.5m and a maximum of 20m from the canal edge. The proposed crossings would each oversail the canal and towpath at an appropriate heights to enable free movement along these routes and to maintain views.

11.5.14 Removal of the utilitarian boundary fences, building line set-back and creation of linear open spaces alongside the canal side would enhance the Canalside Conservation Area. The proposed development would re-establish a built form within the Site that would be of a higher townscape quality than it's historic uses.

11.5.15 The Crescent and six unlisted houses on Randolph Road would be demolished to enable construction of the Eastern Access to the Site and improve vehicular and pedestrian links to South Road. Similarly, creation of these links would remove the open space/play area and motor engineer's workshop to the north of The Crescent. The effects of this demolition has been discussed within Chapter 15: Archaeology and Built Heritage.

Existing Views

11.5.16 Publicly recognised views have been identified to or across the Site. The reintroduction of built development within the Site would form new elements within the backdrop to the LB Ealing View 25 from South Road Bridge (Comparative View in Figure 11.5b). This view would also be affected by the realignment and highway improvements for the Eastern Access.

11.5.17 There are also views of note along the Canal corridor (see Comparative Views in Figures 11.5e to 11.5i). The new canal/river crossings and Pump Lane Link Road would affect views across Minet Country Park and from the Grand Union Canal and towpath. Pump Lane Link Road has been aligned toward the southern limit of Minet Country Park to reduce land take and to run parallel with the railway to the south. The Springfield Road Footbridge does not fall within Minet Country Park, but does lie within Green Belt. This route is aligned toward the north-eastern limit of the Green Belt to minimise impacts and to link to Beaconsfield Road (Hayes) and urban development to the north. The Minet Country Park Footbridge would encroach into the Green Belt and the Park and provides a direct link between the Site and Minet Country Park (see Comparative View in Figure 11.5j).

11.5. 18 Views from the west would also be affected by the redevelopment of the Site, and new development along the Canal frontage in particular. The change in such views would be marked, comprising the introduction of built form up to 10 storeys. The proposed building form reduces the potential effect as it presents the narrowest parts of the structure toward the Canal and Minet Country Park (see Comparative View in Figures 11.5j to 11.5l).

11.5.19 Views from public realm to the north of the Site, and south of the railway are controlled by existing residential properties along those boundaries. Views to the proposed Scheme would be gained above and between existing buildings, particularly along the five new links from the north and north-east boundary of the Site to Beaconsfield Road (see Comparative View in Figure 11.5d).

11.5.20 Elevated, fleeting views from the railway would be affected by the Pump Lane Link Road which would temporarily open up views during construction works and vegetation clearance toward Minet Country Park, and those across new buildings and public realm within the Site.

11.5.21 The height of proposed buildings along the northern edge are generally three to four storeys (with some 5 to 6 storeys). Lower buildings along the periphery would obscure many of the taller structures within the Site, although the tallest buildings (up to 13 storeys) would be visible to establish new landmark features and site hierarchy. Notwithstanding this, the gasholder would remain the dominant feature at c.91m AOD.

11.5.22 Increased distance between receptors and the proposed Scheme occurs along the southern boundary to the east of the gasholder, due in part to the presence of the railway, but also by the location of the school, health and cinema uses to the north of the railway. This increased distance would reduce apparent height of proposed buildings within the Site, when viewed from this direction. To the west of the gasholder, new four and five storey properties would reduce the impact of taller buildings within the Site when viewed from the north.

Effects of Construction

11.5. 23 Construction, earthworks/site remediation, and associated vehicular movements would be visible from the surrounding area. The degree of such effects is dependant on the proximity to the viewer, which would vary along public rights of way, highways, and to local residences. There are likely to be several tower cranes located on the site during construction at any one time, resulting in adverse visual effects. Whilst the effects of the tower cranes are temporary in terms of reversibility, the extended construction period means that tower cranes are likely to be a part of the townscape for approximately 15 years. There would be a general progression, with the tower crane positions moving from the east of the site, to the southwest.

11.5.24 Careful location and design of temporary site compounds, lighting and signage would reduce both landscape and visual impacts to ensure the effects on both the environment and visual amenity are minimised. The construction activities and mitigation measures proposed for the West Southall Development are described in Chapter 6: Construction and Phasing.

Effects on Trees and Vegetation

11.5.25 Remediation of contamination, adjustment of site ground levels and de-watering of excavation would affect the long-term viability of mature trees within the Site and those adjacent to the boundaries, as well as existing tree condition. All but three of the existing mature trees would be removed as a result of the site preparation and development. This assessment has assumed that all mature trees and shrubs within the Site boundary would be removed.

11.5.26 A number of trees of 'poor' quality and/or health have been identified that should be removed on the grounds of public safety and amenity (see Appendix 14.5). The loss of such trees would be of slight adverse significance. The loss of trees of low to high quality across the Site would have a slight to moderate adverse effect. Proposed planting would more than compensate for this loss in terms of overall tree numbers, species diversity and condition, with planting of public realm and open spaces being part of a comprehensive landscape Scheme as described in the DAS.

Remediation and Construction Effects

11.5. 27 Potential temporary effects may arise from the extended period of remediation and construction that is likely to result in a 'building site' character in progressive areas of the Site for about 15 years. It is

inevitable that the appearance of Site accommodation, cranes, construction plant and vehicles etc. would convey the impression of construction in progress and an unfinished site. The construction process would also affect local views through the demolition of existing structures and felling trees (obscuring some features, but also opening up new views), and the emergence of new buildings within the view. These effects would progressively diminish as each Phase is built-out.

11.5.28 It is likely that the public will be concerned about the overall effects of remediation and construction including noise, dust etc (see Chapters 5, 9, 10 and 12). However, there would be positive effects on character and views, as the under-used land is brought into beneficial use and occupation, signalling an end to the period of uncertainty that has dogged the Site.

