Proposed Redevelopment of Land at Gondar Gardens

London NW6

Environmental Report

Main Report

November 2013

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on behalf of Linden Wates Homes (Hampstead) Limited

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1. Introduction

1.1 Linden Wates (West Hampstead) Limited are seeking planning permission for the development of 28 homes and associated works on land at Gondar Gardens, London NW6, within the London Borough of Camden (LB Camden). The site is 1.24 hectares in area and is occupied partly by a redundant covered reservoir. It is shown on **Fig 1.1**.

1.2 The current application has evolved from an earlier scheme for development on the frontage of Gondar Gardens, submitted in January 2012, which was refused planning permission on appeal in June 2013. The Inspector's concerns were restricted to matters of design detail, and these have been addressed; the fundamental parameters of the scheme remain the same as before.

1.3 The previous frontage scheme had itself evolved from an earlier proposal to develop housing within the footprint of the reservoir (the reservoir scheme). When this original submission was made, the Council issued a Screening Opinion to the effect that they regarded the proposals as "EIA development" under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations, 1999, as amended (the EIA Regulations).

1.4 The Council's Opinion was based, firstly, on the fact that the proposals, being an "urban development project" larger than 0.5 hectares in size, constituted "Schedule 2 development" under the Regulations; and secondly, on the Council's view that the development would be likely to give rise to significant environmental effects, primarily in relation to ecology. Accordingly, an EIA was carried out and its findings were presented in the form of an Environmental Statement (ES).

1.5 When the previous frontage scheme was submitted, it was also subject to EIA – in accordance with the new Town and Country Planning (Environmental Impact Assessment) Regulations, 2011 - on the assumption that the Council would probably require one. A similar approach has been adopted for this application.

1.6 The ES comprises a Main Report (this document), a Non-Technical Summary and a series of Technical Annexes. The Main Report is intended to provide a single consolidated source of information on:

- the EIA process;
- the application site;
- the baseline environmental conditions;
- the proposed development;
- the predicted effects; and
- the measures proposed to mitigate or avoid significant adverse effects.

1.7 The Technical Annexes present a range of supporting information related to the assessment topics, together with standalone reports required by the planning process. They are as follows:

1. Air Quality Impact Assessment

2. Climate Change
   2.1: Energy strategy
   2.2: Sustainability Statement

2.3: Code for Sustainable Homes Strategy

3. Cultural Heritage
   3.1: Archaeological Desk-Based Assessment
   3.2: Built Heritage Assessment

4. Ecology
   4.1: Extended Phase 1 Habitat Survey
   4.2: Bat Surveys
   4.3: Reptile Surveys
   4.4: Breeding Bird Surveys
   4.5: Reptile Mitigation Strategy

5. Flood Risk and Drainage Assessment

6. Geo-Environment
   6.1: Geo-Environmental Site Assessment Report
   6.2: Envirocheck Report

7. Noise and Vibration
   7.1: PPG24 Environmental Noise Survey
   7.2: BS5228 Noise Impact Assessment
   7.3: BS5228 Vibration Impact Assessment
   7.4: Road Noise Impact Assessment
   7.5: Car Lift Noise Assessment

8. Sunlight and Daylight Assessment

9. Townscape and Views: Modelled Views

10. Transport Statement and Transport Statement Addendum

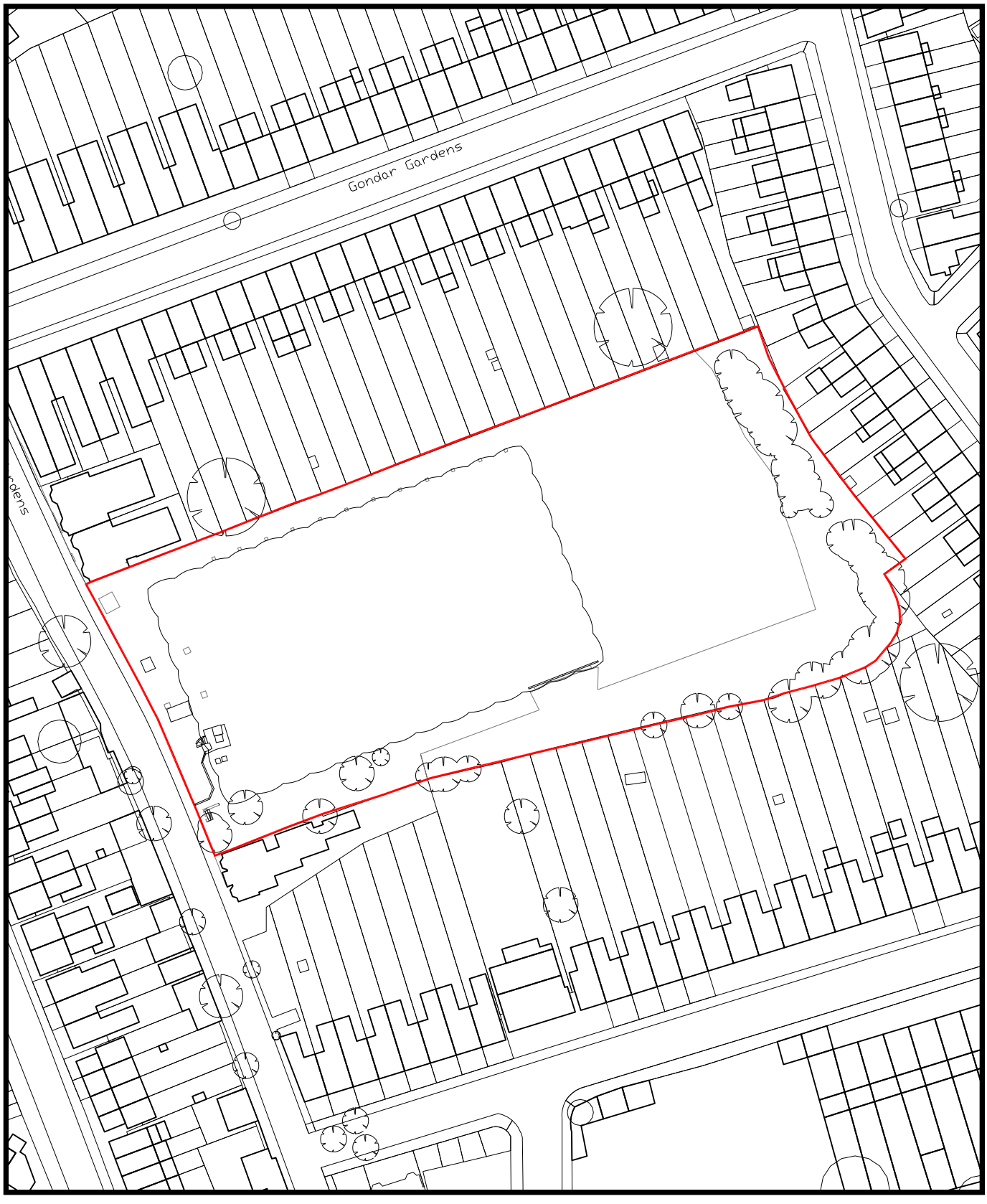

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FIGURE 1.1

Application Site

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2. EIA Process

Regulatory Context

2.1 EIA is a structured process for identifying the potential environmental effects of a development. It has formally been part of the UK planning system since 1988, when Regulations implementing the provisions of EC Directive 85/337/EEC were introduced.

2.2 An amending Directive (97/11/EEC) was followed by the publication of new Regulations in March 1999. Since then, a considerable amount of case law has accumulated, together with additional government advice. These have been consolidated into a third series of Regulations – the Town and Country Planning (Environmental Impact Assessment) Regulations, 2011 - which took effect in August 2011.

Overview

2.3 The main steps in the assessment process are as follows:

- confirming the need for EIA (screening);
- defining its scope (scoping);
- consulting relevant parties;
- carrying out baseline studies;
- predicting the potential effects;
- assessing the significance of those effects;
- identifying and incorporating mitigating measures;
- assessing the residual effects; and
- preparing the ES.

Scope

2.4 Schedule 4 of the Regulations sets out the information to be included in environmental statements. Part I, para 3 requires an ES to include "*a description of the aspects of the environment likely to be significantly affected*"… and then lists the following topics:

- *Population;*
- *Fauna;*
- *Flora;*
- *Soil;*
- *Water;*
- *Air;*
- *Climatic factors;*
- *Material assets, including the architectural and archaeological heritage; and*
- *Landscape.*

2.5 In addition, para 1(c) requires an ES to identify the "*expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation etc)*", whilst para 4 includes "*the use of natural resources…emission of*

pollutants, creation of nuisance and elimination of waste" as potential sources of environmental effects.

2.6 This list is neither exhaustive nor prescriptive; the scope of each EIA must be defined on a case-by-case basis, taking account of the nature of the development and the sensitivity of the environment.

2.7 For programming reasons, a Scoping Opinion has not been sought from LB Camden. Instead, the scope of the previous EIA has been used as the starting-point for the current assessment. It should be noted that this scope has not been challenged by LB Camden or any of the statutory consultees.

2.8 The schedule of assessment topics is set out in Table 2.1 below, together with the relevant Schedule 4 reference and justification.

Table 2.1: Assessment Topics

Topic	*Schedule 4 Ref.*	*Justification*
Air Quality	*Air*	The whole of Camden is designated as an Air Quality Management Area (AQMA). The development will introduce potential sources of operational emissions such as traffic Fugitive dust emissions during demolition and construction could affect sensitive receptors such as nearby residents.
Climate Change	*Climatic factors*	Whilst the development is of modest scale, it will be required to demonstrate an appropriate level of climate change mitigation and adaptation, specifically in relation to opportunities to reduce energy consumption and carbon emissions.
Cultural Heritage	*Archae-ological heritage*	Since most of the site has been previously developed, it is considered to have minimal potential for the survival of archaeological remains. However, a study has been commissioned to verify this. The development will involve substantial demolition of the disused reservoir, although this is neither statutorily nor locally listed.
Ecology	*Fauna* *Flora*	The site is designated as a Site of Nature Conservation Interest (SNCI) and is known to support a protected species (slow-worm). The proposals involve removal of the reservoir roof, and thereby its grassland cover, together with restoration of the interior of the reservoir as a landscaped space. The potential impacts on habitats and protected species therefore need to be considered.
Flood Risk and Drainage	*Water* *Population*	Whilst the site is not located in an area of flood risk, it is of sufficient size to require a Flood Risk Assessment (FRA) in accordance with PPS25. In addition, the development will alter the runoff characteristics of part of the site and will need to demonstrate that a sustainable surfacewater drainage strategy can be delivered.
Ground Contaminati on	*Soils*	Since part of the site was previously occupied by a drinking-water reservoir, contaminating uses are unlikely to have taken place on or close to it. However, this needs to be verified, together with the nature and

		vulnerability of the groundwater regime and the sensitivity of surrounding and future uses.
Noise and Vibration	*Population*	Nearby residents could be affected by noise or vibration during demolition and construction. The development will introduce sources of operational noise such as traffic and building services plant. New residents will be introduced into an area with typical urban background noise levels.
Sunlight and Daylight	*Population*	The development will introduce new buildings onto what is currently an open site, and will be required to demonstrate that it can deliver acceptable levels of amenity for new and existing residents.
Townscape and Views	*Landscape Population*	The development will introduce buildings onto part of the site and will involve removal of the reservoir roof. These changes will alter the character of the site, with the potential to affect local townscape and views.
Transport	*Population*	The development will involve the creation of a new vehicular access onto the public highway, together with the removal of some parking spaces. It will inevitably generate some traffic, together with additional walking, cycling and public transport trips.

2.9 Several topics have been "scoped out" of the assessment. These are as follows (with explanation):

- Agricultural Land: Because no part of the site is in agricultural use.
- Wind and Electronic Interference: Because no tall buildings are proposed.
- Socio-Economics: Because the scheme is of modest scale, will not displace any jobs and will not have significant effects on employment, housing or social infrastructure.
- Waste: Because operational waste arisings will be small and will have an insignificant effect on the Council's waste management regime, whilst construction wastes will be managed in-situ in accordance with best practice so as to minimise their residual effect.
- Water Resources: Because no surfacewater features would be affected, whilst water consumption has been addressed as part of the sustainability strategy and groundwater has been addressed under ground contamination.

Methodology for Topic Assessments

2.10 The approach adopted for the original assessment of each topic is summarised below. In several cases, a full assessment has not been repeated, since there have been insufficient changes to the scheme or to baseline conditions to justify this, and an updating exercise has been carried out instead. Full details are provided in the technical chapters and annexes.

2.11 Air Quality

- Review of baseline air quality data and LBN's Local Air Quality Management (LAQM) process.

- Qualitative assessment of traffic emissions based on the London Air Pollution Planning and the Local Environment (APPLE) Working Group.

- Qualitative assessment of impacts from construction dust based on the GLA and London Councils guidance (2006).

2.12 Climate Change

- Preparation of an energy strategy to demonstrate how the development will achieve target reductions in regulated carbon emissions through a combination of building design and supplementary on-site generation.

- Performance specification for building design in accordance with Code for Sustainable Homes level 4, including airtightness and fabric standards.

- Assessment of carbon savings achieved by the preferred solution over a minimally-compliant (Building Regs Part L) base case.

2.13 Cultural Heritage

- Desk-based assessment in accordance with Institute of Archaeologists' Standard and Guidance for Archaeological Desk-based Assessments and the Greater London Archaeology Advisory Service (GLAAS) Archaeological Guidance Papers.

- Search of sources such as the Greater London Historic Environment Record, a map regression exercise, geo-environmental evidence and site walkover.

- Assessment of archaeological assets and the significance of any potential effects in accordance with the NPPF.

- Appraisal of the significance of the reservoir as a heritage asset, taking account of its origin, construction, condition and prospects for long-term alternative use.

2.14 Ecology

- A desk-top study to compile existing biodiversity information, including a data search from the local Records Centre and other bodies as required, within a 1km radius of the site.

- An extended Phase 1 habitat survey (JNCC 2010) and assessment of potential presence of protected, Biodiversity Action Plan or otherwise notable species and habitats.

- Specific surveys for protected species (slow-worm, bats and breeding birds).

- Assessment of effects, including the potential for enhancement, based on Institute of Ecology and Environmental Management (July 2006) Guidelines for Environmental Impact Assessment in the UK.

- Preparation of an Ecological Enhancement Plan to provide a framework for future management of the site.

2.15 Flood Risk and Drainage

- A Flood Risk Assessment compliant with the NPPF, focussing primarily on site runoff and the urban drainage system.

- Advice on runoff management and adaptation measures to be incorporated into the design in the form of a stormwater drainage strategy in accordance with SUDs principles.

2.16 Ground Contamination

- A Phase 1 (desk-based) geo-environmental study, including a site visit/visual inspection, an historic map regression to identify previous uses, a review of BGS published information and borehole records to determine ground/groundwater conditions.

- An initial ground contamination assessment based on a conceptual risk model identifying potential risks to groundwater, site workers, future users and surrounding receptors.

2.17 Noise and Vibration

- Baseline monitoring to determine the noise climate around the site.

- Characterisation of the suitability of the site for residential development as per the Noise Exposure Categories in (former) PPG 24.

- Assessment of construction noise and vibration in accordance with BS5228-1:2009 "Noise and Vibration Control on Construction and Open Sites", and accepted mitigation practices.

- Screening assessment of operational traffic noise in accordance with the DMRB methodology.

- Qualitative assessment of potential noise impact from fixed operational plant (car lifts).

2.18 Sunlight and Daylight

- Assessment of baseline sunlight/daylight levels experienced by existing residential receptors around the site.

- Prediction of future levels of sunlight/daylight experienced by existing and future receptors, based on the appropriate tests in BRE Report 209.

2.19 Townscape and Views

- A landscape and visual impact assessment (LVIA) consistent with the IEMA/LI Guidelines for Landscape and Visual Impact Assessment (2013).

- Preparation of modelled views to show the impact of the development from outside the site.

2.20 Transport

- Preparation of a Transport Statement in accordance with Transport Assessment Best Practice, May 2006.

- Background traffic flows and parking demand derived from surveys undertaken in October 2010.

- Non-car accessibility based on a Public Transport Accessibility Level (PTAL) assessment.

- Future trip generation and modal share derived from the TRAVL database.

Identification and Reporting of Effects

2.21 Schedule 4 of the Regulations requires an ES to describe the "*likely significant effects*" of a development, namely "*direct…and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects*…"

2.22 The definition of significance used for each topic is explained in the technical chapters and appendices, and reflects the specific methodological and regulatory requirements for each topic.

2.23 A distinction is made between effects occurring during the construction phase and those related to the permanent features or operation of the development. The additional terminology adopted in the Regulations is used where this is helpful in characterising the nature or duration of an effect.

2.24 The following synergistic effects have been addressed where relevant:

- combined effects, i.e. those resulting from a combination of impacts on specific resources or receptors (e.g. from different phases of the development); and

- cumulative effects, i.e. those resulting from interaction between the proposal and other future committed (or reasonably anticipated) developments.

Baseline Scenario

2.25 The predicted effects of the development have been assessed against a future baseline scenario which assumes that (in the event permission is granted) construction would be completed in 2016.

2.26 Future baseline conditions have been derived from current conditions modified by any known or foreseeable changes. These include committed developments and any dynamic environmental changes (e.g. growth of vegetation, deterioration of the reservoir structure).

Consultation

2.27 Consultation took place within the original EIA and as part of a wider community engagement exercise. The following organisations were consulted by LB Camden when they prepared their previous screening opinion:

- LB Camden officers (e.g. Environmental Health Service, Energy Conservation);
- English Heritage GLAAS;
- Environment Agency;
- Thames Water;
- Natural England; and
- Transport for London (TfL).

2.28 A number of other organisations have also been consulted during the course of the assessment, mainly for information-gathering purposes; these are identified in the technical chapters and annexes. Community and stakeholder consultation has been an integral part of the design development and planning process, and is ongoing.

3. Baseline Conditions

Site Character

3.1 The application site is rectangular in shape and is defined to the west by the kerb-line of Gondar Gardens and on all other sides by the rear boundaries of properties in Gondar Gardens, Agamemnon Road and Hillfield Road. The western side of Gondar Gardens is formed by the garages and rear gardens of properties in Sarre Road.

3.2 The western part of the site comprises a covered reservoir constructed in 1874. At that time the site was located on the edge of the built-up area, with farmland extending to the north. Residential development had enclosed the southern and eastern sides of the site by 1896, and by 1915 its immediate context was entirely built-up.

3.3 The reservoir was emptied in the late 1990s and decommissioned as a reservoir under the Reservoir Act in 2002. It is of brick arch construction with a barrel roof and concrete floor, providing an internal height of up to 7m. It is about 92m long and 53m wide, giving an area of 4,878sqm, representing approximately 39% of the site. The condition of the barrel roof is deteriorating and will continue to do so, resulting in its probable collapse in the long-term.

3.4 The reservoir is covered with soil and supported by earth bunds on each side, forming a plateau-like feature raised above the level of the surrounding area at an elevation of around 80m AOD. This difference is most pronounced to the south and east, where levels slope steeply towards an elevation of about 72mAOD at the site boundary. Levels fall more gradually to the north and form a low bank to the west.