11.5.29 The construction works would also have the potential to affect the new occupiers and visitors who would be made aware of the long-term nature of the proposed development. It is assumed that the effects would be managed as a normal part site operations and such works would be shielded from the pubic as far as possible. Therefore, construction visual effects are unlikely to be significant.

11.5.30 The overall effect of the construction stage is considered to be '**negligible**' over the period of development with the adverse effects balanced out by the significant improvement in the appearance of the Site over time. Any adverse effects on character and views are likely to occur in the early stages of remediation and development whilst site establishment (including site clearance and tree felling) and infrastructure works (including the access roads) are in progress.

11.6 Mitigation and Enhancement

11.6.1 The Parameter Plans fix the maximum extent of built envelope in both plan form and height. This is consistent with the maximum development proposed and thus mitigation is built-in to reduce the visual and landscape effects of the built form of the West Southall scheme. The Parameter Plans, Development Specification and DAS describe and fix the broad scale, massing, grain and townscape pattern for the Site, and identify principal pedestrian and vehicular routes, areas of open space, urban space and public realm.

11.6.2 The establishment of an ordered urban form would offset the loss of openness. Potential effects are minimised by restriction of maximum heights along the most sensitive edges. For instance, potential adverse effects arising from the massing of the new units in close proximity of the Canal are reduced by setting the building line back from the canal edge.

11.6.3 New streets, parks and urban spaces and other public realm are proposed across the Site, including a new active open space along the Canal frontage. Additional private and semi-private open space would be provided as courtyards within individual development blocks. As such spaces would not be accessible to the public, they have been excluded from the assessment.

11.6.4 Mitigation of tree loss would be provided through the establishment of high quality, coherent public realm with the establishment of new trees throughout the Site in both formal and informal groups.

11.7 Residual Effects

Townscape Impacts

11.7.1 Appendix 11.4 presents the townscape assessment for each of the separate Character Areas. A summary assessment of the effects arising from the proposed Scheme on the character and resources of the Character Areas are set out in Tables 11.2 to 11.7. Figure 11.2 presents the division of the Site and surrounding area into Character Areas.

Character Area 1 – Minet Country Park and Yeading Brook Corridor

Stage 1 (Construction)

11.7.2 Pump Lane Link Road would be elevated as it crosses the river corridor and traverses Green Belt Land. The route generally crosses Minet Country Park at its narrowest, southernmost point, thus minimising adverse effects. A swathe of continuous scrub would be removed during construction, thus creating **temporary adverse** effects.

11.7.3 Loss of vegetation and associated construction working zones would be minimised through the early establishment of protective fencing which will define and contain the extent of the construction works. Where existing vegetation is disturbed or removed, then this would be improved through replacement planting.

Stage 2 (Construction)

11.7.4 Minet Park Bridge extends westward from the Site, creating a striking structure and new landmark entrance and feature to Minet Country Park and the Canal. Minet Park Bridge falls within the Green Belt, and would locally remove areas of scrub between the watercourse; a short-term temporary adverse effect that would be transformed into a permanent beneficial effect by completion of Stage 2 works.

11.7.5 The Springfield Road Bridge extends north-westward and is outside Minet Country Park, but is within the Green Belt. A swathe of dense continuous scrub would be removed along the alignment of the route during construction, having a localised, temporary adverse effect on the Yeading Brook corridor and the Canal. By completion of the Stage 2 construction, the Springfield Road Bridge would be an established townscape feature, providing a permanent **beneficial** effect linking the Site with land to the northwest.

Principal Assessment Year

11.7.6 Implementation of the accesses would directly or indirectly and cumulatively affect the resources and character of Minet Country Park, Yeading Brook and the Canal.

11.7.7 New buildings within the Site would obscure or diminish the prominence of the gasholder. However, the hotel in particular, and taller buildings along the proposed high street would create new landmarks, providing permanent **beneficial** effects of **minor** significance.

Principal Assessment Year + 15 Years

11.7.8 It is considered that, due to the early establishment of protective fencing during construction and enhanced replacement planting, long-term neutral effects on trees and vegetation of negligible significance would result.

11.7.9 The watercourse alignments would be unaffected, although the new bridges and associated traffic would introduce additional urbanising features. However, this would be offset by the increased level of public access.

11.7.10 Overall, it is considered that the adverse townscape effects on the water bodies, Green Belt and Minet Country Park would be offset by careful route alignment, landscape mitigation and control of maximum building heights in the adjacent character area. The increased choice and accessibility by the public to the park and canal would further offset potential adverse effects. A permanent **beneficial** effect of **minor** significance would therefore result.

Character Area 2 – Large Scale Urban

11.7.11 No new development would occur in this character area, although it acts as a conduit for pedestrians and cyclists using the new Springfield Road Bridge linking to Uxbridge Road via Beaconsfield Road and Springfield Road. Few direct townscape impacts would therefore occur, save for localised enhancement of the streetscape on Beaconsfield Road (Hayes) close to the new bridge.

Principal Assessment Year and Principal Assessment Year + 15 Years

11.7.12 The creation of increased pedestrian and cycle connectivity would benefit the existing commercial/business estates and future occupants of the Site. Overall, a permanent **beneficial** effect of **negligible** significance would occur.

Character Area 3 – Small Scale Urban

Stage 1 (Construction)

11.7.13 Demolition of the the Crescent together with the six properties on Randolph Road and removal of the neighbouring open space would occur, to accommodate the new Eastern Access road and signalised junction with South Road, creating a localised impact upon the townscape. Steps and a stepped ramp would be constructed to provide access to the elevated South Road Bridge. This will form a high quality landscape feature at the Eastern Access.

11.7.14 Direct impacts would not occur on the fabric, setting or curtilage of the Listed Water Tower representing a '**negligible**' neutral effect. Whilst not part of the proposed Scheme, the Water Tower would represent the eastern extent of the proposed development, forming a focal point at the entrance. Although a new road is to be constructed to provide access to the proposed development, it is considered that this would not harm (and thus preserve) the setting of the Listed Water Tower.

11.7.15 Residential and retail development would commence to the west of the Water Tower, and along much of the northern edge of the Site, including the creation of five access routes requiring the demolition of five properties along Beaconsfield Road and one on Grange Road. Localised **temporary adverse** effects would affect the public routes and townscape during construction with permanent **negligible** effects on townscape character along Beaconsfield Road and Grange Road at completion of Stage 1.

11.7.16 The proposed Scheme will introduce a new townscape form on previously open and underused land, extending the urban grain from the north into the Site.

Stage 2 (Construction)

11.7.17 The proposed Scheme would have localised minor effects on the Blair Peach School during Stage 2, arising from the construction of three storey residential units immediately to the south. Overall there would be a permanent **negligible** effect.

Principal Assessment Year and Principal Assessment Year + 15 Years

11.7.18 Overall, it is considered that localised indirect adverse effects on the Water Tower would be offset and balanced by increased connectivity and the delivery of a high quality townscape. This is a permanent **beneficial** effect of **moderate** significance.

Character Area 4 – The Site

Stage 1 (Construction)

11.7. 19 Much of this character area would be transformed during Stage 1, with a localised area (the hotel) being developed during Stage 2. The proposals broadly affect the eastern third of the Site through the introduction of new built form and public realm. A new primary access route would traverse the whole of the Site to link the newly created Access with Hayes Bypass to the west, via the Pump Lane Link Road. Secondary traffic and pedestrian routes would extend in a generally rectilinear form from the primary access within the Stage 1 area.

11.7.20 Restricted maximum heights along the northern boundary minimise adverse effects on adjacent residential properties. Building heights increase toward the centre of the Site, with a maximum Stage 1 height of 56m AOD (HS.06), thus creating a new landmark.

11.7.21 Construction impacts would not have a significant adverse effect upon this character area. Establishment of a coherent and high quality townscape featuring public realm and new connections to the north, east and west represents a permanent **beneficial** effect of **substantial** significance.

Stage 2 (Construction)

11.7.22 Comprehensive redevelopment would generally occur within the central third of the Site, and the remaining pocket of open land within Stage 1 area (the hotel). Again, maximum building heights would be restricted to three storeys at the northernmost part of this Stage. The proposed Scheme has been designed to restrict impacts upon the Canal, whilst maximising opportunities for views across Minet Country Park. Heights along this frontage would vary between five and ten storeys, although the proposed 'U' shaped building form presents only narrow facades toward the Canal with landscaped space in between.

11.7.23 Eight to twelve-storey buildings front onto the primary access route, culminating in the tallest structure of 13 storeys proposed as part of the overall Scheme to the northeast. Proposed urban grain is generally rectilinear, transforming southwards to a softer curvilinear form.

11.7.24 An extensive new park would be created during Stage 2 between the main access road and the NG Gas Compound (Character Area 5). A new active canal-side open space would also be created.

11.7.25 Temporary adverse construction impacts arising from Stage 2 development would be experienced by the new occupants and users of the Stage 1 area. However, the delivery of a primary public park and open space, including public realm and access to the Canal towpath, would offset such temporary adverse effects. As with Stage 1, the new coherent, high-quality townscape would further add to the advantages of the new public realm to give permanent **beneficial** effects of **substantial** significance**.**

Stage 3 (Construction)

11.7.26 Stage 3 would complete the redevelopment of the western third of the Site, providing a generally curvilinear street pattern and built form. Canal-side development would be similar to that established during Stage 2, but with maximum heights varying from seven to ten storeys. Development along the main access road would vary from five to ten storeys. Three blocks of four storey units would be constructed to the north of the railway, west of the NGG compound.

11.7.27 A broad, linear open space would be created, extending southwest from the new park adjacent to the main access road.

11.7.28 Temporary adverse construction impacts arising from Stage 3 development would be experienced by the new occupants and users of Stage 2. As with Stage 2, such impacts would be more than offset

by the creation of new high quality urban form and public realm, resulting in permanent **beneficial** effects of **substantial** significance**.**

Principal Assessment Year

11.7.29 A high quality coherent townscape would be established by this time, on what was formerly underused brownfield land that had blighted the area for many years. The proposed development would establish new public realm and open spaces creating connections to, from and across the Site to the wider area including Minet Country Park and the Grand Union Canal towpath and regional recreational routes. Initial removal of site vegetation would be offset by a co-ordinated and extensive programme of tree and landscape planting across the Site. Permanent beneficial effects would result throughout the Site, creating permanent **beneficial** effects of **substantial** significance.

Principal Assessment Year + 15 Years

11.7.30 Permanent beneficial effects of substantial significance would continue, with the Site becoming more mature and established. Stage 1 planting would be at least 25 years old, and Stage 3 planting would be at least 15 years old.

Character Area 5 – NG Gas Compound

11.7.31 No new development would occur within this character area as a result of the proposed development. However, existing pedestrian and cycle access would be maintained along The Straight and Spencer Street underpass. Retention of this connectivity provides a basis for future links into and through the Site and existing residential areas to the north.

Principal Assessment Year and Principal Assessment Year + 15 Years

11.7.32 Overall, the effect would be permanent **negligible** effect**.**

Character Area 6 – Derelict Recreational Area

Stage 1 (Construction)

11.7.33 Much of this character area would be redeveloped during Stage 1, as it falls within the Main Site. Maximum building heights would be restricted to four to six storeys across the area, to minimise adverse effects on adjacent two-storey residential properties and the Listed Water Tower.