3.5 The reservoir and most of the site are covered with rough grass, which is cut periodically. A strip of scrub and trees runs along the eastern boundary, whilst there are also several trees along the southern boundary. Areas of hardstanding and ruderal vegetation, together with three small buildings, are located close to the western boundary.

Land Use Context

3.6 The surrounding area is densely developed, mainly with two- and three-storey terraced houses typical of the period. Whilst it is primarily residential in character, there are several schools, such as Hampstead School to the north-west and Beckford Primary School to the south.

3.7 Areas of open space include the UCL sports ground and Hampstead Cemetery to the north, and Fortune Green Park to the north-east. Local shops are services are located on Mill Lane, together with community facilities such as a public library on West End Lane, about 500m to the east. West Hampstead Thameslink Station is located 750m to the south-east.

Relevant Designations

3.8 Most of the site, except for a strip of “white land” along the western boundary, is shown as Private Open Space on the current Proposals Map and Core Strategy.

Since the site is not accessible to the public, including local residents, its amenity value as open space is primarily visual.

3.9 The area of Private Open Space is also designated as a Site of Nature Conservation Importance (SNCI Borough II). The citation for this designation refers in particular to:

- its cover of mostly neutral grassland, supporting a moderate diversity of wildflowers and typical grassland butterflies;
- the presence of spiked sedge, which is locally uncommon; and
- the presence of slow-worm, of which this is the only known occurrence in Camden.

3.10 Trees along the eastern boundary of the site are the subject of a Tree Preservation Order. The reservoir has recently been added to the draft schedule of locally listed buildings.

Site History

3.11 The reservoir was constructed in 1874 on what was then farmland on the edge of the built-up area. Residential development had enclosed the southern and eastern sides of the site by 1896, and by 1915 its immediate context was entirely built-up. The reservoir was emptied in the late 1990s and decommissioned as a reservoir under the Reservoir Act in 2002.

Future Changes

3.12 Water penetration is occurring through the roof of the reservoir, which requires significant and costly maintenance. Structural advice is that the roof will deteriorate over time if repairs are not completed. If development does not proceed, the grassed areas within the site would continue to be mowed, as at present. However, surrounding trees and shrubs would mature, and unless this vegetation is managed the degree of shading would probably increase, resulting in further habitat changes.

Environmental Context

3.13 Key environmental influences on the sensitivity of the site and local area are summarised below.

Air Quality

3.14 The whole of Camden has been declared an Air Quality Management Area (AQMA) on the basis of predicted exceedances of the UK Air Quality Objectives for NO_2 and fine particulates (PM_{10}). In reality, such exceedances are likely to be confined to the vicinity of major roads; those closest to the site are the A5/Shoot Up Hill, 0.5km to the west; and the A41/Finchley Road, 0.5km to the north-east. In addition, air quality can be expected to be better in the less densely developed northern part of the borough, where the site is located.

3.15 Air quality at the site is typical of an "urban background" location, corresponding to Air Pollution Exposure Criteria (APEC) A or B for NO_2 and A for PM_{10} (as per the London Councils' Air Quality Guidance). This suggests that concentrations of NO_2 are likely to be slightly above or slightly below the AQ Objectives, whilst concentrations of PM_{10} are likely to be slightly below.

3.16 The proximity of residential properties, together with the ecological value of the site, contributes to its sensitivity in terms of the potential for adverse effects to result from fugitive dust emissions during the demolition and construction phase.

Climate Change

3.17 The site is currently assumed to give rise to very low carbon emissions, associated with occasional maintenance (mowing) and with natural sources (release from soils etc).

Cultural Heritage

3.18 The site is not located within an Archaeological Priority Area, and the surrounding area is not considered to be of high archaeological potential. In view of the substantial degree of ground disturbance that would have occurred during construction of the reservoir, it is highly unlikely that any pre-existing archaeological remains will have survived within the site.

3.19 There are four designated heritage assets within 500m of the site: Beckford Primary School (Grade II listed), two K2 telephone kiosks (also Grade II listed) and Hampstead Cemetery. The cemetery is a Registered Park and Garden (Grade II) and contains a number of individually listed features.

3.20 The reservoir has been added to the schedule of locally listed buildings. The Heritage Statement considers it to be of medium evidential value, medium to low historical value, and very low communal and aesthetic value. It is not unique as a heritage asset, since at least 30 reservoirs of similar type were constructed across London around the same time.

3.21 The reservoir structure itself is not visible and makes no contribution to the surrounding townscape, except as an area of green space. English Heritage do not consider the reservoir to be of statutorily listable quality, and the Heritage Statement concludes that the site is of low to very low overall value.

Ecology

3.22 As described above, the greater part of the site is designated as a Site of Nature Conservation Importance (Borough II), citing its neutral grassland cover and the presence of spiked sedge and slow-worm. Neutral grassland and spiked sedge are priority species identified in Camden's Local Biodiversity Action Plan. Slow-worms occur within part of the site and are protected under the Wildlife and Countryside Act, 1981 (as amended) and are a UK priority BAP species.

3.23 Surveys have found no evidence of bats roosting (emerging or re-entering) within the site, including the reservoir structure. A small number of common bat species were seen foraging or commuting along the site boundary, and are likely

to roost in mature trees within nearby gardens. None of the trees within the site are considered to have roosting potential.

Flood Risk and Drainage

3.24 The site is located within Flood Zone 1, which signifies a low (less than 1 in 1,000 year) probability of flooding. The site occupies a hilltop location, and there are no watercourses in the vicinity; the local area is served by a combined urban drainage system. There are no records of flooding from sources such as groundwater or surcharging of sewers.

3.25 About 60% of the site is in a greenfield condition; the remainder (the reservoir), whilst having a covering of soil and grass, is effectively impermeable and is likely to discharge runoff towards the surrounding area.

Ground Contamination

3.26 As noted above, the site comprised farmland prior to construction of the reservoir. Its use for potable water supply precluded public access and probably resulted in particular care being taken during any maintenance work to avoid the spillage of any potential contaminants.

3.27 The surrounding area was developed by the early 20th century and since then has largely been in residential use. Trade Directory entries include a metal fabrication business in Gondar Gardens, together with various other businesses in the surrounding area (e.g. dry cleaners, motor repairs, petrol station) which could pose a contamination risk (e.g. due to spillage of oils, solvents etc).

3.28 Such risks, however, are highly localised and are commonplace within a built-up area. No landfills are recorded in the vicinity of the site. The underlying geology (London Clay) is a non-aquifer; groundwater movement will be minimal and unlikely to provide a pathway for the spread of contaminants. In addition, the site is locally elevated, and any contaminated groundwater is unlikely to have migrated towards it. Overall, the risks that residual contamination or ground gas may be present are considered to be low and very low respectively.

Noise and Vibration

3.29 Ambient noise levels around the site are typical of an urban environment; the main sources of noise comprise background "hum" from distant major roads, intermittent noise from local traffic and aircraft movements. A PPG24 assessment places the site into Noise Exposure Category (NEC) A during the day and NEC B at night, which means that noise must be taken into account when determining the application. The proximity of residential properties, together with the presence of protected reptiles within the site, increases its sensitivity to introduced sources of noise and vibration such as construction, operational traffic and building services plant.

Sunlight and Daylight

3.30 The largely open character of the site allows relatively high levels of natural lighting, both within the site itself and at the facades of nearby residential properties. Sources of overshadowing are confined to the surrounding properties

and trees. The proximity of residential properties increases its sensitivity to potential changes in natural daylighting and shadowing.

Townscape and Views

3.31 As noted previously, the site is defined as Private Open Space on the Proposals Map/Core Strategy. Its main contribution to the townscape is as a remnant of green space in an otherwise built-up area, including a number of notable (and protected) trees. Its visibility, however, is confined by the rear facades of the dwellings in Hillfield Road, Agamemnon Road, Gondar Gardens and Sarre Road; apart from the tallest trees, it exerts little influence on the wider townscape. In addition, the surrounding dwellings turn their back on the site, and make no attempt to exploit its potential in the manner of a London square.

3.32 The surrounding area is typical of the suburban development of the period, and is not designated as a Conservation Area. The site does not fall within any of the London panorama's identified in the London View Management Framework SPG; the nearest is from Parliament Hill, 3km to the north-east.

Transport

3.33 Gondar Gardens is a typical residential street with controlled on-street parking used mainly by local residents. It is characterised by low traffic flows amounting to one two-way movement every two minutes during the morning and evening peak hours. The strategic road network is accessed via Mill Lane westwards to the A5/Shoot Up Hill and eastwards via the B150/Fortune Green Road to the A41/Finchley Road.

3.34 The site has a Public Transport Accessibility Level (PTAL) rating of 1 (low). However, this understates the actual degree of access to public transport within the wider area. The nearest bus stops are on Mill Lane, Westbere Road and Fortune Green Road, providing a total of 69 services per hour to destinations such as Brent Cross Shopping Centre and Central London. West Hampstead railway station and Kilburn Underground station are within 1km of the site. A range of local services are available within easy walking distance on Mill Lane. A car club has vehicles available within 250m and 500m of the site.

FIGURE 3.1

Aerial Photo

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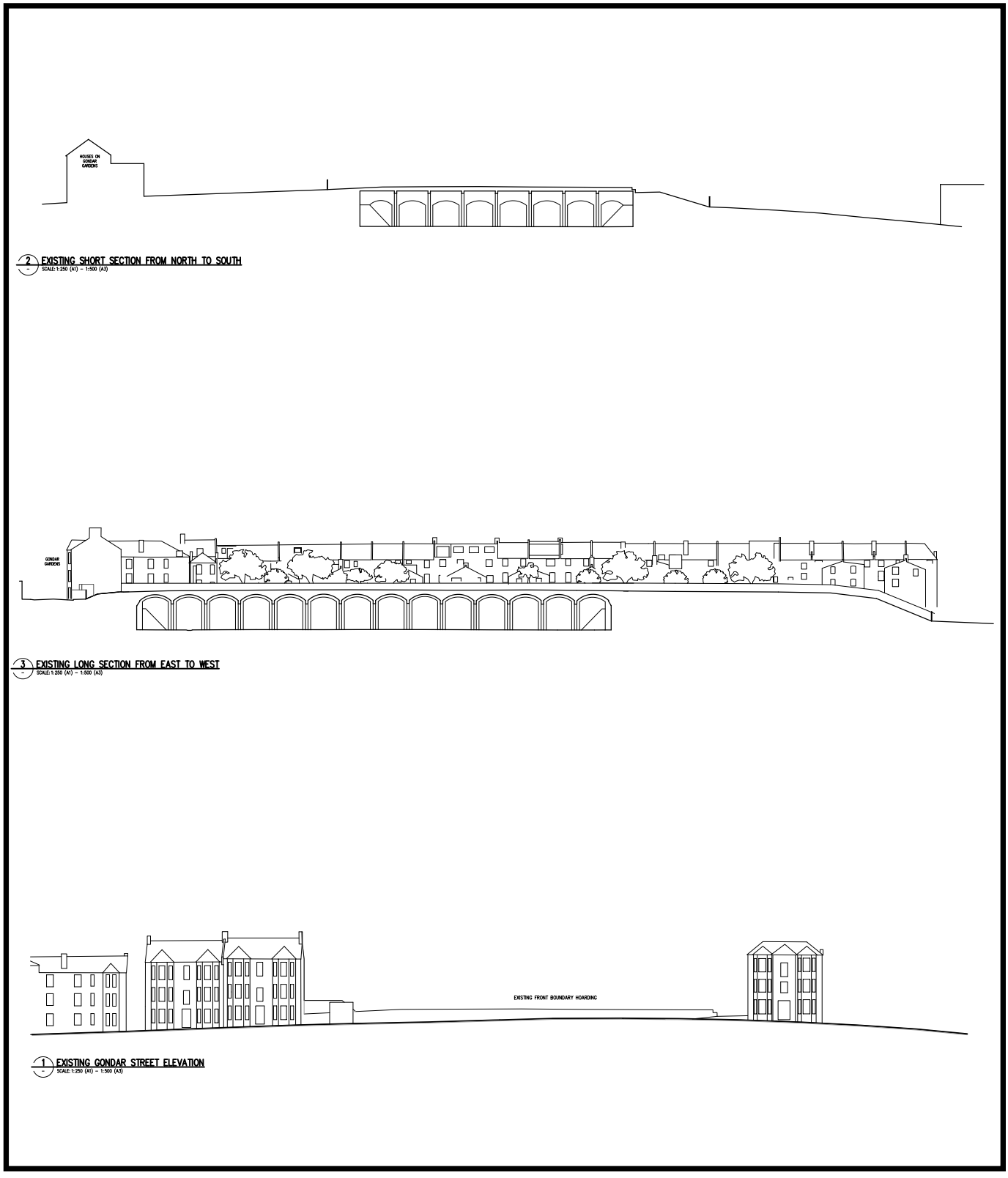

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FIGURE 3.2

Existing Site Sections

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4. The Proposed Development

Main Alternatives

4.1 The current scheme has evolved from a detailed consideration of alternatives. Historically, there have been two main alternatives: the original scheme, which located residential units within the footprint of the reservoir; and the previous frontage scheme, which was rejected at appeal.

4.2 The reservoir is redundant, and its roof structure suffers from excessive water penetration which requires significant levels of maintenance. Nevertheless options for returning the site to an alternative use have been examined. These options have been tested against the desirability of maintaining the open character and ecological value of the site, whilst acknowledging its proximity to residential properties.

4.3 Any use that retained the reservoir would require varying degrees of structural intervention, including wholesale removal or replacement of the roof. Retention of the reservoir in its current condition is not a realistic option if the site is to be made accessible for an alternative use. In addition, vehicular access is only possible from the Gondar Gardens frontage of the site.

4.4 Non-residential uses such as storage were soon rejected, because they are fundamentally incompatible with a residential area and would have generated HGV traffic on local streets. A residential scheme emerged as the most sympathetic to the character of the area and the most adaptable to the constraints of the site.

4.5 A medium- or high-rise development was also rejected as being incompatible with local character, as well as potentially giving rise to additional effects in relation to issues such as visual amenity and microclimate. A higher density scheme would potentially give rise to greater environmental impacts and would unavoidably have a greater physical impact on the site.

4.6 The previous reservoir scheme was considered to represent a workable compromise by using the footprint of the reservoir as a template for development. This allowed the external walls of the reservoir to be retained and preserved the open character of the site on three sides. However, the reservoir scheme was rejected by the Council on the basis of its impact on the open character and biodiversity of the site, but subsequently allowed at appeal.

4.7 In tandem with the reservoir scheme being considered, an alternative frontage scheme was developed. The planning brief for the current proposal is an evolution of this scheme, which although being supported by officers, was refused by the Planning Committee and subsequently dismissed at appeal for very specific design reasons. These were as follows (taken from the Inspector's report):

18. However, my main concern with the appeal scheme is the detailed design. The proposed design seeks to repeat the proportions of houses and bay windows seen in the area, through a series of brick projections. However, the varying size of the projections, the large expanses of brickwork (seen particularly

on the two large projections), the combination of geometric shapes and the four storey sections with a flat roof, only serve to distinguish all elements of its design from those in the surrounding area. There is no visible connection to the intricate shapes, decorative detailing (including red brick and white mouldings) or the strong vertical emphasis seen in the surrounding houses which combine to determine the character of West Hampstead.

19. There are examples of new development of contrasting design in the area. However, they are generally smaller developments, which exert little influence over the area. By contrast, the appeal scheme would stretch some 70 metres along Gondar Gardens, filling most of this section of the road along one side. It would impose a long development of a very different character, thereby significantly harming the distinct and attractive character of this part of West Hampstead and its contribution to the wider area.

20. It is appreciated that the design was as a result of an iterative process with the Council, but it is the appeal submission before me that is for consideration and dealings with the Council have not influenced my decision. The building would be there for many years to come, negatively influencing the character and appearance of the area. The harm from the detailed design would not, therefore, be overcome by the significant benefits of the scheme. It would conflict with LP policy 7.6, CS policy CS14 and Camden Development Policies DP24 which seek to protect local character. These policies are consistent with paragraphs 58 and 60 of the Framework which aim to ensure that development responds to local character including the promotion of local distinctiveness

25.The development has been designed to minimise the impact on the POS and SNCI and I have concluded that the benefits of the scheme outweigh any small harm in this regard. While many other aspects of the scheme are acceptable including the siting and size of the proposed buildings, the scheme fails on the detailed design as outlined above. For this reason, it would be contrary to National and Local Plan policy and the appeal is dismissed (ref APP/X5210/A/12/2188091.)

Design Brief

4.8 The key requirements of the brief have been to:

- create a long-term viable solution for the site and reservoir structure;
- retain and enhance the open character and ecological value of the site;
- provide innovative and neighbourly homes;
- achieve high levels of sustainability (Code for Sustainable Homes Level 4 and a targeted reduction in regulated carbon emissions);
- creatively address the Gondar Gardens frontage;
- consider the amenity of surrounding properties; and
- respond positively to the design criticisms of the previous frontage scheme

Concept

4.9 The new dwellings will be located along the Gondar Gardens frontage of the site, comprising two four-storey blocks (predominantly 3 stories with a subsidiary fourth floor) addressing the street, with three-storey extensions behind, above a basement. Vehicles would enter the site from Gondar Gardens, between the frontage blocks, with a double car lift providing access to residents' parking at basement level. Level access will be provided throughout.

4.10 The dwellings would be designed to comply with Code for Sustainable Homes Level 4. This would be achieved through the use of energy-efficient building fabric, supplemented by roof-mounted solar photovoltaics. Other sustainable features of the design would include green roofs and stormwater attenuation.

4.11 The roof and internal piers of the reservoir would be demolished, leaving the side walls and buttresses. Fill would be used to create grassed banks against the walls, and the void would be landscaped to create a new grassland/wildlife area. The street frontage would be landscaped as public realm, whilst private amenity space would comprise green roofs and private gardens.

4.12 The remainder of the site would remain essentially in its current open condition as private open space (general public access would not be permitted) and would be managed to enhance its biodiversity. This would be achieved within the framework of an Ecological Enhancement Plan, which would include measures such as:

- selective thinning/replanting of perimeter trees and shrubs;
- erection of bird nesting and bat roosting boxes;
- construction of habitat piles to provide refuges for species such as slow-worm and hedgehogs;
- regular cutting of the main grassland area to maintain a hay meadow character;
- less frequent cutting of the banks and peripheral areas to encourage a more diverse sward and maintain conditions suitable for slow-worm; and
- creation of a pond.

Construction

4.13 Construction is anticipated to extend over 24 months. The main tasks would comprise:

- enabling works, setting up site compound etc;
- removal of the reservoir roof ;
- demolition of most of the internal structure;
- remedial work to remaining reservoir walls and arches;
- construction of foundations;
- erection of blockwork walls;

- cladding and roofing;
- fitting of windows and doors;
- internal finishing, dry lining and joinery;
- laying and connecting services; and
- external structures and landscaping.

4.14 The site compound, welfare facilities etc would be set up close to Gondar Gardens, from which all access would be obtained. Construction traffic is anticipated to be routed via Mill Lane to/from the A5/Shoot Up Hill.