11.7.34 The Proposals would establish a high quality coherent townscape on this derelict area, establishing a link to Grange Road. Temporary adverse impacts during construction, in particular tree loss, would be offset in the long-term by co-ordinated tree and landscape planting. Permanent **beneficial** effects of **substantial** significance would result.

Stage 2 (Construction)

11.7.35 Stage 2 development within this character area is limited to the construction of the cinema complex and retail blocks HS.11 and HS.12 in close proximity to the railway. No other development would occur. As with Stage 1, permanent **beneficial** effects of **substantial** significance would be gained.

Principal Assessment Year and Principal Assessment Year + 15 Years

11.7.36 Overall the effect would be permanent **beneficial** and of **moderate to substantial** significance.

Visual Impacts

11.7.37 Appendix 11.5 presents the Visual Impact Schedules for each of the separate Character Areas. A summary assessment of the effects arising from the proposed Scheme on the views from within the Character Areas is set out in Tables 11.3 to 11.8.

Character Area 1 – Minet Country Park and Yeading Brook Corridor

Stage 1 (Construction)

11.7.38 Minet Country Park is contiguous with Yeading Brook corridor, which collectively provides a large scale open space within the vicinity of the Site. Informal open space within the park permits views in all directions from various points. These views are largely experienced by leisure users within the open space and from paths.

11.7.39 Development in the Stage 1 area would not be discernible from Minet Country Park due to the degree of separation and intervening land form/vegetation. High-level cranes may be visible during construction for the tallest elements of the Stage 1 development (12-storeys) but would not be a major element of the view, representing temporary medium-term impacts as this stage is developed. Ground level construction features would not be visible due to river corridor trees/scrub.

11.7.40 Construction of the Pump Lane Link Road will clear a swathe of vegetation along the southern edge of Minet Country Park. New views will be created to and from the road, from Minet Country Park, the railway and the elevated Hayes Bypass. Planting along the Pump Lane Link Road embankments would soften the impact of the proposed road in the longer-term.

11.7.41 Stage 1 temporary adverse (construction) impacts on views would be offset by **negligible** (operational) effects.

Stage 2 (Construction)

11.7.42 Development along the western frontage of the Site would be visible from within Minet Country Park in close proximity to the Canal above the river corridor vegetation, particularly proposed canal side buildings of up to 10-storeys. The light structural form of Minet Park Bridge would be discernible from some locations (see Illustrative Comparative View in Figure 11.5j), and would in turn form the main focal point on the approach to the bridge. Existing river corridor vegetation and artificial landform would largely hide the Footbridge in views from the Park.

11.7.43 High-level cranes present during construction would create temporary medium-term visual effects as Stage 2 is developed, particularly for the proposed residential tower (13 storeys). Ground level construction features within the Site would be filtered by existing scrub but would be openly visible through localised gaps in vegetation created by the bridge development. Temporary short-term visual effects would occur during bridge construction.

11.7.44 Proposed tree and shrub planting along bridge routes and canal frontage would ‘anchor’ the Scheme and soften the interface between old and new. Pump Lane Link Road planting would at this point be a minimum of 5-years old.

11.7.45 Opening up of new vistas into the Site will enhance the visual experience for users of the Grand Union Canal and Yeading Brook corridor, and from Minet Country Park.

11.7.46 Stage 2 temporary adverse (construction) impacts would be offset by **beneficial** (operational) effects of **substantial** significance**.**

Stage 3 (Construction)

11.7.47 Generally, Stage 3 effects of the proposed development would be similar to those of Stage 2, principally affecting the southern part of the Park. Views would continue to be controlled by the artificial topography of Minet Country Park and the intervening vegetation along the river, but buildings along the canal side of seven to ten storeys would be visible above the riverside tree/scrub canopy.

11.7.48 High-level cranes during construction would create temporary medium-term impacts as this stage is developed. Ground level construction features would not be visible. Pump Lane Link Road planting would be a minimum of ten years old and the pedestrian bridge planting would be a minimum five years old.

11.7.49 Stage 3 temporary adverse visual impacts during construction would be offset by **beneficial** (operational) effects of **substantial** significance**.**

Principal Assessment Year and Principal Assessment Year + 15 Years

11.7.50 Little change is anticipated over and above Stages 2 and 3 of the proposed development for Operational Year 1 and Year 15. Canal-side development would largely screen views to the proposed Scheme further east, and would be enhanced by frontage planting as it matures.

11.7.51 Overall, permanent beneficial visual impacts of moderate significance would arise from the implementation of the proposed development; this would not change much between operational Years 1 and 15.

Character Area 2 – Large Scale Urban

Stage 1 (Construction)

11.7.52 Development during this stage is unlikely to be visible from the large scale character area. High-level cranes during construction would create temporary medium-term impacts as this stage is developed; however, ground level construction features unlikely to be discernible at this distance.

Stage 2 (Construction)

11.7.53 The upper levels of the proposed residential tower (up to 13 storeys) would be visible from this character area. High-level cranes during construction would create temporary medium-term impacts as the northern part of this stage is developed.

11.7.54 Stage 2 visual impacts for this character area would be **negligible** during construction tending toward **beneficial** and **negligible** towards completion of this stage.

Stage 3 (Construction)

11.7.55 Medium to long-range views of this part of the proposed Scheme would be largely screened from view by virtue of topography and intervening development including the Guru Nanak Sikh College. Effects would be negligible both during construction and operational stages, leading to a negligible significance.

Principal Assessment Year and Principal Assessment Year + 15 Years

11.7.56 No additional effects are anticipated over and above Stage 2 impacts. Proposed planting on the approach to the two Pedestrian Bridges would be well established. Therefore, overall operational effects would be permanent **neutral** effect of **negligible** significance.

Character Area 3 – Small Scale Urban

Stage 1 (Construction)

11.7.57 The demolition of properties along Beaconsfield Road will have a limited, localised impact upon views along the road, but will open up new vistas southward into the West Southall development.

11.7.58 Site clearance of trees along the site boundaries will open views up from the south and the elevated railway in particular. New buildings will be seen behind the former Water Tower, forming a new backdrop, although the retained gasholder will continue to provide a distinctive and dominant land mark.

11.7.59 A significant impact arising from Stage 1 will be the demolition of The Crescent which will open up views toward the rear of properties along Randolph Road, and provide open, elevated views from South Road toward the former Water Tower and the Site. High quality landscape works will mark the new entrance to the proposed development, and improve foreground views of the former Water Tower.

11.7.60 Existing buildings largely obscure views of the Water Tower from the immediate area. This is not surprising. Gasworks were perceived as 'bad neighbours' and generally were isolated from surrounding residential development and other industrial sites by substantial walls. The Tower is a prominent feature for users of the railway line running into London Paddington. There is no development proposed between the railway and the Water Tower. Views from passing trains of this industrial heritage feature would not be interrupted, but would be enhanced by the new landscape setting and public realm around it.

11.7.61 Existing views of noted local interest from South Road Railway Bridge looking west to the Water Tower would be maintained, but would experience temporary adverse impacts during construction of Stage 1 development, arising in particular from the demolition of The Crescent and neighbouring buildings, and removal of the public open space. Medium-term temporary adverse impacts would arise from the loss of some mature vegetation to the west of the Water Tower (trees within curtilage of Water Tower would remain), however, the impact will be offset by the establishment of varied new skyline within the Site.

11.7.62 Highway and landscape works would also adversely affect views during the Stage 1 construction works, but by completion of Stage 1 they would be positively enhanced by new high quality townscape setting, with a permanent **beneficial** effect. Cranes and ground-level hoardings during construction would create temporary medium-term effects as this stage is developed.

11.7.63 Temporary adverse impacts during construction would be offset by **negligible beneficial** effects during operation.

Stage 2 (Construction)

11.7.64 Taller structures would be introduced as part of Stage 2 (up to 13 storeys) and would be visible behind but appear lower and subservient to the Water Tower when viewed from the east. The proposed school, health centre and residential dwellings would be visible in part to the north of the railway. Views would be softened by proposed tree planting along the southern boundary of the Site as it matures. Cranes and ground-level hoardings during construction would create temporary medium-term impacts as this stage is developed.

11.7.65 Temporary adverse impacts during construction would be offset, resulting in **negligible** operational effects**.**

Stage 3 (Construction)

11.7.66 Development at the far western corner of the Site would just be visible in the context of the gasholder, but would form a very minor element within views. These would be softened by proposed tree planting along the southern boundary of the Site as it matures. Cranes and ground-level hoardings during construction would create temporary medium-term impacts as this stage is developed. Whilst there would be a general progression of construction activity from east to west within the Site, cranes etc. would be visible from elevated vantage points such as South Road Railway Bridge for the duration of the construction (i.e. fifteen years).

11.7.67 Temporary adverse impacts during construction would be offset, resulting in **negligible** operational effects.

Principal Assessment Year and Principal Assessment Year + 15 Years

11.7.68 There would be little change over and above the staged impacts, although tree planting along the access route and main street would mature and soften views to the new buildings, thus 'anchoring' them within the Site. A notable change would be the removal of construction features including cranes. Generally, Operational Year 15 impacts would be as per Year 1, although trees will continue to mature and increase in stature.

11.7.69 Overall, the operational impacts would be permanent **beneficial** of **moderate** significance.

Character Area 4 – West Southall Site

Stage 1 (Construction)

11.7.70 The proposed development of the Site would allow for new views in and around the site to be created along the new public realm zones and filtered by the new buildings. This includes views from the Site northward along the new access routes (leading to Beaconsfield Road), and those along the tree-lined primary access road.

11.7.71 The creation of all new views in the Stage 1 area is considered to be a beneficial impact of minor to moderate significance.

Stage 2 (Construction)

11.7.72 Visual impacts arising from the construction of Stage 2 will affect the properties and public realm, including Blair Peach School at the westernmost end of Beaconsfield Road. Existing properties further to the east along Beaconsfield Road will in part be buffered by new housing constructed as part of Stage 1. In turn, views from the new Stage 1 properties will be affected by the Stage 2 development; particularly those adjacent to the proposed residential tower and the cinema and retail buildings to the southeast. Temporary hoardings will generally prevent ground level views from the Stage 1 public realm toward the Stage 2 construction works, although elevated views are likely to be gained from 1st floor windows and above.

11.7.73 Significant new views would be opened up between the Stage 2 area and the Canal and the Country Park to the west. Such views would be controlled by the new built form within the Site, and would be framed and softened by proposed tree and landscape planting. New internal site views would be enhanced by the high quality urban form (including new landmark structures) and landscape treatment and public realm.

11.7.74 Construction features such as cranes and scaffolding will create temporary visual impacts on views from Minet Country Park and along the Grand Union Canal and Yeading Brook corridor during construction of Minet Park Bridge and the Springfield Road Bridge. Creation of the new landscaped park and sports pitches will provide broad opportunities for new views within the site, and also to adjacent areas and features including the gasholder.

11.7.75 As with Stage 1 impacts, the creation of all new views in the Stage 2 area is considered to be a permanent **beneficial** effect, but with establishment of high quality canal side views and the new park these are considered to be of **moderate** significance.

Stage 3 (Construction)

11.7.76 New views would be created within the Site and to areas beyond, including westward to the Canal and Country Park, in a manner similar to those of Stage 2. Creation of the linear park would compliment and enhance views from the new park established as part of Stage 2.