4.15 The works will be carried out in accordance with a Construction Management Plan (CMP), which would consolidate the various mitigation measures identified in this ES and would be agreed with the Council and relevant statutory bodies. The site would fall within the provisions of the Considerate Contractors Scheme. The CMP would be a contractual obligation and would apply to sub-contractors. It would include the following:

- the overall construction strategy and phasing;
- a schedule of agreed environmental parameters (e.g. noise levels);
- a schedule of relevant policies, standards and guidance;
- management and monitoring protocols;
- provisions for public liaison, prior notification and handling complaints;
- general housekeeping requirements
- details of prohibited or restricted operations, including timing and no-go areas;
- traffic management provisions, including agreed HGV routes; and
- method statements for environmentally sensitive activities (e.g. piling).

FIGURE 4.1

Site Layout and Landscaping

N

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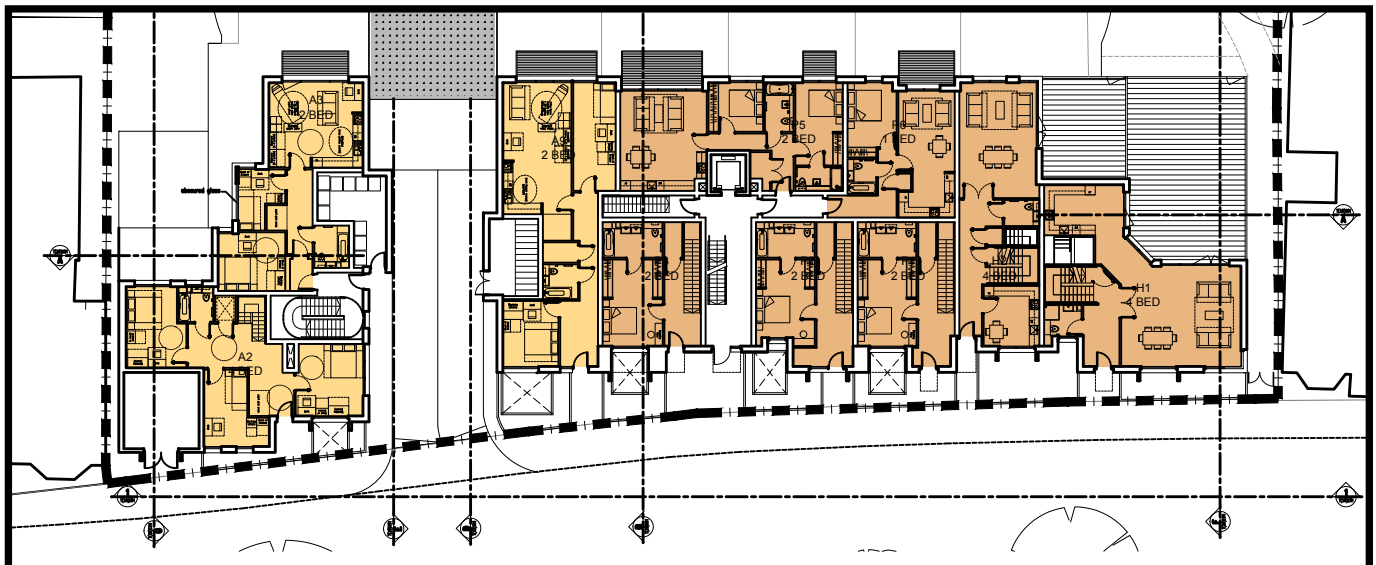
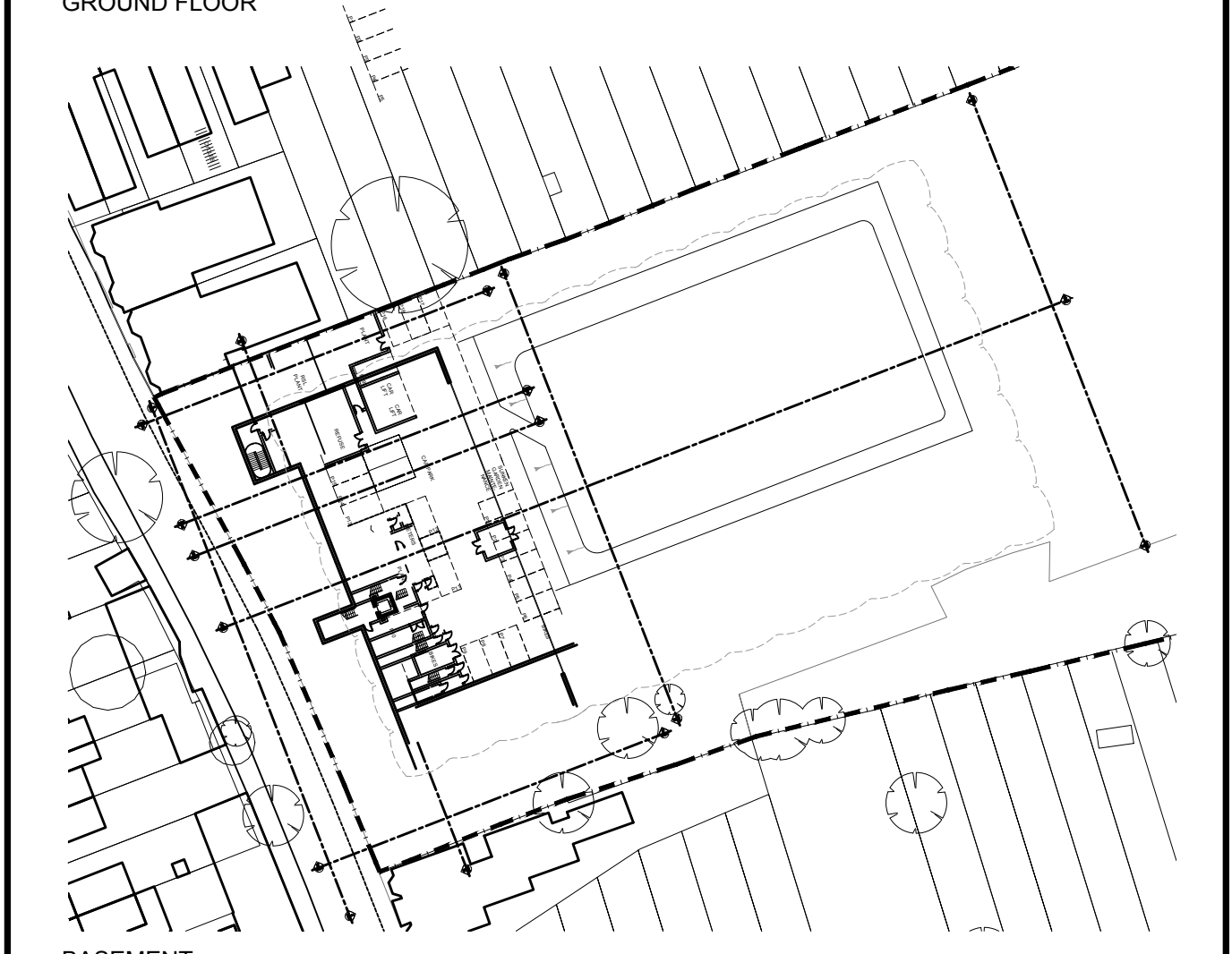


GROUND FLOOR



BASEMENT

FIGURE 4.2

Basement and Ground-Floor Plans

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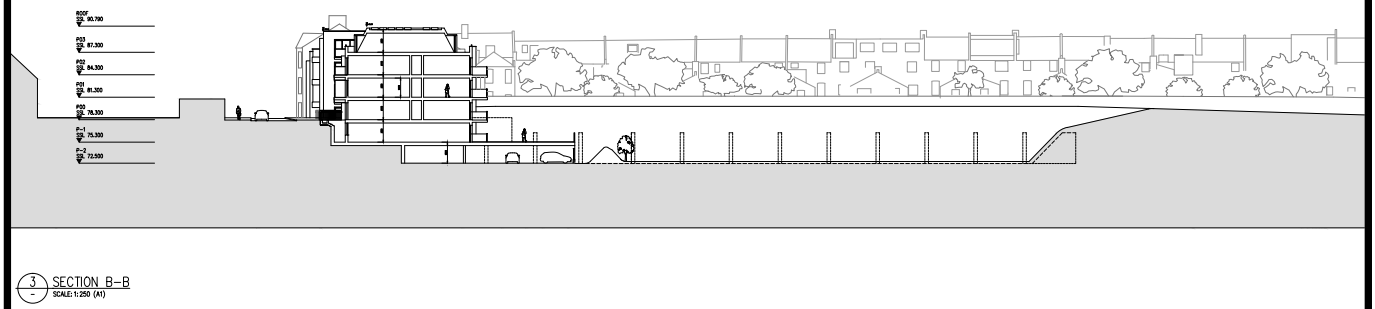

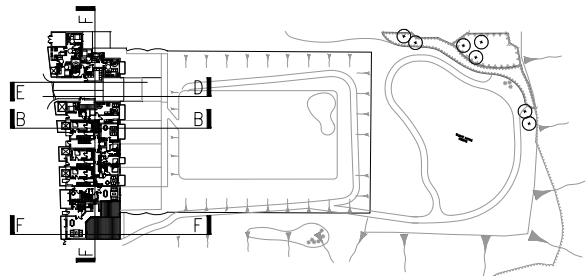

FIGURE 4.3

Proposed Site Sections

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FIGURE 4.4

Gondar Gardens Elevation

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1 GONDAR GARDENS REAR ELEVATION 3-3
SCALE: 1:100 (A1)

2 GONDAR GARDENS REAR ELEVATION 3-3
SCALE: 1:250 (A1)

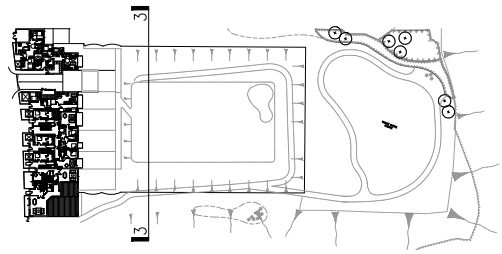

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FIGURE 4.5

Rear Elevation and Section

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5. Air Quality

Introduction

5.1 This chapter assesses the effects relating to air quality and should be read in conjunction with the detailed assessment presented in **Technica**l **Annex 1**.

Scope and Methodology

5.2 A qualitative approach was adopted for the assessment, as the proposed scheme is of modest scale, is not expected to generate a significant amount of road traffic and does not include any significant point sources of combustion emissions. No detailed dispersion modelling of construction or operational emissions was therefore undertaken.

5.3 The significance of demolition/construction impacts has been evaluated with reference to best practice guidance published IAQM (2011). The significance of operational impacts has been evaluated with reference to guidance provided by the London Air Pollution Planning and the Local Environment (APPLE) Working Group (endorsed by the London Councils Transport and Environment Committee, 2007).

Policy Context

National Policy

5.4 UK air quality policy is published under the umbrella of the Environment Act 1995, Part IV and specifically Section 80, the National Air Quality Strategy (NAQS). The latest Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Working Together for Clean Air, published in July 2007, sets air quality standards and objectives for ten key air pollutants to be achieved between 2003 and 2020.

5.5 The air quality standards in the United Kingdom are derived from European Commission (EC) Directives and are adopted into English law via the Air Quality (England) Regulations 2000 and Air Quality (England) (Amendment) Regulations 2002. The Air Quality Limit Values Regulations 2003 and subsequent amendments implement the EU Air Quality Framework Directive into English law. 2008/50/EC was translated into UK law in 2010 via the Air Quality Standards Regulations 2010. The objectives relevant to the proposed development are summarised below in Table 5.1.

5.6 These, and other objectives, are to be used in the review and assessment of air quality by local authorities under Section 82 of the Environment Act (1995). If exceedances are measured or predicted through the review and assessment process, the local authority must declare an Air Quality Management Area (AQMA) under Section 83 of the Act, and produce an Air Quality Action Plan to outline how air quality is to be improved to meet the objectives under Section 84 of the Act.

Table 5.1: Relevant National Air Quality Objectives

Substance	Averaging period	Exceedences allowed per year	Ground level concentration ($\mu g\ m^{-3}$)	Target date
Nitrogen dioxide (NO_2)	1 year	-	40	31.12.05
	1 hour	18	200	31.12.05
Particles (PM_{10})	1 year	-	40	31.12.04
	24 hours	35	50	31.12.04

London Councils Air Quality and Planning Guidance

5.7 The London Air Pollution Planning and the Local Environment (APPLE) Working Group issued a guidance document on air quality and planning issues for developments. The revised version of this document (January 2007) was endorsed by the London Councils Transport and Environment Committee (TEC) on 17th October 2007.

5.8 The guidance identifies that air quality can be a material consideration in the planning process. Only zero-emission developments are unlikely to have any impact on local or global air quality and therefore mitigation should be a consideration for all developments. Figure 5.1 and Table 5.2 outline the suggested approach for determining the significance of impacts and level of mitigation required to minimise exposure to air pollution.

Baseline Conditions

Emission Sources and Key Air Pollutants

5.9 In recent decades, transport-related emissions have become one of the main sources of air pollution in urban areas. The principal pollutants relevant to this assessment are NO_2 and PM_{10}, two key parameters released by vehicular combustion processes or subsequently generated by vehicle emissions in the atmosphere through chemical reactions, and which are generally considered to have the greatest potential to result in human health impacts.

Review of LB Camden Local Air Quality Management Studies

5.10 LB Camden has declared an Air Quality Management Area (AQMA) for both NO_2 and PM_{10}, covering the entire borough. Since the application site is within the AQMA, current air quality may be expected to have the potential to expose future residents of the proposed development to concentrations of relevant pollutants in excess of the Air Quality Standards.

5.11 However, LB Camden's 2009 Updating and Screening Assessment (USA) notes that 'The north of the borough, in contrast is less congested, and there are more open spaces and parks, of which particular areas [Hampstead Heath Woods, approximately 2 km north-east of Gondar Gardens] have been designated as Sites of Special Scientific Interest (SSSI). Air pollution in these areas is generally lower resulting in improved air quality.' Gondar Gardens is located towards the north of LB Camden, and is close to areas of open space, so is likely to experience better air quality than southern areas of the borough.

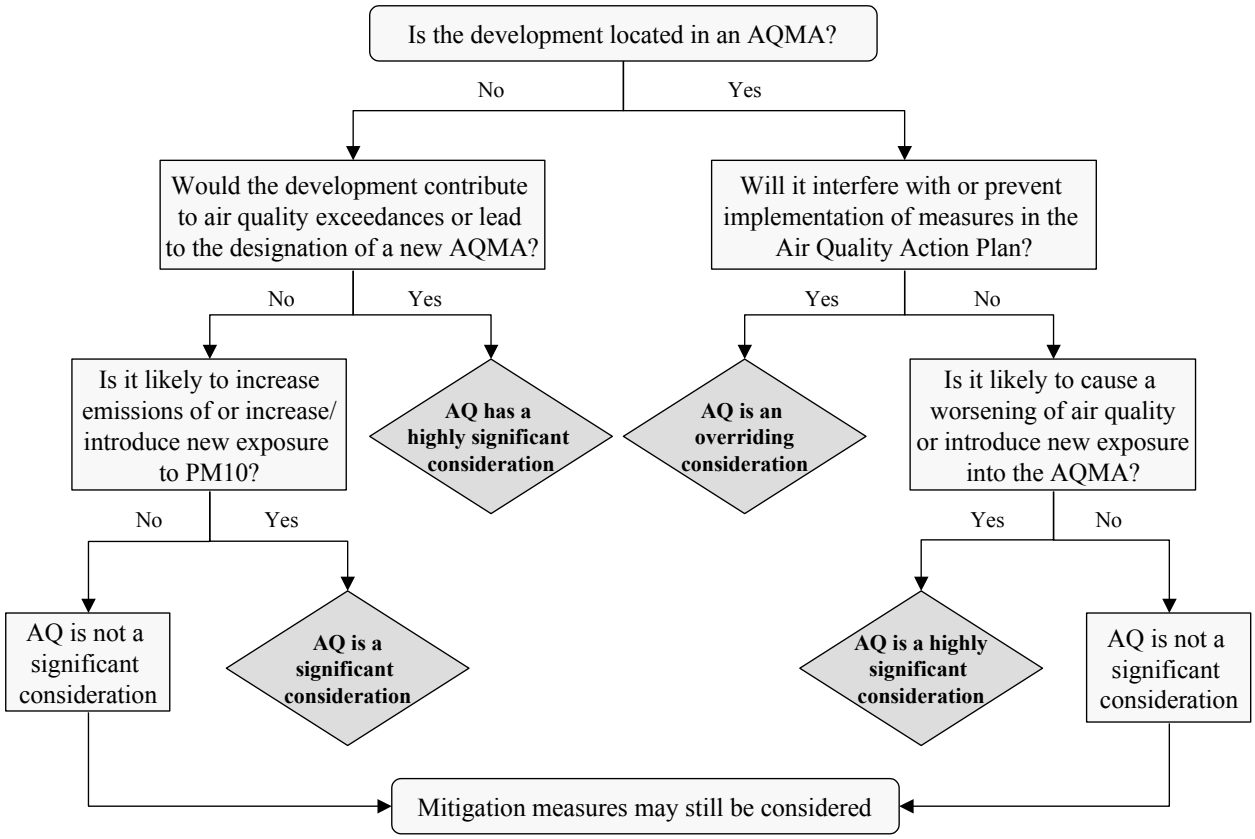

Fig 5.1: Procedure for Determining Significance

Table 5.2: Air Pollution Exposure Criteria (APEC)

APEC	Applicable Range Nitrogen Dioxide Annual Mean	Applicable Range PM_{10}	Recommendation
APEC – A	> 5% below national objective	**Annual Mean:** > 5% below national objective **24 hr:** > 1-day less than national objective	No air quality grounds for refusal; however mitigation of any emissions should be considered.
APEC – B	Between 5% below or above national objective	**Annual Mean:** Between 5% above or below national objective **24 hr:** Between 1-day above or below national objective.	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered e.g., Maximise distance from pollutant source, proven ventilation systems, parking considerations, winter gardens, internal layout considered and internal pollutant emissions minimised.
APEC – C	> 5% above national objective	**Annual Mean:** > 5% above national objective **24 hr:** > 1-day more than national	Refusal on air quality grounds should be anticipated, unless the Local Authority has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/industrial land uses should be

		objective.	considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures.

Note: Applicable ranges assume downward pollutant trend has been established.

Air Quality Monitoring Data

5.12 LB Camden operates automatic air quality monitors at three locations in the borough. However, two of these - at London Bloomsbury and Shaftsbury Avenue - are distant from the site in the southern portion of the borough and are unlikely to be representative of air quality at Gondar Gardens. The third monitor is at a location roadside to the A41 Finchley Road, Swiss Cottage, approximately 2.75 km from Gondar Gardens.

5.13 The neighbouring London Borough of Brent operates a number of automatic air quality monitors, and one of these, Brent St Mary's Primary School, is approximately 3.5 km from Gondar Gardens. This site is now closed and monitoring data is only available to 2009.