11.7.77 The creation of new views in Stage 3 area is considered akin to the Stage 2 effects, and as such would be a permanent **beneficial** impact of **moderate** significance.

Principal Assessment Year and Principal Assessment Year + 15 Years

11.7.78 There would be little change over and above the staged impacts, although the extensive new tree planting within the Site would mature and soften views to the new buildings, thus 'anchoring' them within the Site. A notable change would be the removal of construction features including cranes. Generally, Operational Year 15 impacts would be as per Year 1, although trees will continue to mature and increase in stature.

11.7.79 Overall, the operational impacts would be permanent beneficial of moderate significance.

Character Area 5 – National Grid Gas Compound

11.7.80 There are no existing public views from this character area, and public access would continue to be prohibited. Therefore the significance of the visual impact is not applicable.

Character Area 6 – Derelict Cricket Pitch

Stage 1 (Construction)

11.7.81 New views would be created within the Site and to areas beyond, including northward along Grange Road, and particularly, eastward toward the Listed Water Tower.

11.7.82 The creation of all new views in the Stage 1 area is considered to be a **beneficial** effect of **minor** to **moderate** significance**.**

Stage 2 (Construction)

11.7.83 In turn, views from the new Stage 1 properties will be affected by the localised Stage 2 development that would occur within this character area (the cinema and retail buildings to the south of this character area). Temporary hoardings will generally prevent ground level views from the Stage 1 public realm toward the Stage 2 construction works, although elevated views are likely to be gained from 1st floor windows and above.

11.7.84 Temporary adverse impacts on Stage 1 views arising from the Stage 2 construction would be offset by the completion of the new urban form which would lead to permanent **beneficial** impacts of **minor** significance**.**

Operational Year 1(Principal Assessment Year) and Year 15

11.7. 85 Effects would be similar to those for Character Area 4 – West Southall Site as a whole. There would be little change over and above the staged impacts, although the extensive new tree planting within the Site would mature and soften views to the new buildings, thus 'anchoring' them within the site. A notable change would be the removal of construction features including cranes. Generally, Operational Year 15 impacts would be as per Year 1, although trees will continue to mature and increase in stature.

11.7.86 Overall, the operational impacts (Years 1 and 15) would be permanent **beneficial** of **moderate** significance**.**

Wider Views

11.7.87 Appendix 11.5 presents an assessment of the effects on views from the wider study area, including medium-range and long-range oblique and perpendicular views such as those from Osterley Park. The M4 motorway and Hayes Bypass. Of these, the most significant impacts (of moderate significance) are likely to be gained from users of the elevated sections of the Hayes Bypass (see illustrative Comparison View L in Figure 11.5l). The remainder of representative viewpoints within the wider area would experience impacts of minor or negligible impact. It is considered that the individual effects of each stage of development would not be discernible from these viewpoints, bearing in mind factors such as topography, intervening vegetation and built form, distance and, in many cases, viewer activity (i.e. travelling in vehicles).

Paddington to Bristol Railway

11.7.88 Fleeting views from the adjacent slightly elevated mainline railway would be maintained, although the nature of the view would be markedly changed. Whilst the views from the railway would be glimpsed, it would be possible to identify the effects arising from separate stages of development. Certain views may be shielded from the railway by the construction of a proposed acoustic barrier along the southern boundary of the site, stretching westwards from the NGG compound.

Stage 1 (Construction)

11.7.89 New views would be opened up toward Minet Country Park by removal of vegetation for Pump Lane Link Road, although the duration of such views would depend upon train speed and would tend to be brief. Elevated open views across the eastern part of the Site would be controlled by new built form to the east of the gas compound. New views of high quality townscape would be created, replacing views of car parking. Cranes and ground-level hoardings during construction would create temporary medium-term impacts as this stage is developed. Views from the railway would be tempered by the mode and speed of travel.

11.7.90 The transformation of the Site from underused brownfield land to high quality townscape would be a permanent **beneficial** effect of **moderate** significance**.**

Stage 2 (Construction)

11.7.91 Slightly elevated open views across this area would be seen as a backdrop to the gasholder and Stage 1 development, although the cinema complex would be openly visible in close proximity to the railway. Cranes and ground-level hoardings during construction would create temporary medium-term impacts as this stage is developed. Views from the railway would be tempered by the mode and speed of travel.

11.7.92 As with the Stage 1 development, the transformation of the Site from underused brownfield land to high quality townscape would be a permanent **beneficial** effect, although this would be of **minor** significance.

Stage 3 (Construction)

11.7.93 Slightly elevated open views across Site would be controlled by new built form to west of gas compound, new views to east and high quality townscape, replacing views to car parking. Cranes and ground-level hoardings during construction would create temporary medium-term impacts as this stage is developed. Views from the railway would be tempered by the mode and speed of travel.

11.7.94 The transformation of the Site in close proximity to the railway to substantial public open space and high quality townscape would be a permanent **beneficial** effect of **moderate** significance**.**

Principal Assessment Year and Principal Assessment Year + 15 Years

11.7.95 No further changes over and above Stage 3 would occur following completion of the Scheme. Planting within the Site would continue to mature, providing further softening of the townscape. By Year 15 planting would largely be mature and would act to soften views to Minet Country Park and within the development.

11.7.96 Overall, the effect of the proposed development on views from the railway would be a permanent **beneficial** impact of **moderate** significance.