Table 5.3: Air Quality Monitoring from Local Monitoring Stations

Monitor location	Classification		Annual mean			
		Year of data	NO_x $\mu g/m^3$	NO_2 $\mu g/m^3$	PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$
Camden, Swiss Cottage	Roadside (R)	2012	182	70	23	13
Brent, St Mary's Primary School	Urban background (UB)	2009	56	36	21	Not measured

5.14 The development site on Gondar Gardens is at an urban background location, and therefore the Swiss Cottage roadside site is unlikely to be representative. However, air quality at the application site may be expected to be broadly similar to that experienced at the St Mary's Primary School urban background monitoring station.

5.15 LB Camden also measures nitrogen dioxide using passive diffusion tubes at a number of locations. However, these are mainly in the southern part of the borough. The diffusion tube sited at Frognal Way is at an urban background location in the northern part of the borough, approximately 1.5km east of Gondar Gardens and at a location likely to be broadly similar to Gondar Gardens. Diffusion tube results for 2007, 2008 and 2009 at the Frognal Way site are presented in Table 5.4 below.

Table 5.4: Nitrogen Dioxide Monitoring Data from Local Diffusion Tubes

Tube reference	Location	Bias-adjusted annual mean NO_2 concentrations, $\mu g/m^3$		
		2010	2011	2012
CA7	Frognal Way	29	31.5	28.9

DEFRA UK Air information Resource (AIR) Data

5.16 Estimated background air quality data are available from DEFRA's UK AIR (Air information Resource) website (formerly the UK Air Quality Archive) and can be used to establish likely background air quality conditions at the proposed development site. The UK AIR provides estimated annual average concentrations of oxides of nitrogen (NOx), NO_2 and PM_{10} (and other pollutants) on a $1km^2$ grid basis across the UK.

5.17 Table 5.5 below presents estimated annual average NOx, NO_2 and PM_{10} concentrations for the grid square containing the Gondar Gardens site, in 2013 and 2016 (the intended opening year of the development).

Table 5.5: UK AIR Estimated Annual Average Background Pollutant Concentrations

Assessment Year	Estimated Annual Average Pollutant Concentrations from the UK AIR		
	Annual Average NO_X ($\mu g/m^3$)	Annual Average NO_2 ($\mu g/m^3$)	Annual Average PM_{10} ($\mu g/m^3$)
2013	51.2	30.0	18.9
2016	45.3	27.3	18.3
Air Quality Objective	30	40	40

The air quality objective for NO_X is for the protection of vegetation and ecosystems. The data obtained from UK AIR website (http://uk-air.defra.gov.uk/) are for grid reference: 525500, 185500. The approximate centre of the reservoir on Gondar Gardens is at: 524845, 185300.

5.18 The UK AIR estimates of background concentrations of PM_{10} and NO_2 are below relevant air quality objectives and generally decrease over time, although this predicted decrease may not occur in the short to medium term.

Predicted Effects

Demolition/Construction Phase

5.19 Atmospheric emissions from demolition and construction activities will depend on a combination of the potential for emissions (the type of activity) and the effectiveness of control measures. In general terms, there are two sources of emissions that need to be controlled to minimise the potential for adverse environmental effects: exhaust emissions from site plant, equipment and vehicles; and fugitive dust emissions from site activities.

5.20 The operation of vehicles and equipment powered by internal combustion engines results in the emission of exhaust gases containing, amongst other pollutants, NO_X, PM_{10}, Volatile Organic Compounds (VOCs), and carbon monoxide (CO). The quantities emitted depend on factors such as engine type, service history, pattern of usage and fuel composition.

5.21 The operation of site equipment, vehicles and machinery will result in emissions to atmosphere of exhaust gases, but such emissions are unlikely to be significant, particularly in comparison to existing concentrations of vehicle exhaust pollutants in the vicinity of the site[1].

5.22 Fugitive dust emissions arising from demolition/construction activities are likely to be variable in nature and will depend on the type and extent of the activity, soil conditions (soil type and moisture), road surface conditions and weather conditions. Soils are inevitably drier during the summer, and periods of dry weather combined with higher than average winds have the potential to generate the most dust.

5.23 Fugitive dust arising from demolition/construction activities is generally of a particle size greater than the PM_{10} fraction, which has a greater potential to impact upon human health. According to guidance produced by the IAQM on the impacts of construction on air quality, the proposed development site be classified as a 'high risk' site before any mitigation, as identified below in Table 5.6. This is due the location of the proposed site and its proximity to nearby receptors.

Table 5.6: Demolition/Construction Emissions Class Guidelines

Construction Activities	Dust Emissions Class	Nearest Receptor	Notes
Demolition	Medium	**<20m**	**High Risk**
Earthworks	Medium	**<20m**	**High Risk**
Construction	Medium	**<20m**	**High Risk**
Track-out	Small	**<20m**	**Medium Risk**

5.24 The sensitivity of receptors near the proposed development site can be classified as 'medium'. Dust emissions from demolition/construction activities can be effectively controlled by adopting suitable mitigation measures to prevent dust becoming airborne and/or by containing dust within enclosures to prevent dispersion beyond the emission source.

5.25 Mitigation measures to control demolition/construction impacts based on the London Councils and GLA best practice guidance document for 'high risk' sites have been identified and are presented in the Technical Annex. These measures will be incorporated into a Construction Environmental Management Plan (CEMP), which will be agreed with LB Camden to ensure that the potential for adverse environmental effects on local receptors is minimised. The CEMP will include measures to control traffic routing, site access points and methods for controlling dust and general pollution nuisance from site operations. Controls will be applied throughout the demolition/construction period to ensure that dust emissions are mitigated.

5.26 Overall, demolition/construction effects on air quality will be minimised through the implementation of mitigation measures. This will significantly reduce the amount of dust that escapes the site boundary. Any demolition/construction

[1] Only 5-10 construction vehicle movements are expected each working day (during construction period only)

effects on air quality will be temporary and short-term (i.e. during the demolition/construction period only).

Operational Phase

5.27 The application site is not located close to a major road and may be considered an urban background location. Nevertheless, pollutant concentrations are likely to be elevated. On the basis of air quality monitoring results from similar urban background locations discussed above, the site is likely to have experienced annual mean NO_2 concentrations in the range 29 $\mu g/m^3$ to 36 $\mu g/m^3$ and PM_{10} of approximately 21 $\mu g/m^3$. This places it in London Councils' APEC A or B for NO_2 and A for PM_{10}, for which air quality would not normally be expected to be a grounds for planning refusal.

5.28 It is widely recognised that ambient concentrations of NOx, NO_2 and PM_{10} are not decreasing as was previously expected, but are often relatively stable. Adopting a conservative assessment, it is assumed that the development is likely to experience similar air quality in its opening year as the site has in 2009.

5.29 The development units are intended to be energy efficient, achieving Code for Sustainable Homes (CSH) level 4. The proposed number of units is small (28) and therefore the development will not generate significant road traffic/emissions. It is understood that maximum traffic generation is predicted to be of the order of 80 vehicle movements per day (5-8 vehicle movements in peak hours). Such an increase is not considered significant.

5.30 No on-site CHP (combined heat and power) unit is proposed for the development. It is understood that the residential units will have highly efficient, low NOx gas condensing boilers, supplemented by solar photovoltaic (PV) panels. Significant building emissions are not therefore expected.

5.31 Guidance to mitigate air pollution exposure resulting from development is given by APPLE and the London Councils (Air Quality & Planning Guidance, 2007) and the Mayor of London (Sustainable Design and Construction, supplementary planning guidance issued in May 2006).

5.32 The following mitigation measures are proposed:

- The site is located in an urban background location, and will not expose future residents to poor air quality.
- The site is well served by public transport (rail and bus), and includes provision of cycle storage for each unit, minimising the need for private car use by future residents.
- Less than one car parking space per residential unit will be provided, discouraging private car use by future residents.

5.33 The development will achieve Code for Sustainable Homes (CSH) Level 4 and will employ a number of measures to reduce energy consumption and on/off site emissions, including:

- accredited/enhanced construction detail to minimise building emissions/ improve building fabric energy efficiency;
- renewable energy technologies such as solar PV;
- energy efficient space and security lighting/light fittings;
- rainwater harvesting and sustainable urban drainage system(s); and
- low NOx condensing gas boilers.

5.34 Referring to the APPLE guidance mentioned above:

- the proposed development is located within an AQMA but is at an urban background location and is likely to experience air quality classifying it as APEC A or B in the anticipated opening year;
- the development will not interfere with or prevent implementation of measures in an Air Quality Management/Action Plan;
- the development is unlikely to cause a significant worsening of air quality and includes a number of mitigation measures to minimise emissions; and
- although within the AQMA, the site is unlikely to experience air quality not meeting the objectives for LAQM, and therefore further exposure to poor air quality is unlikely to occur.

5.35 Therefore, air quality is not regarded as a 'significant consideration' in this case.

Residual and Cumulative Effects

Demolition/Construction Phase

5.36 With the proposed mitigation measures in place, no significant residual effects are anticipated during the demolition/construction works. Any impacts will be temporary and any effects will be minimised through the implementation of an agreed CEMP.

Operational Phase

5.37 Significant residual effects associated with the operational development are not expected. The development is not anticipated to result in significant additional road traffic emissions and no major on-site point sources of emissions (such as a CHP) are proposed. The operational development will meet CSH Level 4 and includes a number of measures to minimise emissions and improve the energy performance of the residential units.

Cumulative Effects

5.38 It is highly unlikely that any cumulative effects on air quality will occur in combination with any other developments identified in the local area.

6. Climate Change

Introduction

6.1 This chapter addresses the importance of tackling climate change through reducing CO_2 emissions and energy use, and describes the measures proposed to reduce the impact of the development on climate change. These measures will target:

- achieving a 25% reduction in regulated CO_2 emissions over Building Regulations Part L 2010 baseline; and
- reducing regulated CO_2 emissions by 20% through the use of on-site Low or Zero Carbon technologies as far as feasible and;
- monitoring and reporting on site CO_2 emissions during the construction phase.

6.2 The chapter should be read in conjunction with the Energy Strategy, the Sustainability Statement and the Code for Sustainable Homes Strategy, which are presented as **Technical Annexes 2.1, 2.2 and 2.3** respectively.

Background

6.3 With a majority of the world's scientists accepting that climate change is occurring, resulting in increased global temperature and rising sea levels, energy has become a key concern. The carbon we consume on a daily basis mainly comes from non-renewable fossil fuels, which are becoming increasingly expensive as resources are depleted. This use is inherently unsustainable, and alternative energy sources must be sought.

6.4 Generating energy from fossil fuels emits greenhouse gases into the atmosphere, in particular carbon dioxide (CO_2), which contributes to pollution and climate change. Reducing carbon consumption and the related greenhouse gas emissions is therefore essential to protect the environment, maintain energy security and reduce the likelihood of fuel poverty.

6.5 The Climate Change Act (2008) sets legally binding targets for the reduction of greenhouse gases including carbon. Under this Act, the UK net carbon account for 2050 will be at least 80% lower than the 1990 baseline with the interim target of 2020 at 34%.

Scope and Methodology

6.6 Total CO_2 emissions from the development will be reduced by 25% over Part L 2010 baseline. Further to this the implementation of Low or Zero Carbon technologies (LZC) are to be implemented to reduce CO_2 emissions by 20% as far as feasible. Setting these targets complies with the London Plan 2011 and Camden Local Development Framework.

6.7 Meeting this target is challenging. After a review of opportunities and constraints, an energy strategy was developed in accordance with best practice, planning

policy requirements and guidance. Sample Standard Assessment Procedure (SAP) calculations from similar developments were used to demonstrate that the building has been designed to meet these targets as far as feasible.

6.8 SAP calculations model the likely energy usage of dwellings, and therefore the indicative carbon usage, of space and water heating in a dwelling. At the early design stage, SAP calculations were estimated using indicative figures taken from actual SAP calculations which reflect the size, form and configuration of the dwellings. These calculations will be updated as the detailed design is refined, and actual SAP calculations will be produced.

6.9 The energy strategy has been produced in accordance with the (1) be lean, (2) be clean and (3) be green energy hierarchy (set out in the London Plan). The strategy has been built around two main concepts: a Fabric First Approach and a Solar Led Approach.

Fabric First

6.10 In embracing the energy hierarchy a fabric first approach has been adopted. A fabric-first approach means consuming less energy and allowing greater resilience to increasing energy prices and climate change. The methodology ensures that a building will consume less energy over its long lifetime (circa 50+ years). The rationale is that other technologies have much shorter life-spans (by a factor of 2 to 4) and that there is no guarantee that they will be replaced, whereas a high-quality low energy consuming home will be around for many years.

6.11 The materials for the development have been selected to ensure that both the embodied carbon and the operational carbon of the buildings will be minimised over their lifespan.

Solar Led

6.12 This approach involves the use of photovoltaic (PV) panels. As a renewable Low or Zero Carbon (LZC) technology, they generate electricity from sunlight in sunny, cloudy and overcast conditions, although more electricity can be generated in direct sunlight.

6.13 The advantages of this approach include low maintenance costs, as panels are usually cleaned by rainwater and many are guaranteed for 20-25 year lifetime, but are expected to last longer. PV panels will be placed on roofs; based on the indicative SAPs, around 60 panels will be needed to meet the target. The associated energy and carbon savings have been calculated using SAP 2009 methodology taking into account actual irradiance, orientation and pitch of the PV array. The CO_2 savings from the strategy are as follows:

Technology	Details	tCO_2 saved	London Plan target met?
Enhanced building fabric	Highly energy-efficient building fabric and services with additional energy-saving devices	5.55	No
Photovoltaic panels (PV)	Approx 15.9kWp PV system* (e.g. 60 x 265 Wp PV panels)	8.48	No
	Total	14.03	Yes

6.14 In developing the energy strategy, the analysis has used indicative SAP calculations, since the detailed design has yet to be finalised. The strategy has therefore considered the use of supplementary renewable technologies such as hybrid PV panels or air-source heat pumps if required. The final solution will be submitted for approval during detailed design.

Policy Context

6.15 Government White Papers including '*Our Energy Future – Creating a Low Carbon Economy'* (published 2003) and '*The Carbon Plan'* (published 2010) and the Climate Change Act (November 2008) have shaped a vision for the UK's response to climate change and inform practice in the construction industry and in planning policy at the national, regional and local level.

6.16 The following London-wide and borough-wide planning documents are relevant:

- The London Plan (July 2011);
- London Sustainable Design & Construction Supplementary Planning Guidance (May 2006);
- Camden Core Strategy (November 2010);
- Camden Development Policies (November 2010);
- Sustainability Camden Planning Guidance 3 (2011);
- London Housing Design Guide INTERIM EDITION (Aug 2010); and
- Draft London Housing Sustainable Design Supplementary Planning Guidance.

Baseline Conditions

6.17 The site is currently vacant brownfield land. The only carbon emissions it produces are associated with natural releases from soils and with occasional maintenance activities (grass cutting etc). No on-site sources of ground gas (e.g. methane) have been identified.

Predicted Effects

6.18 The dwellings will comply with Building Regulations 2010 Part L, Code for Sustainable Homes 'Level 4', which seeks a 25% improvement in DER/TER and a 20% reduction in CO_2 emissions from on-site LZC technologies. They will be orientated to face east and west, allowing each unit to benefit from solar gain, particularly through the summer months when the angle of the sun and window is closer to 90 degrees. Houses will benefit from being dual aspect, thereby increasing the amount of natural light penetrating into the homes.

6.19 Surrounding trees will not provide substantial shading of PV panels. Balanced mechanical ventilation with heat recovery has been modelled, as this is in line with the London Plan energy hierarchy to use heat efficiently and recycles warm air that would otherwise be lost.

6.20 On-site construction emissions will be monitored and minimised. Materials used in the construction process, for products such as windows, will be selected where

they demonstrate low embodied energy (or carbon) so that the energy used in the production, processing use and disposal is accounted for.

6.21 Technologies built into the dwellings during construction will also achieve reductions in the amount of energy and carbon emitted from the operational development, including:

- the "fabric first" approach (outlined previously);
- high efficient individual gas-fired boilers;
- an air permeability standard of 3-5 $m^3/hr/m^2$;
- Heat Recover Ventilation; and
- 100% low energy light fittings.

6.22 These technologies will ensure a high level of energy efficiency across the development as demand for energy and CO_2 emissions are reduced. The remainder of the required reduction in CO_2 emissions, and the demand for energy from on-site renewable technologies, will be met through the use of photovoltaic (PV) cells.

		Be Lean	Be Clean	Be Green	
Regulated CO_2 Emissions	**Baseline (Part L 2010 TER)**	**Proposed Gas Baseline (DER)**	**Proposed Building (DER)**	**Proposed Building (DER)**	**Final % Reduction over Part L 2010 Baseline**
		No LZC or Energy Efficiency Measures	**With MVHR**	**With MVHR + PV**	
Total Regulated (tCO_2/yr)	47.64	47.34	42.09	34.87	26.81%
% Reduction over Part L 2010	N/A	0.63%	11.65%	26.81%	N/A
% Reduction from Energy Efficiency Services + LZC	N/A	N/A	11.09%	20.14*%	N/A

*SAP 2009 methodology accounting for actual orientation, pitch and local irradiance

6.23 Once the development is occupied, the residents will be responsible for reducing CO_2 emissions. The behaviour of residents will vary from home to home, depending on factors such as the number of users inhabiting a home. Residents will be provided with a Home User Guide which sets out ways in which they can use their home in an energy-efficient manner.

Residual Effects

6.24 The proposed development will meet Building Regulations Part L 2010 CO_2 Target Emission Rate (TER). The actual Dwelling Emission Rate (DER) will be 25% better than this, providing a significant saving in CO_2 emissions.

6.25 The incorporation of enhanced building fabric, energy efficient services and a PV system will ensure that the London Plan 25% reduction in CO_2 emissions over Part L is achieved. Further to this, the implementation of PV to cover all available non shaded roof space technologies will reduce the total CO_2 emissions as measured by the indicative SAP calculations of the site by 20%..

7. Cultural Heritage

Introduction

7.1 This chapter considers the potential effects relating to cultural heritage, and should be read in conjunction with the **Archaeological Desk-Based Assessment (Technical Annex 3.1)** and **Built Heritage Assessment (Technical Annex 3.2).**

Scope and Methodology

7.2 This chapter describes and reviews the historic environment within and around the application site. It also considers the setting of heritage assets within a study area proportionate to the scale and prominence of the proposed development and the surrounding heritage assets.

7.3 This information is used as a baseline from which the magnitude and significance of the impacts on the historic environment are identified and assessed. These effects can include direct effects (e.g. the loss of structures or fabric) and indirect or general effects on the character and appearance of any heritage assets (e.g. change in setting).

Definition of Significance

7.4 The National Planning Policy Framework (NPPF) and relevant guidance defines significance as " the value of a heritage asset to this and future generations because of its heritage interest. This interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting".

7.5 In order to identify heritage assets, public records were consulted, including the statutory list, the local Historic Environment Record (HER) and the local authority's local designation records. Site investigations were carried out to assess the special interest of assets and their relationship to the site. Site visits were carried out by a qualified Archaeological Consultant and a Historic Building Consultant during 2011.