Table 11.3 Minet Country Park and Yeading Brook Character Area 1 – Summary of Townscape and Visual Impacts (Based on Appendix 11.5)

Asset/Feature	Receptor		Effect		Significance (Stage/Year)	Overall Significance (Asset/Feature)	Comments
	Importance/ Value	Sensitivity to Change	Magnitude/ Scale	Nature of Effect			
Heritage Buildings/ Features	High	Moderate	Ph.1: Medium	Temporary Adverse	Moderate	Moderate	Loss of some lengths of boundary walls (assumed to be at Stage 1) would be offset by creation of canal side public realm at Stages 2 and 3, and establishment of new visual links (all Stages) and physical links (Minet Bridge - Stage 2).
			Ph.2: Large	Permanent Beneficial	Moderate		
			Ph.3:Medium	As Stage 2	Moderate		
			PAY: Large	As Stage 2	Moderate		
			Yr.15: As Yr. 1	As Stage 2	Moderate		
Townscape and Character	Low to High	Moderate	Ph.1:Medium	Neutral	Moderate	Moderate	Minor adverse effects from new routes offset by careful location/alignment, high quality design and landscape mitigation (Stages 1 and 2). Much improved and enhanced public access created between Minet Country Park, the Canal and towpath, and the West Southall Site and beyond (Stages 2 and 3).
			Ph.2: Large	Permanent Beneficial	Moderate		
			Ph.3: Large	As Stage 2	Moderate		
			PAY: Large	As Stage 2	Moderate		
			Yr.15:As Yr.1	As Stage 2	Moderate		
Views	Moderate to High	Moderate	Ph.1: Medium	Permanent Beneficial	Moderate	Moderate	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 (Stages 1 and 2).
			Ph.2: Medium	As Stage 2	Moderate		
			Ph.3: Small	As Stage 2	Moderate		
			PAY: Medium	As Stage 2	Moderate		
			Yr.15: As Yr.1	As Stage 2	Moderate		
Overall Assessment	Moderate	Moderate	Small to Large	Permanent Beneficial	-	Moderate	Adverse effects on Canal offset by control of maximum building heights and enhancement of canal side frontage. Landscaped access routes create new beneficial linkages and seek to limit land take in Green Belt and Country Park.

PAY = Principal Assessment Year

Table 11.4 Large Scale Urban Character Area 2 – Summary of Townscape and Visual Impacts (Based on Appendix 11.5)

Asset/Feature	Receptor		Effect		Significance (Stage/Year)	Overall Significance (Asset/Feature)	Comments
	Importance/ Value	Sensitivity to Change	Magnitude/Scale	Nature of Effect			
Heritage Buildings/ Features	N/A	N/A	N/A	N/A	N/A	N/A	No acknowledged buildings or features of heritage value occur within this character area.
Townscape and Character	Low to Moderate	Low	Ph.1: N/A	N/A	N/A	Minor	Creation of pedestrian and cycle access/linkage between commercial and business estates off Springfield Road during Stage 2 would benefit customers/workers of this Character Area and also occupiers/users of the proposed new development.
			Ph.2: Small to Medium	Permanent Beneficial	Minor		
			Ph.3: N/A	N/A	N/A		
			Yr1: As Stage 2	Permanent Beneficial	As Stage 2		
			Yr15: As Stage 2	Permanent Beneficial	As Stage 2		
Views	Low	Very Low to Low	Ph.1:	N/A	N/A	Negligible	Views not generally gained from area due to urban context. Some localised enhancement of views at Stage 2 in relation to Pedestrian Bridge.
			Ph.2: Negligible	Permanent Neutral	Negligible		
			Ph.3: Negligible	As Stage 2	Negligible		
			PAY: Negligible	As Stage 2	Negligible		
			Yr.15: Negligible	As Stage 2	Negligible		
Overall Assessment	Low	Low	Small	Permanent beneficial	-	Negligible	Low sensitivity of area limits occurrence of adverse effects. Increased connectivity arising from Pedestrian Bridge beneficial to this area and West Southall Site.

PAY = Principal Assessment Year

Table 11.5 Small Scale Urban Character Area 3 – Summary of Townscape and Visual Impacts (Based on Appendix 11.5)

Asset/Feature	Receptor		Effect		Significance (Stage/Year)	Overall Significance (Asset/Feature)	Comments
	Importance/ Value	Sensitivity to Change	Magnitude/Scale	Nature of Effect			
Heritage Buildings/ Features	High	High	Ph.1: Large	Temporary Adverse	Substantial	Moderate	'Opening-up' of areas around Listed Water Tower enhances localised visual and physical prominence. Water Tower is embedded within new development. Loss of distinctive façade of The Crescent offset in the longer-term by enhancement of Water Tower setting and high quality landscape.
			Ph.2: Small	Permanent Beneficial	Moderate		
			Ph.3: N/A	N/A	N/A		
			PAY: Small	Permanent Beneficial	Moderate		
			Yr.15: As PAY	As Yr.1	Moderate		
Townscape and Character	Moderate to High	Moderate	Ph.1: Medium	Temporary Adverse	Substantial to Moderate	Moderate	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 West Southall Site and the Grand Union Canal/ Minet Country Park. Loss of The Crescent has localised adverse townscape effect.
			Ph.2: Medium	Permanent Beneficial	Moderate		
			Ph.3: N/A	N/A	N/A		
			PAY: Medium	Permanent Beneficial	Moderate		
			Yr.15: Medium	Permanent Beneficial	Moderate		
Views	Moderate	High	Ph.1: Medium	Permanent Beneficial	Moderate	Minor	Adverse effects limited by height restrictions along boundaries adjacent to existing residential areas. Wider views controlled by existing urban form.
			Ph.2: Small	As Ph.1	Minor		
			Ph.3: Small	As Ph.1	Minor		
			PAY: Small	Permanent Beneficial	Minor		
			Yr.15: Small	As Yr.1	Minor		
Overall Assessment	Moderate to High	Moderate to High	Small to Large	Permanent Beneficial	-	Moderate	Localised adverse effects on heritage and views offset and balanced by increased connectivity and linkages. Creation of new high quality townscape east of Water Tower is beneficial.