7.6 The sensitivity of any heritage asset is defined by its importance in terms of national, regional or local statutory or non-statutory protection and grading of the asset. Table 7.1 sets out the criteria for assessing sensitivity.

Table 7.1: Methodology for Determining Sensitivity

Sensitivity	Example of Receptor
High: International Important	World Heritage Site
High: National Important	Scheduled Monuments, Listed Buildings, Registered Parks and Gardens
Medium: Regional Importance	Conservation Areas, Archaeological Priority Zones
Low: Local Importance	Locally listed buildings, undesignated archaeological assets

Magnitude of Effect

7.7 Magnitude of effect indicates the scale of change experienced by an asset and is a function of the nature, scale and type of disturbance, or damage to the heritage asset. For example, a high magnitude of effect may result in the loss of or damage to a feature of archaeological or cultural heritage interest. Criteria for assessing the magnitude of predicted effect are given in Table 7.2.

Table 7.2: Methodology for Determining Impact Magnitude

Magnitude of Impact	Criteria for Assessing Impact
10.1 High	10.2 Significant damage to baseline conditions (i.e. the destruction of archaeological or built heritage remains), or causing breach of legislation or statutory objectives
10.3 Medium	10.4 Moderate change to baseline conditions
10.5 Low	10.6 Slight change to baseline conditions
10.7 Negligible	10.8 Negligible change to baseline conditions
10.9 Nil	10.10 No discernible change to baseline conditions

7.8 The significance of the effect will derive from taking into account the sensitivity of the receptor and the magnitude of the effect. Those effects highlighted in grey in **Table 7.3** are considered to be significant in EIA terms.

Table 7.3: Significance Matrix

		International/ National (High Sensitivity)	Regional (Medium Sensitivity)	Local (Low Sensitivity)
Magnitude of Effect	High	Major	Major – Moderate	Moderate – Minor
	Medium	Major – Moderate	Moderate – Minor	Minor
	Low	Moderate – Minor	Minor	Minor - Neutral
	Negligible	Neutral	Neutral	Neutral
	Nil	Neutral	Neutral	Neutral

Study Area

7.9 In order to inform the preparation of this chapter a search of the Greater London Historic Environment Record (GLHER) was conducted for data relating to known Heritage Assets within a 500m radius of the Application Site.

Consultation

7.10 Consultation of the Camden Local Studies Library, a map regression exercise and a site walkover was undertaken as part of the assessment. Initial consultations were also been undertaken with the English Heritage advisor to the London

Borough of Camden in 2011, Ms Kim Stabler. These consultations were confined to buried heritage assets and sources of information.

Uncertainty/Assumptions

7.11 The assessment is based on extensive professional experience gained on other major developments across England and Wales. In particular, potential impacts from excavations for foundations, access, services and landscaping have been considered. Professional judgement has been used as the basis for the assessment of the likely scale of effect on listed buildings and their settings.

Policy Context

National Policy

7.12 Statutory protection for archaeological remains is provided by the Ancient Monuments and Archaeological Areas Act 1979, as amended by the National Heritage Act 1983 and subsequent amendments. Nationally important sites may be included on the schedule of monuments and are then accorded statutory protection. Details of scheduled monuments are maintained and advised by English Heritage. For other components of the historic environment, the Planning (Listed Buildings and Conservation Areas) Act 1990 amends the Town and Country Planning Act 1971 and provides statutory protection for listed buildings and Conservation Areas.

7.13 In March 2012, the Government published the *National Planning Policy Framework* which replaced *Planning Policy Statement 5: Planning for the Historic Environment*, providing guidance for planning authorities, property owners, developers and others on the conservation, management and investigation of heritage assets. In short, Government policy provides a framework which:

- Has a presumption in favour of the conservation and enhancement of designated heritage assets
- Protects the settings of designated heritage assets
- Takes into account the desirability of sustaining and enhancing the significance of heritage assets (designated and undesignated)
- Requires applicants to provide proportionate information on heritage assets affected by their proposals and an assessment of the impact of the proposed development on the significance of those heritage assets
- Accepts that harm to heritage assets may be justified where balanced or exceeded by community or other benefits arising from proposals, and/or where other mitigation is provided for, such as the recording of assets and publication of the resulting evidence.

Regional Policy

7.14 Relevant policies in the London Plan 2011 include Policy 7.8 Heritage Assets and Archaeology as follows:

Strategic
A: London's heritage assets and historic environment, including listed buildings, registered historic parks and gardens and other natural and historic landscapes, conservation areas, world heritage sites, registered battlefields, scheduled monuments, archaeological remains and memorials should be identified, so that the desirability of sustaining and enhancing their significance and of utilising their positive role in place shaping can be taken into account.
B: Development should incorporate measures that identify, record, interpret, protect and, where appropriate, present the site's archaeology.

Planning Decisions
C: Development should identify, value, conserve, restore, re-use and incorporate heritage assets, where appropriate.
D: Development affecting heritage assets and their settings should conserve their significance, by being sympathetic to their form, scale, materials and architectural detail.
E: New development should make provision for the protection of archaeological resources, landscapes and significant memorials. The physical assets should, where possible, be made available to the public on-site. Where the archaeological asset or memorial cannot be preserved or managed on-site, provision must be made for the investigation, understanding, recording, dissemination and archiving of that asset.

LDF Preparation
F: Boroughs should, in LDF policies, seek to maintain and enhance the contribution of built, landscaped and buried heritage to London's environmental quality, cultural identity and economy as part of managing London's ability to accommodate change and regeneration.
G: Boroughs, in consultation with English Heritage, Natural England and other relevant statutory organisations, should include appropriate policies in their LDFs for identifying, protecting, enhancing and improving access to the historic environment and heritage assets and their settings where appropriate, and to archaeological assets, memorials and historic and natural landscape character within their area.

Local Policy

7.15 The Camden Local Development Framework (LDF) was published in November 2010 replacing the previous Unitary Development Plan. The LDF is a collection of planning documents which work in conjunction with national policy and the London Plan to set out the strategy for managing growth and development in the borough.

7.16 Core Strategy Policy CS14: Promoting high quality places and conserving our heritage, states that:

The council will ensure that Camden's places and buildings are attractive, safe and easy to use by:

a) Requiring development of the highest standard of design that respects local context and character;

b) Preserving and enhancing Camden's rich and diverse heritage assets and their settings, including conservation areas, listed buildings, archaeological remains, scheduled ancient monuments and historic parks and gardens;

c) Promoting high quality landscaping and works to streets and public spaces;

d) Seeking the highest standards of access in all buildings and places and requiring schemes to be designed to be inclusive and accessible;

e) Protecting important views of St Paul's cathedral and the palace of Westminster from sites inside and outside the borough and protecting important local views.

7.17 Camden Development Policy DP25: Conserving Camden's heritage, states that:

To preserve or enhance the Borough's Listed Buildings the Council will not permit development that it considers would cause harm to the setting of a listed building (extract).

The Council will protect remains of archaeological importance by ensuring acceptable measures are taken to preserve them and their setting, including physical preservation, where appropriate.

Other Guidance

7.18 The Conservation Principles: Policies and Guidance, English Heritage, 2008 (Ref 8.5) relate to the sustainable management of the historic environment. Four key values are ascribed to heritage assets (pages 27 to 32 of the document), and understanding these values is fundamental to understanding the significance of a place. The four values are as follows:

- Evidential value - the potential of a place to yield evidence about past human activity.
- Historical value - ways in which past people, events and aspects of life can be connected through a place to the present.
- Aesthetic value - deriving from the way in which people draw sensory and intellectual stimulation from a place.
- Communal value - deriving from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory.

7.19 Heritage values are subject to further considerations such as understanding the fabric and evolution of the place, consideration of the relative importance of the values that have been identified, and by matters such as setting, context and comparative studies.

7.20 In terms of managing change, which is described on pages 43 to 48, the primary consideration is set out in paragraph 84 as follows:

"Change to a significant place is inevitable, if only as a result of the passage of time, but can be neutral or beneficial in its effect on heritage values. It is only harmful if (and to the extent that) significance is eroded".

7.21 The Setting of Heritage Assets: English Heritage (October 2011) (Ref 8.6) seeks to provide a firm definition for the term itself, as well as guidance to allow councils and application assess the impact of developments upon the settings of heritage assets.

7.22 The document supports the definition of setting provided in the NPPF, defining it as 'the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve.' Setting is also described as being a separate term to curtilage, character and context; while it is largely a visual term, setting, and thus the way in which an asset is experienced, can also be affected by noise, vibration, odour and other factors.

7.23 The document follows the existing terminology of the NPPF, and therefore considers 'heritage assets' to include Conservation Areas. Indeed, the document explicitly notes that townscapes, including such designated areas 'have a setting of their own', despite their size and internal variation.

7.24 In terms of 'views', the document notes that while different views may contribute to the significance of a heritage asset, 'some views may contribute more to the understanding of a heritage asset than others. Considering setting and urban design, the document notes the importance of protecting 'conscious design or fortuitous beauty' within the townscape, and it is clear that any such instances of such visual attractiveness should be identified as part of the planning process.

Baseline Conditions

Archaeology

7.25 There are no Scheduled Ancient Monuments or other designated archaeological remains located on or which have been previously recorded on, or particularly near the application site.

7.26 The site is considered to have a low archaeological potential for as yet to be discovered undesignated heritage assets from all past periods. It is also considered that the construction of the reservoir will have severely impacted and completely removed any archaeological remains which would have been present. Full discussion of the archaeological heritage assets is contained in the Technical Annex.

Built Heritage

7.27 There are no formally identified built heritage assets within the site. The structure of the reservoir is of some limited historic interest and has been included on the draft Local List. Designated heritage assets within 500m of the site comprise a school building and associated separate building in the grounds of the school, a pair of telephone kiosks and a registered park and garden, Hampstead Cemetery, which incorporates 20 individually listed monuments or tombs. These assets were identified for particular study due to their proximity to the site and are shown on Fig 2 of Technical Annex 3.1.

7.28 Table 7.4 below summarises the description and significance of these assets. Where assets are geographically grouped and undergo the same impacts (such as the listed monuments within Hampstead Cemetery), they are considered in combination.

Table 7.4: Built Heritage Assets

Name and Grade	Type of Asset	Sensitivity	Summary of significance
Former Reservoir structures Unlisted	Structure	Low	A reservoir constructed in 1874 to a standard design and form that is well understood and represented widely across London. Limited local historic and architectural

			significance
Beckford Primary School, attached railings and gateway GII	LB	High	Former Board school constructed in 1885-6 and 1891, now a primary school. Yellow stock brick with red brick dressings and a dated infants gateway. Significant as a good example of a board school by a known architect with clear architectural interest and historical interest in contributing to the history of the community and area as well as to the history of education. Nationally significant
Beckford Primary school building in the playground GII	LB	High	Free standing building probably dating to 1885-6 in the grounds of the above former Board School. Similar in architectural style and reflecting that interest as well as the history of the area and community education. Nationally significant
Pair of K2 telephone kiosks outside the recreation ground GII	LB	High	Pair of the relatively rare K2 type telephone kiosks by Sir George Gilbert Scott in 1926/7. This type was only distributed to the capital and has become a design icon. Nationally significant
20 listed tombs or monuments II one II*	LB	High*	A good collection of tombs from the 1870s to the 1930s. The most notable are collected along the main driveway and adjacent to the central twinned chapels. They present an important group and include tombs to many known historic characters. Nationally significant

Heritage Places and Spaces

7.29 Located to the north of the site within the 500m radius is Hampstead Cemetery, a designated Registered Park and Garden (RPG) Grade II. The cemetery is nationally significant as an exceptional example of a High Victorian (1874-76) public cemetery for the Metropolis, and is of high sensitivity.

7.30 Its artistically notable and impressive buildings and landscape design were by designers of note including the landscape architect Joseph Fyfe Meston and buildings, including lodge, chapels, gate piers, and railings, designed by the architect Charles Bell. The cemetery layout and structures survive largely intact in good condition. Its local and national social interest is expressed in a rich variety of C19 monuments including many London worthies

Predicted Effects

Construction

7.31 The development includes partial demolition of the existing reservoir followed by comprehensive redevelopment of the site fronting on to Gondar Garden. This demolition is considered to amount to a medium impact; taking account of the low sensitivity of the asset, this would result in a minor adverse effect.

7.32 No effects on on-site archaeological heritage assets, or on designated heritage assets in the surrounding area, will occur during the demolition and construction phase.

Completed Development

7.33 The assessment of operational impacts takes into account the sensitivity (significance) of designated heritage assets, the assessment of their settings and the predicted change. There will be no direct impacts on any designated heritage assets; the impacts will be indirect and based on changes to the setting of assets including key views which may affect its significance. Impacts are set out in Tables 7.5 and 7.6 below.

Table 7.5: Assessment of Operational Effects (Buildings)

Name and Grade	Type	Sensitivity	Impact Assessment
Beckford School II Building in Beckford school yard II	LB	High	The Application Site is located to the north of the two listed school buildings. The intermediate land is occupied with densely built up residential streets and there is no visibility between the Site and the school buildings. The setting of the buildings is judged to be the school yard and the streets immediately bordering the school site. The predicted magnitude of impact on the setting of the heritage assets of the operational stages is considered **negligible**, there will therefore be a predicted effect of: **Neutral**
Pair of K2 Telephone Kiosks II	LB	High	The Application Site is located to the west of the two listed telephone kiosks. Their setting is restricted to the street and recreation ground immediately adjacent to their location. The tight urban grain and distance between the kiosks and the Application Site mean there is no connection between them. The predicted magnitude of impact on the setting of the heritage assets of the operational stages is considered **negligible**, there will therefore be a predicted effect of: **Neutral**
Listed tombs and	LB	High	The Application Site is located to the south of the listed tombs and monuments within the

monuments II and II*			cemetery, none of which are visible from the Application Site. The setting of the tombs and monuments is provided by the cemetery itself. The predicted magnitude of impact on the setting of the heritage assets of the operational stages is considered **negligible**, there will therefore be a predicted effect of: **Neutral**

Table 7.6: Assessment of Heritage Assets (Areas)

Name, Grade	Type	Sensitivity	Impact Assessment
Hampstead Cemetery II	Registered Park and Garden	High	The Application Site is located to the south of the Cemetery, fully concealed by the terraces making up the northern side of Gondar Gardens. The cemetery's immediate setting is comprised of its walls behind housing developments and the area of Fortune Green Road that passes in front of the cemetery and provides access to it. The predicted magnitude of impact on the setting of the cemetery is considered **nil**. There will therefore be a predicted effect of: **Neutral**

Mitigation and Residual Effects

7.34 Since no impacts will occur on below-ground archaeological remains, no archaeological mitigation measures are required. Similarly, designated heritage assets within the study area will not be affected by the proposed development and no mitigation is required.

7.35 A photographic and measured survey will be undertaken of the reservoir prior to its demolition, allowing its significance to be preserved through record. As a result, the residual effect on the reservoir would be neutral and not significant.

7.36 No cumulative effects have been identified in relation to other future developments in the local area.

8. Ecology

Introduction

8.1 This chapter assesses the potential impacts on ecology and nature conservation. The ecological impact assessment has comprised:

- a review of the national, regional and local ecological planning policy requirements and the legislative context;
- collection and compilation of ecological data:
- an assessment of the site's ecological importance including an analysis of the potential of the site to support protected species or species of conservation significance;
- identification of impacts likely to have an adverse effect on the site's ecological value, both in terms of the effect on individual species and habitats and on the overall integrity of the site;
- recommendations for mitigation to minimise, or remove, potentially significant impacts; and
- assessment of the residual impacts on species and habitats and an assessment of the effect on the overall integrity of the site.

8.2 The surveys carried out for the assessment have comprised:

- an extended Phase I Habitat Survey from 2013;
- Bat Surveys 2010 and 2011 (with reference to works undertaken in 2009);
- Reptile Surveys 2013 (with reference to work undertaken in 2010 and 2009);
- Breeding Bird Surveys 2011 (with reference to works undertaken in 2009).

8.3 These surveys, together with a Reptile Mitigation Strategy, are presented in **Technical Annex 4**.

Policy Context

National Policy

8.4 The Wildlife and Countryside Act 1981 (WCA), (as amended) provides protection for certain mammal, reptile and amphibian species, listed under Schedule 5: It is an offence to disturb, kill or injure such an animal or to damage or destroy a breeding site or resting place of such an animal. All plants are protected from unauthorised uprooting (that is, without the landowner's permission) under Schedule 13 of the WCA. Certain plants are also afforded protection under Schedule 8 of the WCA.

8.5 Under the Conservation of Habitats and Species Regulations 2010, it is an offence to deliberately kill, capture, or disturb a European Protected Species or to damage or destroy the breeding site or resting place of such an animal. These Regulations also list habitats of European-wide importance under Annex 1 of the

Directive. Sustainable areas of such habitats are eligible for designation as Special Areas of Conservation (SAC).

8.6 Certain species and habitats listed under Section 74 of the Countryside and Rights of Way (CROW) Act 2000 are present in the study area. Section 74 provides statutory underpinning to the UK Biodiversity Action Plan (UKBAP), and thus, all habitats and species listed under the UKBAP are also Section 74 species.

8.7 The Natural Environment and Rural Communities (NERC) Act 2006 states that "*every public authority must in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity*", known as the Biodiversity Duty. Biodiversity here relates to those habitats and species listed under Section 74 of the CROW Act.

8.8 The National Planning Policy Framework (NPPF 2012) places responsibility on local authorities to aim to conserve and enhance biodiversity and to encourage biodiversity in and around developments.

8.9 All bats are protected by the Wildlife and Countryside Act 1981 and the Conservation of Habitats and Species Regulations 2010. It is unlawful to harm, disturb or destroy either bats or their roosts. Further enforcement has been provided by The Countryside and Rights of Way Act 2000. Foraging areas are not explicitly included.

8.10 UK widespread reptiles including common lizards *Zootoca vivipara*, slow worms *Anguisfragilis*, grass snakes *Natrixnatrix* and adders *Viperaberus* are partially protected under the Wildlife and Countryside Act 1981 as amended by the Countryside and Rights of Way Act 2000. All widespread reptiles are also UK and London priority BAP species.

8.11 Invasive Species are listed on Schedule 9 of the Wildlife and Countryside Act 1981 as amended by the Countryside and Rights of Way Act 2000. It is an offence to cause the spread of a Schedule 9 invasive species.

8.12 Wild nesting birds are protected from harm under the Wildlife and Countryside Act 1981 (as amended). Some bird species (such as barn owl) are further protected under Schedule 1 of the Wildlife and Countryside Act and others are BAP or Birds of Conservation Concern (BoCC) species.

Greater London

8.13 The London Plan (2011) is the strategic spatial planning document for London. The London Plan endorses the protection of land of strategic importance for biodiversity and stresses the requirement for development proposals to include new or enhanced natural habitats, or design and landscaping that promotes biodiversity, the greening of the built environment and associated provision for its management.

8.14 The Mayor's Biodiversity Strategy (2002) details the Mayor's vision for protecting and conserving London's natural open spaces. In particular, the strategy aims to:

- ensure that people have access to nature by creating new green spaces, improving existing ones and encouraging people to visit less well-know places;
- protect wildlife habitats, as part of the London Plan, stating that sites which are important for nature conservation should not be built on;
- encourage businesses to incorporate green design into their development proposals; and
- protect London's most vulnerable wildlife, for example, bats and birds.

8.15 The site is covered by the Camden Local and London Regional BAPs.

Scope and Methodology

8.16 The survey methodologies followed standard best practice guidelines, as recommended by the Institute of Ecology and Environmental Management and Natural England, and are described below.

Habitat Surveys

8.17 A Phase 1 Habitat survey was undertaken on the 22nd of July 2010 by Odette Robson BSc (Hons) PhD MIEEM and Roger Spring BSc AIEEM (Annex 4.1) and updated by Odette Robson on the 23rd May 2011 and August 2013.

8.18 The survey methodology followed JNCC (Joint Nature Conservation Committee) Guidelines (JNCC, 2010) and included mapping habitat types and identifying all plant species observed on the site, including Wildlife and Countryside Act Schedule 9 invasive plant species, such as Japanese Knotweed *Fallopia japonica*.

8.19 A desk study was conducted to identify any records of protected, BAP and rare species within 2km of the site. The National Biodiversity Network (NBN) was accessed on 14th December 2011, and Greenspace Information for Greater London (GiGL) was consulted on 13th December 2011 and 9th September 2013. The Multi-Agency Geographic Information for the Countryside (MAGIC) was accessed in October 2013 to identify statutory sites and habitats within 2km.

Bat Surveys

8.20 The underground reservoir was inspected internally for signs and evidence of bats and potential to support roosting bats. This involved surveying for the following:

- Signs and evidence of bat activity; taken to be the bats themselves, urine and grease stains, droppings and scratch marks.
- Potential for access and suitability for roosting sites, based on large enough cracks, crevices and other areas suitable for roosting.

8.21 Two dusk emergence and two dawn re-entry surveys were conducted on the site between 25th July and 4th August 2010, including transects at the site boundary (considered to be the most potentially valuable foraging/commuting habitat). All

surveys were conducted in optimal weather conditions (mild, dry, little wind) and during the peak survey season (July and August).

8.22 Emergence surveys started approximately 20 minutes before sunset and continued for approximately 2 hours after sunset. Dawn re-entry surveys started approximately 1.5 hours prior to sunrise and finished at sunrise or when light levels became too high. Equipment used included Pettersson D240x detectors, Zoom H2 digital recorders, Batbox Duet detector, as well as observation to record all bats on the site. The recordings were analysed using BatSound Software.

8.23 The emergence and re-entry parts of the surveys focused primarily on trees considered to contain features potentially suitable for roosting bats (cracks and crevices and thick ivy *Hedera helix* growth) along the southern and eastern boundaries. A large ash tree in an adjacent garden to the north of the site was also surveyed for bat activity. A second hibernation survey within the reservoir structure was carried out on 2nd February 2011 by Mary Davies AIEEM (Class bat licence WML-CL18) and Odette Robson MIEEM (Class bat licence WML-CL18).

Reptile Survey

8.24 Ninety artificial tin and felt refuges, measuring approximately 0.25m^2, were distributed on the 22nd July 2010. The refuges were placed in areas of suitable habitat for reptiles, scattered across the whole site area. Artificial refuges were left to settle for a period of twelve days prior to the commencement of the survey, to allow any reptiles present to begin using them. Refuges were checked on ten separate survey visits to the site.

8.25 Further full reptile surveys were completed during 2013: The survey started on 28th August and one hundred and thirty one refuges were laid out across the site. Ten separate survey visits were completed between the 4th September and the 2nd October. A good population of slow worms were found to be using the site – due to a maximum adult count of 5 individuals on a single survey visit. Distribution was concentrated on the south-facing bank at the southern boundary – mainly to the south east of the site in the area outside the development footprint. An individual slow worm was also recorded adjacent to the northern boundary fence.

Bird Surveys

8.26 Six breeding bird surveys were undertaken between the 29th March and 6th June 2011. Surveys were undertaken within two hours of dawn when territorial behaviour is usually at its peak. The survey was based on a registration mapping methodology adapted from the BTO Breeding Bird Survey: During each visit, all birds seen or heard were recorded on a plan along with any significant behaviour, particularly regarding breeding activity e.g. territorial singing, display, carrying food, active nests etc. Surveys were conducted in optimal weather conditions (dry with little wind) and during the peak bird nesting season (March to June), for approximately three hours.

Assessment Methodology

8.27 A key consideration in assessing the effects of any development on flora and fauna is to define the areas of habitats affected and the species that need to be considered. In identifying these receptors, it is important to recognise that a development can affect flora and fauna directly (e.g. the land-take required) and

indirectly, by affecting land beyond the development site (e.g. through noise generation or dust deposition).

8.28 The approach that has been undertaken throughout this EIA process, including at the earlier scoping stage, is to identify '*valued ecological receptors*'. This evaluation methodology has been adapted from guidelines produced by the Institute of Ecology and Environmental Management (2006). Assessment criteria are set out in Table 8.1. The value of species populations and habitats is assessed with reference to:

- their importance in terms of 'biodiversity conservation' value - which relates to the need to conserve representative areas of different habitats and genetic diversity of species populations, often reflected in policy through their inclusion in Biodiversity Action Plans and national lists of priority species and habitats;
- their legal status – which is generally, but not exclusively, related to their biodiversity value;
- any social or economic benefits that species and habitats deliver.

Nature and Magnitude of Effects

8.29 Effects can be permanent or temporary; direct or indirect; adverse or beneficial; and can be cumulative. These factors are brought together to assess the magnitude of the effect on the conservation status of the particular valued ecological receptors, and on the integrity of the habitats that support them.

8.30 Integrity is the coherence of the ecological structure and functions of a site or habitat that enables it to sustain its plant and animal communities and populations. Conservation status is the ability of a habitat, a plant or animal community or population to maintain its distribution and/or extent/size. Conservation status is therefore largely determined by the extent to which integrity is maintained.

8.31 Professional judgement is used to assign the effects on the receptors to one of four classes of magnitude, defined in Table 8.2, and the sensitivity of the receptor to one of the three classes, defined in Table 8.3.

Significance of Effects

8.32 The significance of an effect is largely a product of the value/ sensitivity of the ecological receptor and the magnitude of the effect on it, moderated by professional judgement. Table 8.4 illustrates a matrix which is used for guidance in the assessment of significance. Effects that are major or major/moderate are deemed to be significant for the purposes of the Ecological Impact Assessment.

Table 8.1: Assessment Criteria

Level of Value	Characteristics
International	• An internationally designated site or candidate site. • A viable area of a habitat type listed in Annex 1 of the Habitats Directive, or smaller areas of such a habitat, which are essential to maintain the viability of a larger whole. • Any regularly occurring population of an internationally important species, which is threatened or rare in the UK. • Any regularly occurring, nationally significant population/number of any internationally important species.
National	• A nationally designated site. • A viable area of a priority habitat identified in the UK BAP, or smaller areas of such habitat, which are essential to maintain the viability of a larger whole. • Any regularly occurring population of a nationally important species, which is threatened or rare in the region or county. • A regularly occurring regionally or county significant population/ number of any nationally important species. • A feature identified as of critical importance in the UK BAP.
Regional (London)	• Viable areas of key habitat identified on the Regional BAP or smaller areas of such habitat, which are essential to maintain the viability of the larger whole. • A regularly occurring, locally significant number of a regionally important species.
Borough (Camden)	• Areas of habitat identified in a District/ Borough level BAP. • Sites designated at a Borough level. • Sites/features that area scarce within the Borough or which appreciably enrich the District habitat resource. • A population of a species that is listed in a Borough BAP on account of its rarity in the locality.
Local	• Area of habitat considered to appreciably enrich the habitat resources within the context of the local area. • Local Nature Reserves/SINCs.
Low	• Habitats of poor to moderate diversity such as established conifer plantations, species poor hedgerows and un-intensively managed grassland that may support a range of local BAP species but which are unexceptional, common to the local area and whose loss can generally be readily mitigated.

Table 8.2: Magnitude of Potential Effects

Magnitude	Definition
High	Total loss or major/substantial alteration to key elements/ features of the baseline (pre-development) conditions such that the post development character/ composition/ attributes will be fundamentally changed.
Medium	Loss or alteration to one or more key elements/ features of the baseline conditions such that post development character/ composition/ attributes of the baseline will be materially changed.
Low	A minor shift away from baseline conditions. Change arising from the loss/ alteration will be discernible/ detectable but not material. The underlying character/ composition/ attributes of the baseline condition will be similar to the pre-development circumstances/ situation.
Negligible	Very little change from the baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.

Table 8.3: Receptor Sensitivity

Sensitivity	Definition
High	The receptor/ resource has little ability to absorb change without fundamentally altering its present character, is of high ecological value or is of international, national or regional importance.
Medium	The receptor/resource has moderate capacity to absorb change without significantly altering its present character, has some ecological value or is of county or district importance.
Low	The receptor/resource is tolerant of change without detriment to its character, is of low ecological value or is of parish importance.

Table 8.4: Impact Significance Matrix

Magnitude	Sensitivity		
	High	Medium	Low
High	Major	Major/Moderate	Moderate
Medium	Major/Moderate	Moderate	Moderate/Minor
Low	Moderate	Moderate/Minor	Minor
Negligible	Moderate/Minor	Minor	Negligible

Baseline Conditions

Designated Sites

8.33 Westbere Copse Local Nature Reserve (LNR) located at Grid Reference: TQ 245 853, was situated within the 2km search radius. This site is of local importance and includes Jenny Wood Nature Reserve (restricted access) and Westbere Copse Open Space (open to the public at all times).

8.34 The area was once farmland through which a railway was built in the 1860s. Grey poplar trees were planted for matchwood and still dominate the site. In relation to the receptors to which this report relates and the distance from the proposed development, no impacts are predicted on the LNR and therefore this site is scoped out of the further assessment.

8.35 One site of Metropolitan Importance for Nature Conservation (SMINC), seven sites of Borough Grade I Importance for Nature Conservation (Grade I SINC), seven sites of Borough Grade II Importance for Nature Conservation (Grade II SINC) and seven sites of Local Importance for Nature Conservation (SINC) were located within the 2km search radius.

8.36 Given the distance from the proposed development and the absence of connectivity through the intervening landscape, no impacts are predicted to these sites excluding Gondar Gardens Reservoir (Grade II SINC); therefore, they are scoped out of the further assessment. Details of these sites and their proximity to the survey area are summarised in Technical Annex 4.1.

Protected Species Records

8.37 Species for which action plans have been prepared and which are applicable to the survey area based on the habitats identified and the desk study records are: bats (grouped plan), hedgehog, slow worm and common lizard. The Greenspace Information for Greater London and NBN database searches provided information for a number of protected and/or notable species within 2km of the survey area (many of the NBN records are not location specific, and are historical records without a date). These are listed in full in Annex 4.1.

Habitats within the Site

8.38 The site has a SINC Borough Grade II designation. Surveys in 2010 (updated 2011 and 2013; Annex 4.1) indicated that the site was dominated by neutral grassland with a patch of ruderal vegetation to the west. The eastern and southern banks of the covered reservoir consisted of areas of neutral grassland with greater species diversity. Also present along the eastern boundary was a band of scrub and trees. Occasional mature trees were also present on the southern boundary.

8.39 Dominant species within the ruderal patch of vegetation included wall barley *Hordeummurinum*, common mallow *Malvasylvestris*, field bindweed *Convolvulus arvensis* and perforated St. John's wort*Hypericumperforatum*. The grassland area on the reservoir roof was dominated by grass species such as false oat grass *Arrhenatherumelatius*, Yorkshire fog *Holcuslanatus*, and forbs, including ribwort plantain *Plantagolanceolata* and yarrow *Achilleamillefolium*.

8.40 A small stand of spiked sedge *Carexspicata* was found within this area of the site and is uncommon in Camden, though is not a BAP or red-listed species. Dominant species on the banks included false oat grass, comfrey *Symphytumofficinale*, red clover *Trifoliumpratense*, birds foot trefoil *Lotus corniculatus* and black knapweed *Centaureanigra*. Dominant species within the scrub/tree band included hawthorn *Crataegusmonogyna*, sycamore *Acer pseudoplatanus*, elder *Sambucus nigra* and ivy *Hedera helix*.

8.41 The flora recorded at the site was updated in May 2011 and August 2013, due to the initial survey having been undertaken shortly after the grassland area had been mowed. Acid grassland indicators; common sorrel *Rumex acetosa*, sheep's sorrel *Rumex acetosella* and a species associated with sandy substrates, spotted medick *Medicago Arabica*, were recorded to the east of the reservoir footprint. These species were not identified within the grassland covering the reservoir roof.

8.42 The UDP Enquiry (2005) categorised the grassland to the east of the reservoir footprint as acidic, whilst the SINC designation lists the grassland as neutral. There are elements of both within the site, and the slightly different species composition (including the presence of acidic species such as sheep's sorrel) in the deeper soils to the east of the reservoir footprint, indicates that the non-roof vegetation is of a more natural established character than the reservoir roof, which has been subject to more intensive management (mowing to allow inspection of the reservoir roof), and disturbance – possibly including re-seeding – when the roof vegetation has been removed to re-waterproof the reservoir over the years.

8.43 Habitats within the site (ruderal area to the west and roof of the reservoir structure) are considered to be of local value. The banks and eastern part of the site (excluding the reservoir roof), indicated a more established species composition; these areas are considered to be of district value.

Protected Species

Bats

8.44 Numerous potentially suitable cracks and crevices were recorded in the internal arched brick structure of the reservoir. However, no signs or evidence (droppings, stains, scratch marks etc) of bat activity were found during two internal inspections of the reservoir. The reservoir structure was vermin proofed, and no signs or evidence of any mammal species (including rats and mice) were recorded inside the structure. No potential access points for bats were found: All ventilation pipes and grills leading to the surface were blocked.

8.45 No bats were observed or detected emerging from or entering trees or structures within the site. However, one common pipistrelle exhibited swarming behaviour at sunrise on the 4th of August 2010 around trees in gardens adjacent to the northern boundary.

8.46 Previous surveys undertaken by Entec in 2009 recorded common pipistrelle, soprano pipistrelle and Nathusius' pipistrelle. Soprano and Nathusius' pipistrelle observations were recorded at the earliest 30 and 44 minutes after sunset respectively. It was concluded that these species were roosting off-site and would not be impacted by the development. Common pipistrelles were the only species detected on or near the site during the 2010 surveys and these were only detected in very low numbers (occasional, individual passes).

8.47 The site is considered to be of low value to the local bat population, and as no roosts were recorded within the site it is considered that roosts are absent and will therefore not be impacted by the development. Only low numbers of individual common pipistrelles were recorded foraging and commuting within the site.

8.48 Therefore it is considered that the site is only of low functionality value to the local bat population. Although open green space is limited in London, within the borough of Camden there are numerous green spaces and an abundance of tree coverage. Therefore, the value of the site is reduced within the local context.

Reptiles

8.49 Reptile surveys were undertaken between 3rd August 2010 and 20th September 2010 on days with suitable weather conditions for finding reptiles. Further survey was undertaken between 28th August and 2nd October. The Phase 1 survey (Annex 4.1) identified habitats on the site (rough grassland, hedge/tree-lines and scrub) that were considered to be suitable for foraging, basking and sheltering widespread reptiles.

8.50 A good population of slow worms was recorded within the site, with a maximum daily count of five adults. The majority of slow worms were recorded using the bank to the southern boundary of the site, and an individual record adjacent to the northern boundary fence.. No slow worms were found to be using the grassland on top of the covered reservoir, or the construction zone to the west, adjacent to Gondar Gardens. Previous surveys undertaken in 2008, 2009 and 2010 recorded a low population of slow worms., confined to the southern banks of the site, corresponding to more recent surveys.

8.51 The reptile population within the site is assessed as being of District value on account of being the only known slow worm population within Camden district. However, the majority of the good habitat at the site will be retained within the development. The area of shorter neutral grassland on the reservoir roof will be re-created within the development, although reptiles were not recorded in this part of the site.

Birds

8.52 Surveys were carried out by Odette Robson MIEEM, a suitably experienced ornithologist (Annex 4.4). Twenty-three bird species were recorded on or close to the site, of which twelve species used habitats within the site boundary: robin, wren, blue-tit, great-tit, wood pigeon, black cap, house sparrow, dunnock, feral pigeon, jay, blackbird and starling. The remaining eleven species were observed flying over the site or using adjacent gardens, and were not recorded on the site during the six survey visits.

8.53 Previous spring surveys undertaken by Entec (2009c) recorded 17 species during 10 survey visits, of which most were associated with scrub and trees at the periphery of the site and in adjacent gardens. It is not clear from the report if any of the species were recorded foraging on the roof of the reservoir.

8.54 Three BoCC red-listed species were recorded, of which two (starling and house sparrow) were observed to be using the site itself. However, although starlings are red-listed they are still ranked within the top six most common bird species in all counties of the UK. The house sparrow is also red-listed due to a dramatic decline. However, for the eighth year running with an average of four per garden, this was the most common bird in gardens taking part in the RSPB Big Garden Birdwatch 2011.

8.55 Two BoCC amber-listed species were recorded during the surveys, of which one (dunnock) used the trees on the site to the eastern boundary. A dunnock was also heard within gardens beyond the southern site boundary. The other amber listed species recorded were swifts (Local BAP species) in numbers of up to ten at a time, foraging high over the site and over adjacent gardens.

8.56 The site was considered to be of local value for bird populations within the area; the species recorded were generally widespread and seen regularly within the Greater London region.

Evaluation

8.57 The valuation of the nature conservation interest of the ecological receptors present on the site, and whether or not they are subject to detailed impact assessment is summarised in Table 8.5.

Table 8.5: Summary of Valuation of Nature Conservation Interest

Receptor - Site/ Habitat/ Species	Evaluation Rationale	Value of receptor or value of site to the receptor	Potential for Impact	Subject to detailed assessment
Grassland	Grassland of varying quality, provides habitat for slow worms, small mammas (including hedgehogs), and invertebrates.	Local to District	Yes - some will be lost and re-created within the development	Yes
Ruderal vegetation	Dominated by common weed species.	Low	Yes - lost to the development	No - due to low value
Scrub/ trees	Bird nesting and foraging habitat, reptile hibernation area, small mammals.	Low to Local	No	No
Bats	European Protected common pipistrelle uses habitats at the site boundary for foraging and commuting, although the majority of the site was not used by bats. No bat roosts have been identified on the site.	Local	Yes - potential disturbance to foraging/ commuting areas	Yes
Reptiles	A low population of slow worms use the site	District	Yes – temporary loss of poor quality habitat and potential disturbance	Yes
Birds	23 bird species were recorded within or adjacent to the site.	Local	Yes - potential disturbance to foraging/ nesting habitat	Yes

8.58 The following receptors have been taken forward for further assessment: Grassland, Bats, Reptiles and Birds.

Predicted Effects

8.59 The potential impacts on individual receptors are assessed below. Some of the potential impacts have been mitigated to a substantial extent by sensitive design; for example, siting of the proposed buildings is within an area with lowest floristic interest and does not include mature or well established vegetation. Potential impacts below are therefore described with this in-design mitigation already in place, and further mitigation is then discussed before an assessment of residual impacts.