PAY = Principal Assessment Year

Table 11.6 West Southall Site Character Area 4 – Summary of Townscape and Visual Impacts (Based on Appendix 11.5)

Asset/Feature	Receptor		Effect		Significance (Stage/Year)	Overall Significance (Asset/Feature)	Comments
	Importance/ Value	Sensitivity to Change	Magnitude/Scale	Nature of Effect			
Heritage Buildings/ Features	High	High	Ph.1: Large	Temporary Adverse	Substantial	Substantial	Re-introduction of new built form in proximity to the canal edge offset by height restrictions and increased connectivity, including creation of canal side public realm.
			Ph.2: Large	Permanent Neutral	Substantial		
			Ph.3: Large	As Ph.1	Substantial		
			PAY: Large	As Ph.1	Substantial		
			Yr.15: Large	As Ph.1	Substantial		
Townscape and Character	High	Low	Ph.1: Large	Permanent Beneficial	Substantial	Substantial	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.
			Ph.2: Large	As Ph.1	Substantial		
			Ph.3: Large	As Ph.1	Substantial		
			PAY: Large	As Ph.1	Substantial		
			Yr.15: Large	As Ph.1	Substantial		
Views	Low	Low	Ph.1: Large	Permanent Beneficial	Moderate	Moderate	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.
			Ph.2: Large	As Ph.1	Moderate		
			Ph.3: Large	As Ph.1	Moderate		
			PAY: Large	As Ph.1	Moderate		
			Yr.15: Large	As Ph.1	Moderate		
Overall Assessment	High to Low	Low	Large	Permanent Beneficial	-	Substantial	Permanent beneficial effects would result throughout due to creation of high quality, coherent townscape with improved connectivity on exiting underused brownfield land.

PAY = Principal Assessment Year

Table 11.7 National Grid Gas Compound Character Area 5 – Summary of Townscape and Visual Impacts (Based on Appendix 11.5)

Asset/Feature	Receptor		Effect		Significance (Stage/Year)	Overall Significance (Asset/Feature)	Comments
	Importance/ Value	Sensitivity to Change	Magnitude/Scale	Nature of Effect			
Heritage Buildings/ Features	N/A	N/A	N/A	N/A	N/A	N/A	No acknowledged buildings or features of heritage value occur in this character area.
Townscape and Character	Low to Moderate	Low	Ph.1: Small	Permanent Neutral	Minor	Minor	No new development proposed in this area, but the retained gasworks 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.
			Ph.2: Small	As Ph.1	Minor		
			Ph.3: Small	As Ph.1	Minor		
			PAY: Small	As Ph.1	Minor		
			Yr.15: Small	As Ph.1	Minor		
Views	Very Low	Very Low	Ph.1:	Permanent Neutral	Negligible	Negligible	Negligible effect upon views of very low sensitivity, due to working industrial context.
			Ph.2:	As Ph.1	Negligible		
			Ph.3:	As Ph.1	Negligible		
			PAY:	As Ph.1	Negligible		
			Yr.15:	As Ph.1	Negligible		
Overall Assessment	Very Low to Moderate	Very Low to Low	Small	Permanent Neutral	-	Negligible	Permanent neutral effect of negligible significance due to lack of intervention. Maintenance of southern pedestrian and cycle access provides opportunity for wider northward connectivity into new urban area of Main Site.

PAY = Principal Assessment Year

Table 11.8 Derelict Cricket Pitch Character Area 6 – Summary of Townscape and Visual Impacts (Based on Appendix 11.5)

Asset/Feature	Receptor		Effect		Significance (Stage/Year)	Overall Significance (Asset/Feature)	Comments
	Importance/ Value	Sensitivity to Change	Magnitude/Scale	Nature of Effect			
Heritage Buildings/ Features	High	Moderate	Ph.1: Moderate	Temporary Adverse	Substantial	Moderate	Effect of construction of new buildings adjacent to Listed building limited by imposition of height restrictions. Development would not encroach on setting of Listed building.
			Ph.2: Moderate	Permanent Neutral	Moderate		
			Ph.3: Small	As Ph.2	Moderate		
			PAY: Small	As Ph.2	Moderate		
			Yr.15: Small	As Ph.2	Moderate		
Townscape and Character	High	Low	Ph.1: Large	Permanent Beneficial	Substantial	Substantial	Proposals establish a high quality, coherent townscape on currently underused brownfield land. Proposed development establishes new public realm and open spaces, establishing connections to the wider area. Tree loss at Stage 1 would be offset in the long-term by co-ordinated programme of tree planting across the area and Site as a whole.
			Ph.2: Moderate	As Ph.1	Substantial		
			Ph.3: N/A	N/A	N/A		
			PAY: Moderate	As Ph.1	Substantial		
			Yr.15: Moderate	As Ph.1	Substantial		
Views	Low	Low	Ph.1: Large	Permanent Beneficial	Moderate	Moderate	Substantial enhancement of views into the area, and creation of new views within and from the area (i.e. new vista toward Water Tower along high street). Creation of new landmarks and high quality townscape setting.
			Ph.2: Moderate	As Ph.1	Moderate		
			Ph.3: Small	As Ph.1	Minor		
			PAY: Moderate	As Ph.1	Moderate		
			Yr.15: Moderate	As Ph.1	Moderate		
Overall Assessment	High to Low	Low	Large	Permanent Beneficial	-	Moderate	Permanent beneficial effects would result throughout due to creation of high quality, coherent townscape with improved connectivity on existing under-used brownfield land.

PAY = Principal Assessment Year

References

11.1 IEMA and LI (2002) Guidelines for Landscape and Visual Impact Assessment (GLVIA), Institute of Environmental Management and Assessment and The Landscape Institute.

View 1

View 2

View 3

View 4

JWR.1222-Panorama views

Figure 11.1a