8.60 Mitigation and/or compensation are only required when an impact is likely to be significant; however, there are a number of measures that would be implemented as best practice and further opportunities for enhancement: These are described within the mitigation section.

Effects during Construction

Grassland

8.61 The reservoir roof will be removed, and the grassland that currently covers the roof will be re-created within the reservoir void, to form a bowl with sloped sides. The development does not impact on areas of grassland banks that were used by slow worms during the most recent survey.

8.62 A borderline low/good population of slow worms was recorded using the grassy banks along the southern and eastern boundary of the site; however, this habitat will be retained within the development as a wildlife area with restricted public access. The impacts on the slow worm population are discussed below.

8.63 Spiked sedge was mainly recorded on the south-facing bank, which will not be impacted by the development. A single stand of spiked sedge was also recorded in the area which will be lost to the development during 2010. However, this was of lower significance due to the main area being located outside the construction zone.

8.64 Given that the area of grassland present in the site is approximately 1.02 hectares (ha) it is estimated that the reservoir roof constitutes approximately 48% of the total grassland area within the site boundary. Although the affected area constitutes approximately half of the total habitat resource available in the site, this is the area with the lowest floristic value and will be reinstated and enhanced post-development.

8.65 Overall, the loss of the neutral grassland over the reservoir roof is not predicted to significantly affect ecosystem dynamics or the ability of the wider grassland area to continue to sustain the variety of habitats and species that is currently supported. Although neutral grassland will be temporarily lost to the development, this will be reinstated. Actual loss of grassland (not including the ruderal area) is 2%.The magnitude of impact on the remaining grasslands is considered to be low, resulting in an impact of minor significance.

Bats

8.66 The survey information indicates that there are no bat roosts within the site and therefore no impact on roosting bats is predicted. Bats were recorded foraging and commuting within the site, particularly associated with the trees at the boundary with adjacent residential gardens. Mature trees and shrubs at the boundaries will be retained and enhanced within the proposals.

8.67 The increased noise and lighting associated with the construction phase of the development could have a minor short-term impact upon foraging bats. To avoid this, works will be undertaken in daylight hours and any additional lighting which may be required, e.g. at site compounds, will be kept to a minimum (as necessary for health and safety and security) and be of a low level design.

8.68 Records on the Biodiversity Action Recording System website (https://ukbars.defra.gov.uk/default.asp) show that surveys undertaken in 2010 recorded four species of bat within Camden Borough, one of which was the common pipistrelle. Eight species of bat including common pipistrelles are known to roost within the London region. Common pipistrelles are widely distributed across the UK and are generally common within the south-east. Given the minor short-term construction phase, and retention of boundary vegetation impacts on foraging bats (common pipistrelles) at the site and the widespread nature of their distribution, these impacts are not significant.

Reptiles

8.69 A population of slow worms was recorded at the site, associated with the species-rich grassy banks along the southern and eastern boundary. The development will result in the temporary loss of the neutral grassland on the reservoir roof, which will be reinstated post-development. No reptiles were recorded using this area of the site and the more regular mowing in this section and shallower soils (more susceptible to desiccation) rendered these habitats of lower value to slow worms.

8.70 The remaining grassland within the site will be retained and protected throughout the construction phase. Reptile exclusion fencing will be erected around the construction zone to exclude reptiles and to minimise the risk of harm during the construction phase. A re-location will be undertaken to move any individuals out of the construction zone to a receptor area within the eastern part of the site, which will be managed and protected.

8.71 Slow worms are widespread throughout Britain, but most common in the south and east of England. Slow-worms are also widespread in London but concentrated in the outer London boroughs. Isolated populations are found on inner London sites where suitable habitats exist. The slow worm population at the site is the only known population of slow worms within Camden and is therefore of increased local value. The impact of the temporary loss of grassland is considered to be of low to medium magnitude, resulting in an impact of local value that is not significant.

Birds

8.72 Twenty three species of bird were identified using habitats within or adjacent to the site. These were mainly associated with trees and scrub around the northern

and eastern boundaries with within adjacent residential gardens. These habitats are retained within the proposals. Three UK BAP species; starling, dunnock and house sparrow (also a London BAP species) were recorded within the site. Due to the retention of the boundary vegetation it was considered that the proposals were unlikely to significantly impact on these species.

8.73 The increased noise and lighting associated with the construction phase of the development is considered to have a minor short-term impact upon foraging birds. The site is likely to act as a 'stepping stone' habitat for birds commuting and foraging within sites across the borough. Species recorded within the surveys were common and widespread throughout the UK and the London region. No mature trees or shrubs associated with the boundaries will be removed as part of the development; this impact is therefore not significant.

Effects of the Completed Development

Grassland

8.74 A new area of neutral grassland will be created within the reservoir footprint. The surface area of grassland coverage within the site will not significantly change as a result of the development: Although 787 sqm will be lost to the development, the sloping sides will provide additional grass cover. It is, therefore, considered that the impact will be positive; this is discussed within the mitigation section below.

Bats

8.75 Increased lighting from the new development may cause long-term disturbance to bats. However, lighting minimisation, as detailed in the survey report (Annex 4.2) will minimise these disturbance effects. Bat boxes will be erected on mature trees and new buildings within the site to provide additional roosting opportunities for bats in the local area. This impact is therefore assessed as minor positive.

8.76 The new buildings may provide opportunities in the future for roosting bats in the roofs, cavity walls, barge boards and soffits which may also result in a slight beneficial effect.

Reptiles

8.77 Increased disturbance by restricted access to the site may cause long-term impacts on the slow worm population. The site will not be open access. However, limited access will be necessary for management purposes, and for organized community open days and educational visits. There may be an increase in cats within the area due to the new residences.

8.78 The creation of substantial hibernacula and areas of rough grassland (with no public access) will provide shelter habitat for reptiles post-development. The retained and newly created habitat within the site will be managed in the long-term as a wildlife refuge with management targeted to enhancing the habitat specifically for slow worms.

8.79 The creation of an additional south-facing slope will provide further, optimal slow worm habitat, mirroring the habitat which surveys have shown is preferred by slow worms, and forming a significant enhancement. It is considered that long term

disturbance effects will not be significant. This wildlife area will be gifted to an Independent Conservation Body who will manage it in perpetuity.

Birds

8.80 The increase in domestic animals (i.e. cats and dogs) into the area may cause disturbance to birds through increased predation. However, at present the site is surrounded by residential housing and cats are likely to be already present in the local area. The inclusion of bird boxes within the scrub and tree area to the east, other boundary trees and new-builds, will provide safe nesting opportunities for birds within the site. Therefore, this impact is not significant.

8.81 Post development garden planting within terrace areas will provide additional foraging opportunities for birds in the local area and, once established, new shrub planting at the boundaries will provide additional nesting and foraging opportunities. Overall the impact is considered to be neutral or slightly beneficial but not significant.

Mitigation during Construction

Grassland

8.82 The predicted effect on the semi-natural grassland present within the site is estimated to be of minor significance and therefore requires mitigation. The specific impact that requires mitigation is loss of habitat.

8.83 The loss of habitat due to the removal of the reservoir roof is a temporary effect. This will be mitigated through the creation of a new area of species-rich neutral grassland within the reservoir footprint; banks will also be created providing a larger surface area, increased grassland structure and thermal niches, and connectivity to existing habitat at the site.

8.84 A habitat management plan for the site will ensure appropriate management of the grassland (existing and newly created) post-development. The new grassland area will be seeded with a neutral/acidic grassland seed mix appropriate to the area. Demolition arising and rubble will be used to create the banks and hibernacula.

Other Habitats

8.85 Although none of the impacts on habitats are assessed as significant, it is considered best practice to employ the following mitigation during construction and to enhance habitats where possible.

8.86 The construction footprint will be kept as small as possible to limit the disturbance of vegetation and species. Less than a half of the reservoir footprint will be used for the construction process (as necessary for storage of material and deliveries to site). The construction area will be clearly marked with temporary fencing to prevent any access into the wildlife area by construction vehicles and site workers.

8.87 This will be detailed in the Construction Environmental management Plan (CEMP), which will detail how wildlife will be protected during the construction and

development phase. The grassland creation will be undertaken at the beginning of site works to enable establishment of the majority of the new grassland at the earliest opportunity.

Bats

8.88 The design of the proposed development has ensured that effects on bats during the construction phase are minimised, and no significant impacts are foreseen. Construction works will be undertaken in daylight hours (detailed in the CMS) and any additional lighting which may be required, e.g. at site compounds, will be kept to a minimum as detailed in the Bat Survey report (Annex 4.2).

Reptiles

8.89 The design of the development has minimised any disturbance to reptiles during the construction phase, and no significant impacts are foreseen. Exclusion fencing will be erected around the construction site and existing habitats outside the construction zone will be maintained and enhanced for reptiles. Any reptiles captured within the fenced zone will be relocated to the receptor area to the east of the development site, as detailed in the Reptile Mitigation Method Statement (Annex 4.5).

8.90 The receptor area includes the south-facing bank on which all the slow worms were recorded during the 2010 survey. The receptor area will be enhanced pre-relocation to improve the suitability of the area for slow worms. Habitat management will include: removal of any scrub and ruderal vegetation from the banks; construction of hibernacula; and creation of a mosaic of varying grass heights for basking/cover during different weather/seasonal conditions.

8.91 Post-development habitat management will be crucial to the success of the relocation, and will be detailed in a Habitat Management Plan. Scrub and ruderal vegetation encroachment will be managed to keep the grassland open. The wildlife area will be managed by an experienced independent conservation organisation to ensure appropriate and sustained long-term management.

Birds

8.92 Construction impacts are not considered to be significant to bird populations within or adjacent to the site. Any tree or scrub clearance that is required for management purposes will be undertaken outside the main bird nesting season (which runs from March until the end of August). If removal is required within this time a nesting bird survey will be carried out just prior to the works. This clearance will be minimal selective thinning, as required for sound conservation management purposes.

Mitigation during Operation

8.93 Bird and bat boxes will be erected on existing mature trees and new-builds to provide additional nesting and roosting opportunities, post-development. These boxes will also provide shelter from any potential disturbance from pets or residents. Post development lighting will be minimised as recommended in the ecology reports to minimise impacts on nocturnal species.

8.94 Newly created and existing grassland habitats at the site will be maintained through an appropriate hay-meadow management regime to increase plant diversity within the grassland to the benefit of invertebrates, mammals and slow worm. This will include cutting and re-seeding as necessary (using seed of local provenance, where possible). Hibernacula will be created to provide additional shelter habitat for reptiles and the saprophytic invertebrates. A Habitat Management Plan will detail appropriate timing of works that will minimise disturbance to wildlife.

Residual Effects

8.95 Following the mitigation set out above, it is considered that the loss and disturbance of small amounts of semi-natural neutral grassland would be adequately mitigated. Therefore, the residual impact on this ecological receptor is predicted to be not significant.

8.96 There are no significant residual impacts predicted on any other receptors within the site. Significant positive impacts are predicted through creation and management of species rich grassland. The significance of the predicted effects is summarised in Table 8.6.

Monitoring

8.97 Although only a small population of slow worms was recorded within the site, it was considered to be of district value due to the lack of other recorded populations within Camden. Therefore, it is proposed that a monitoring programme is implemented to assess the population change at the site, post development. Presence/ absence surveys should be carried out for a period of at least two years post-development by a suitably qualified ecologist. The results of surveys will inform on-going appropriate management of the site.

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Table 7.6: Summary of Predicted Effects

Effect	Type of Effect	Probability of the effect occurring	Value of the receptor	Magnitude of effect	Significance in the absence of mitigation
Construction					
Loss of species-poor neutral grassland	Negative	Certain temporary	Low	High	Moderate
Disturbance to bats	Negative	Unlikely	Low	Low	Minor
Disturbance to birds	Negative	Unlikely	Medium	Low	Moderate/ Minor
Harm and/or disturbance to reptiles	Negative	Likely	Medium (District)	Low/Medium	Moderate/ Minor
Operation					
Disturbance to bats	Negative	Unlikely	Low	Low	Minor
Increased predation and disturbance to birds	Negative	Unlikely	Low	Low	Minor
Increased predation and disturbance to reptiles	Negative	Unlikely	Medium	Low	Moderate/ Minor
Creation of species-rich neutral grassland	Positive	Certain	Medium	Medium	Moderate
Management of grassland within the site	Positive	Certain	Medium	Medium	Moderate

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UK BAPwww.ukbap.org.uk

Camden BAPhttp://camden.gov.uk/ccm/content/leisure/outdoor-camden/nature-in-camden/wildlife/introduction-to-the-camden-biodiversity-action-plan.

London BAPhttp://www.lbp.org.uk/londonpriority.html

Biodiversity Action Recording System https://ukbars.defra.gov.uk/default.asp

9. Flood Risk and Drainage

Introduction

9.1 This chapter considers potential effects relating to flood risk and drainage. It should be read in conjunction with **Technical Annex 5: Flood Risk and Drainage Assessment**.

Scope and Methodology

9.2 The assessment has been based on an initial desk-based hydrology study, which includes review of watercourses, drainage and areas prone to flooding. Baseline information on the physical environment was collected from the following sources:

- Environment Agency and LB Camden, on abstractions and discharges to watercourses and water quality records;
- hydrogeological maps;
- groundwater vulnerability maps;
- soil survey maps;
- relevant publications including the Strategic Flood Risk Assessments (SFRA), Catchment Management Plans (CMP) and River Basin Management Plans (RBMP); and
- information from the geotechnical and ground contamination studies.

Flood Risk Assessment

9.3 A FRA has been carried out in accordance with National Planning Policy Framework (NPPF) and its accompanying guidance document. The assessment also makes reference to the Interim Code of Practice for Sustainable Drainage, DEFRA 2004 and CIRIA "The SUDS Manual, C697", together with any relevant supplementary planning documents or guidance on sustainable drainage.

9.4 The FRA has considered the following types of flooding: tidal/fluvial, overland, groundwater and drainage flooding. It has determined the potential changes to surface water and groundwater patterns as the result of development, together with the potential impacts of climate change, and has made recommendations for mitigation/attenuation as required.

9.5 The significance of impacts has taken account of the importance/sensitivity of the receptor, the magnitude of impact, the duration/persistence of impact and the likelihood of the impact. Examples of the criteria that have been used to make judgements on the importance/sensitivity of the receptor(s) and the magnitude of change are presented in Tables 9.1 and 9.2.

Table 9.1: Receptor Sensitivity

Receptor Sensitivity	Example of Receptor
High	Low lying land, groundwater, and local drainage network.

Receptor Sensitivity	Example of Receptor
	Protected areas (e.g. SSSI, Ramsar, SPAs, SACs) highly sensitive to disturbance Zone 1 Source Protection Zone
Medium	Zone II and III Source Protection Zones. Minor aquifers. Areas with intermediate groundwater vulnerability. Biological and chemical water quality within rivers and streams. Surface water (flow patterns).
Low	Non-aquifers. Areas with low groundwater vulnerability.

Table 9.2: Magnitude of Impact

Magnitude	Definitions
Large	The proposals could result in a significant change in terms of flooding, surface water drainage, hydrology or hydrogeology, which may result in hardship.
Medium	The proposals could result in moderate changes to flooding, surface water drainage, hydrology or hydrogeology, which cause inconvenience, which will recover over a medium period of time (5-10 years).
Small	A slight change where the proposals could occasionally cause a minor flooding, surface water drainage, hydrology or hydrogeology change in the short term. (1-5 yrs).
Negligible	No effect detectable
Beneficial	Change is likely to beneficially impact on flooding, surface water drainage, hydrology or hydrogeology.

9.6 The categories used when classifying overall significance are indicated in Table 9.3. Major, Major/Moderate or Moderate effects are regarded as significant.

Table 9.3: Significance of Residual Impacts

Magnitude of Impact	Sensitivity/Importance of Receptor		
	High	Medium	Low
Large	Major	Major/Moderate	Moderate
Medium	Major/Moderate	Moderate	Minor
Small	Moderate	Minor	Minor
Negligible	Minor	Negligible	Negligible

Policy Context

9.7 The National Planning Policy Framework (NPPF) was published in March 2012 by the Department for Communities and Local Government, followed by a new Technical Guidance to NPPF in March 2012.

9.8 The Water Resources Act, 1991 requires consent to be obtained for any discharges to controlled waters. The Act also requires that works in, over, under or adjacent to main rivers require the consent of the Environment Agency. The Flood and Water Management Act, 2010 aims to provide a better and more comprehensive management of flood risk for people, homes and businesses.

9.9 The act identifies water company duties to provide surfacewater sewers and recently transposed the EU Floods Directive functions of the Environment Agency and local authorities to prepare flood risk assessments, flood maps and plans. These functions must be carried out in a manner which is consistent with the draft National Flood and Coastal Erosion Risk Management Strategy, which is currently published for consultation.

9.10 Greater London planning policy ensures that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and making development safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.

9.11 The Camden SFRA has identified which potential development sites are outside the flood zones and what land uses are considered appropriate for each site based on the guidance specified in PPS25 (now superseded by guidance within NPPF). The sequential approach directs planned development towards Flood Zone 1. There will however be occasions where planning permissions will be sought in higher flood risk zones, particularly with respect to the redevelopment of brownfield sites in the urban centre, to remain inline with sustainability objectives.

9.12 If a development with a vulnerability classification is sought in a flood risk zone with a higher probability of flooding, then the Exception Test must be passed as part of the site specific FRA. Flood mitigation measures should be considered as early as possible in the design development process to reduce and manage the flood risks associated with development.

9.13 The Environment Agency has published a number of Pollution Prevention Guidelines (PPGs). Guidance applicable to the construction phase includes:

- PPG 2 – Above Ground Oil storage tanks
- PPG 6 – Working at Construction and Demolition Sites
- PPG 7 – Refuelling facilities
- PPG26 –Storage and Dandling of Drums and Intermediate Bulk Containers.
- PPG 3 – Use and design of oil separators in surface water drainage systems
- PPG 4 – Disposal of sewage where no mains drainage is available

- PPG 13 – Vehicle washing and cleaning

9.14 Guidance on general good environmental practice includes:

- PPG 1 - General Guide to the Prevention of Water Pollution
- PPG 5 – Works in, near or Liable to Affect Watercourses
- PPG 21 – Pollution Incident Response Planning

Baseline Conditions

9.15 A number of Thames Water sewers have been identified in close proximity to the site. The adopted main sewers in the area are combined, accepting both foul and surface water run-off. The nearest sewer to the site is along the western boundary within Gondar Gardens Road, where a 940mm x 635mm sewer flows in a southern direction. According to the sewer records supplied by Thames Water, a connection point existing to the southwest corner of the site, it is proposed to utilise this connection for the development.

9.16 The potential impacts of climate change will not only affect the risk of flooding posed to property as a result of river and/or tidal flooding, but it will also potentially increase the frequency and intensity of localised storms over the area. This may exacerbate localised drainage problems.

9.17 PPS25 provides guidance as to the anticipated increase in rainfall intensity that should be considered for design purposes. Designers should assume a 10% increase in rainfall intensity over the next 20 years, a 20% increase in 50 years and a 30% increase in 100 years. For the purpose of this assessment, a 30% increase in rainfall has been assumed.

9.18 The latest Environment Agency flood zone map shows the flood risk to the site is low with the whole site located in Flood Zone 1. A desk-based study of the Ordnance Survey mapping has confirmed there are no above groundwater features in proximity of the site. The Lost Rivers of London map (Barton, 1995) indicates that the River Westbourne used to flow in the vicinity of the site. It is known that this river is now a lost river, as it has been culverted to form one of Thames Water's main storm surface water sewers for the surrounding area.

9.19 North London is almost entirely underlain by the London Clay formation which overlays a significant chalk aquifer. The London Clay layer varies in thickness from less than 10m near the Lee Valley to over 100m in the areas of higher ground in Camden and Barnet. The clay layer is almost entirely impermeable which has a considerable impact on lead times of fluvial flows in many of the watercourses, especially when combined with intense urban development. The upstream catchment in the River Lee comprises a predominantly chalk soil, which results in increased permeability and slower response times in the watercourse.

9.20 Localised groundwater flooding can also occur around specific geological features, such as areas of permeable soils overlying impermeable strata. Very few groundwater-flooding records are available from the Environment Agency and all of those that are recorded lie within the London Borough of Enfield.

Predicted Effects during Construction

9.21 The following impacts have been considered in terms of the main site activities:

- hydrological change, including possible disturbance and modification of watercourses, existing drainage patterns, overland flow routes and groundwater recharge and flows;
- possible increase in surface water overflow toward watercourses as a result of increased impermeable area;
- sediment or chemical pollution of watercourses and land drains during construction and operation;
- interruption or disturbance of public or private water supplies; and
- effects on freshwater ecology due to pollution, obstruction of land drains and watercourses or changes in hydrological regime.

9.22 Potential impacts associated with the construction of impermeable surfaces include:

- site drainage;
- surface water flow route;
- surface water outfalls (existing and proposed);
- increased surface discharge volume into nearby watercourses; and
- possible contamination of nearby watercourses due to runoff from impermeable surfaces during construction.

9.23 Sudden rainfall events can mobilise silt and materials held within the site and, if not controlled, these will be conveyed to the surrounding area. To a lesser degree, the potential risk of accidental spillages of construction materials will be present. Cement, if leached into surface water features, could have detrimental effects by drawing oxygen from the water and altering the pH of the water.

9.24 Much of the work will be carried out below the level of the surrounding ground, thus any surface water run-off will be retained on site and will be pumped to the sewer located in Gondar Gardens Road. The magnitude could be small due to the receptor of the pumped water being a combined sewer; the impact of spills and mobilisation of silts would therefore be Minor.

9.25 The early establishment of temporary drainage facilities will avoid unforeseen problems during construction. Many of the short-term impacts arising from the construction of the site can be effectively mitigated by the utilisation of good construction techniques.

9.26 Where feasible, suitable construction techniques will be adopted to ensure that no mitigation pathways are created to jeopardise groundwater quality. Where deeper foundations may be required, appropriate piling techniques will be used to minimise the associated risk.

9.27 The use of appropriate measures as outlined in the Environment Agency PPGs to prevent spillage of potentially polluting substances will include:

- Appropriate storage and handling measures for all hydrocarbon fuels and lubricating oils, including the use of bunded storage areas or the use of double-skinned storage tanks.
- All wastes must be stored in designated areas that are isolated from surface water features and bunded to contain any spillages. Rubbish compactors should be covered to prevent the build-up of contaminated rainwater and drained to the foul sewer to prevent polluting liquid entering the surface water drains.
- The use of drip trays for static plant and designated refuelling areas for mobile plant. The implementation of appropriate spillage contingency measures to mitigate the impact of such spillages on the surface water network.
- Appropriate personnel awareness training of the potential environmental implications of all construction work on-site.

Predicted Effects relating to Flood Risk and Surfacewater Drainage

9.28 Flood risk to the site from all sources is considered to be low. However, the development will impact on the surfacewater drainage regime in the area. In terms of surface water generation, construction of permanent hard surfaces will generate additional surface water. The removal of the impermeable cap of the former reservoir and the creation of a large area of soft landscaping will reduce the overall run off generated from the site.

9.29 All positively drained surfaces will gravitate towards a purposely-designed attenuation structure, which will be pumped to the Thames Water Sewer located within Gondar Gardens Road (subject to agreement by Thames Water). The structure will be designed to attenuate all surface water in excess of the allocated flow rate for rainfall events up to the 1 in 100-year rainfall event plus an allowance for climate change of 30%.

9.30 The development will utilise sustainable drainage techniques where feasible. It has been assumed that the reservoir would have been lined to prevent water leaching and therefore infiltration techniques may not be possible. This does not exclude the use of other SUDs techniques. Green roofs are proposed to reduce the impermeable area, although the level of coverage will be dependant on the specification of the PV cells.

9.31 The use of permeable paving will be considered. Although infiltration may not be possible on-site, water passing through the paving system will offer filtration of solids and can be collected below a sub-base within a piped system. However, the main attenuation will be provided within a cellular stage structure, the volume of which has been based on a off site discharge rate of the 1 in 30 year Greenfield rate (1.3l/s), which offers a reduction in the off-site discharge from the pre-development rate. Run-off from the site will be limited to a maximum rate as permitted by Thames Water, and may therefore be subject to chance once further negotiations have taken place.

9.32 The eastern part of the site will be landscaped to provide an amenity area. This area can be assumed to be greenfield and will not increase runoff rates or volumes from the pre-development situation. Given the fact that London Clay

underlies the site, infiltration will be very limited and therefore ponded water can be expected to occur during times of prolonged precipitation.

9.33 The area of the base of the reservoir will be graded with a slope away from the proposed properties. This will ensure that the flood risk to the basement level will remain low. Flood risk to the properties will remain low for the lifetime of the development and has been assessed as Minor.

Predicted Effects relating to Groundwater

9.34 There is a small potential risk of pollution to groundwater from fuel and chemical spills during construction. This is assessed as of small magnitude but with a highly sensitive receptor, resulting in a minor impact.

9.35 The potential risk of pollution to groundwater from the mobilisation of existing contaminants during construction is again assessed to be of small magnitude but with a highly sensitive receptor, therefore a minor impact. The possible creation of a preferential pathway for the migration of contaminants during construction is assessed as Minor.

9.36 The presence of London Clay below the base of the reservoir could result in a perched groundwater level. However, as the site is to be landscaped away from the properties the flood risk from groundwater flows reaching the surface will be mitigated against. According to the GI for the site, groundwater was not encountered in the boreholes, with the exception of BH1 where groundwater seepage was identified 13.0mbgl. The development will not significantly alter the hydrogeology of the area and groundwater levels are therefore not expected to vary from that at present, resulting in a Minor impact

Predicted Effects relating to the Operational Development

9.37 The potential risk of pollution to groundwater arising from the normal use of the site for residential dwellings is assessed as Minor due to the localised and small magnitude of impact combined with the high receptor sensitivity. There is some potential for fuels, oils and lubricants to be deposited by vehicles using the site. However, it is anticipated that the magnitude of the impact of this is negligible, as mitigation measures will be put in place to intercept the pollutants.

9.38 Accidental impacts may occur and affect the surfacewater drainage and groundwater, e.g. vandalism, spills and fire-fighting water. Due to the localised and small magnitude of such events, combined with high receptor sensitivity, the effect can be considered to be Minor.

Residual and Cumulative Effects

9.39 The application of SUDS to the design of the drainage system will reduce the concentrations of pollutants and suspended solids entering the surfacewater network. The majority of impacts identified as a result of the construction of the proposed development can be successfully mitigated during the planning/design phase.

9.40 Should construction require the excavation of made ground, suitable environmental management techniques will be adopted. These will ensure that

no significant migration pathways are created and therefore no significant decrease in groundwater quality will occur. The mitigated magnitude of impact is likely to be small with the receptor sensitivity remaining high, resulting in Minor residual effects.

9.41 The use of construction plant on the site with the potential to contaminate the groundwater and/or surface waters with either hydrocarbon fuels/oils and/or silt laden runoff, will be mitigated by using appropriate measures as outlined in Environment Agency PPG's and timely engineering/measures to intercept and treat such runoff. The mitigated magnitude of impact is likely to be a localised and short-term event with no significant decrease in quality, hence Negligible. Due to the site being outside the Nitrate Vulnerable Zone the receptor sensitivity is low for both surfacewater and groundwater. The overall impact is not considered to be significant.

9.42 Any runoff from the main access and other impermeable areas that may contain low levels of hydrocarbons/heavy metals is likely to have a short-term and highly localised impact. Runoff will be of insufficient quantity to cause a significant decrease in the quality of the environment or biodiversity. As the use of these roads will be minimal after construction is completed, the magnitude of impact is assigned as small. Due to the high sensitivity of the receptors in the locality, the residual impact is assessed as Minor.

9.43 No potential for cumulative effects has been identified.

10. Ground Contamination

Introduction

10.1 This chapter assesses potential constraints posed by ground conditions and any ground contamination, together with the potential geo-environmental impacts of the proposed development on its surroundings, including neighbouring properties, residents and the wider environment.

10.2 The chapter should be read in conjunction with the Geo-Environmental Site Assessment Report, carried out in December 2009, which is presented as **Technical Annex 6.1**. This report includes a desk-based Preliminary Risk Assessment and exploratory intrusive investigation to obtain data on the geo-environmental and geotechnical characteristics of the site.

Scope and Methodology

10.3 The Preliminary Risk Assessment and exploratory investigation were carried out generally in accordance with:

- BS 10175:2001 Code of Practice for the Investigation of Potentially Contaminated Sites;
- BS 5930:1999 Code of Practice for Site Investigations;
- CLR 11 Model Procedures for the Management of Land Contamination, Environment Agency (2004);
- BS 1377:1990 Method of Tests for Soils for Civil Engineering Purposes; and
- Guidance on Requirements for Land Contamination Reports, Environment Agency (2005).

10.4 The Preliminary Risk Assessment includes reference to a commercially available environmental database report and an inspection of the site. Potential changes to surrounding land uses and any contaminative activities since December 2009 have been assessed by reference to an Envirocheck Report dated November 2013, a copy of which is presented as **Technical Annex 6.2**.

10.5 Whilst the Preliminary Risk Assessment enabled the development of a conceptual site model, the exploratory intrusive investigation targeted areas around the margins of the reservoir, including the land beyond its eastern boundary. The investigation therefore did not provide untargeted site-wide coverage to establish the baseline soil contamination conditions across the entire site.

10.6 The specific objectives of the exploratory intrusive investigation were to:

- provide sufficient information on soil and groundwater conditions from available desk study and ground investigations to generate a Conceptual Site Model of ground conditions and contamination for the site;
- use the information thus collated to quantify the risks to identified receptors arising as a result of the proposed development; and
- inform on suitable foundation solutions for the development infrastructure, including buildings and roads.

General Approach

10.7 The identification and assessment of impacts has been made with reference to the information obtained from the desk-based and intrusive investigation reports and the particular issues identified within them. The information has been interpreted using professional judgement and experience based on previous developments on sites of similar environmental sensitivity.

Sensitivity of the Physical Environment

10.8 Receptor importance and/or sensitivity has been categorised as high, medium or low. Receptors with a high degree of sensitivity include:

- Designated sites, such as geological and groundwater SSSIs.
- Regionally important geological and geomorphological sites (RIGS) and geological conservation review sites (GCRs).
- Areas of critical topography, including steep slopes and historic landslip locations.
- Areas of existing mineral extraction and areas designated in Local Authority Plans as preferred areas for mineral extraction.
- Inner groundwater source protection zones (SPZ 1). Areas of high groundwater vulnerability.
- Principal aquifers.
- Areas of known/confirmed contaminated land/groundwater.
- Rivers with a Grade A water classification.
- Areas of flood risk.

10.9 Receptors with a medium degree of sensitivity include:

- Typical rural topography
- Areas of search for minerals
- Outer groundwater source protection zones and total catchment areas (SPZ 2 and SPZ 3)
- Secondary aquifers
- Areas with intermediate groundwater vulnerability
- Rivers with a Grade B water classification.

10.10 Receptors with a low degree of sensitivity include:

- Industrial site topography
- Areas without known mineral resources
- Rivers with a Grade C or D water classification
- Unproductive strata
- Areas with low groundwater vulnerability

Magnitude of Impact

10.11 The predicted magnitude of change has been categorised as major, moderate, small or negligible as follows:

- Major: Total loss or major/substantial alteration to key elements/ features of the baseline (pre-development) conditions such that the post development character/ composition/ attributes will be fundamentally changed.

- Moderate: Loss or alteration to one or more key elements/ features of the baseline conditions such that post development character/ composition/ attributes of the baseline will be materially changed.

- Small: A minor shift away from baseline conditions. Change arising from the loss/ alteration will be discernible/ detectable but not material. The underlying character/ composition/ attributes of the baseline condition will be similar to the pre-development circumstances/ situation.

- Negligible: Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.

Impact Significance

10.12 Significance has been derived by relating receptor sensitivity to magnitude of change, as shown on Table 10.1.

Table 10.1: Significance of Potential Impacts

Magnitude	Sensitivity/Importance		
	High	Medium	Low
Major	Major	Moderate	Minor
Moderate	Moderate	Minor	Not Significant
Small	Minor	Not Significant	Not Significant
Negligible	Not significant	Not Significant	Not Significant

Uncertainty and Technical Difficulties

10.13 The opinions and recommendations expressed in this assessment are based on the ground conditions encountered during exploratory site work conducted in 2009. The interpretation of the results of field and laboratory testing includes interpretation between exploratory holes. The materials encountered and samples obtained represent only a small proportion of the materials present on-site. and therefore other conditions may prevail at the site that have not been revealed by the investigations to-date.

Policy Context

10.14 Relevant policies are outlined in Table 10.2 and pollution prevention guidelines in Table 10.3.

Table 10.2: Legislation and Policy

Policy / Legislation	Key Provisions
National Planning Policy Framework	Paragraph 111 specifies, inter alia, that planning policies and decisions should encourage the effective use of land by re-

	using land that has been previously developed (brownfield land), provided that it is not of high environmental value Paragraph 121 specifies that planning policies and decisions should also ensure that: • the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation • after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990 • adequate site investigation information, prepared by a competent person, is presented. Annex 2 defines 'competent persons' (to prepare site investigation information)
The Water Framework Directive 2000/60/EC	The 1980 Groundwater Directive 80/68/EEC and the 2006 Groundwater Daughter Directive 2006/118/EC of the WFD are the main European legislation in place to protect groundwater.
The London Plan (February 2008)	Optimising the use of previously developed land
Environmental Protection Act:1990 Part IIA	Requires all Local Authorities to inspect their areas for contaminated land, and produce a strategy outlining how they approach this task. Under s.78B(1) the Council is required to maintain a Public Register of Contaminated Land
Camden Core Strategy	Policy DP22 - Where the demolition of a building cannot be avoided we will expect either the re-use of materials on-site or the salvage of appropriate materials to enable their re-use off-site. Where materials cannot be salvaged whole and where aggregate is required on-site, this demolished material should Be crushed for re-use, with measures taken to minimise dust and noise.

Table 10.3: Pollution Prevention Guidelines

Policy / Legislation	Key Provisions
Control of Water Pollution from Construction Sites (2001)	Provides practical help and guidance for consultants and contractors on how to plan and manage construction projects to control water pollution.
PPG1: General Guidance to the Prevention of Pollution	Provides an introduction to a series of Pollution Prevention Guidance notes (PPGs), which provide practical advice to help developers and contractors avoid causing pollution, minimise waste and comply with the law
PPG6: Working at Construction and Demolition Sites (2010)	Provides detailed guidance on construction and demolition activities, including requirements for discharges of water from dewatering operations to controlled waters and foul sewers, and the safe discharge of silt-laden water
PPG21: Pollution Incident Response Planning (2009)	Provides guidance on the development of a pollution incident response plan and includes a template plan

Baseline Conditions

Geology

10.15 The published geological map of the area [Sheet 256 "North London"] identifies the geology of the site as London Clay Formation, with no overlying superficial Drift deposits. The lithology of the London Clay Formation comprises stiff grey silty clay, and the stratum extends to a depth of approximately 40m below ground level. The London Clay Formation is underlain by the Lambeth Group, Thanet Sand Formation and White Chalk Sub-group, the latter at a depth of approximately 100m below ground level.

10.16 The low permeability, cohesive strata of the London Clay Formation provide an effective barrier to the lateral migration of any on or off-site contamination, and also provide a barrier to the vertical migration of any contamination to the deeper strata.

Hydrogeology

10.17 The London Clay Formation constitutes an aquiclude and is designated as 'Unproductive Strata' by the Environment Agency (groundwater vulnerability maps available on the Environment Agency website). Unproductive Strata are defined as formations of negligible permeability. The underlying strata of the Lambeth Group are also designated as 'Unproductive Strata'.

10.18 At depth, the Thanet Sand Formation and White Chalk Sub-group are designated as Secondary 'A' and Principal Aquifers, respectively, and form a regional resource for public supply. However, the presence of the overlying aquiclude, formed by the London Clay and Lambeth Group strata, protects the deeper groundwater resources from the downward migration of any mobile contaminants in the shallow soils or groundwater.

10.19 There are no abstractions for potable water supply in the vicinity, the nearest public abstraction borehole (from the deep aquifer) being located more than 1km from the site. The site does not lie within a currently designated groundwater Source Protection Zone.

10.20 In summary, the groundwater regime beneath the site is characterised by the presence of an aquiclude and there are no shallow water resources potentially at risk from site-derived contamination. The presence of low permeability clay immediately beneath the site could result in discontinuous shallow groundwater, perched on the surface of the clay, particularly within any made ground deposits. However, the site is not located within a sensitive setting with respect to controlled waters, i.e. groundwater resources or surface watercourses.

10.21 No groundwater was encountered during the exploratory investigation, with the exception of a minor seepage within the London Clay at depth. The results therefore confirmed the anticipated absence of any continuous body of shallow groundwater.

Soil Contamination

10.22 The intrusive investigation conducted in 2009 comprised one cable percussive borehole to a depth of 20m and seven window sampler boreholes to a maximum depth of 4.0m. Of the latter boreholes, two were drilled within the eastern area of the site beyond the eastern margin of the reservoir structure. Four of the window sampler boreholes were installed with combined ground gas/groundwater

monitoring wells, but no return monitoring visits were conducted during the investigation.

10.23 With the exception of localised stands of Japanese Knotweed, the investigation found no visual evidence of soil contamination. Six soil samples were tested in the laboratory for a range of potential contaminants, including heavy metals, polycyclic aromatic hydrocarbons (PAH) and asbestos. The laboratory analyses identified a single marginally elevated concentration of the PAH compound Benzo(a)pyrene with respect to the Generic Assessment Criteria (GACs) for human health.

10.24 The majority of concentrations of heavy metals detected in the shallow soils are in line with the published British Geological Survey measured urban soil chemistry data and urban soil chemistry averages for the area, which are presented in the Envirocheck Report included as **Technical Annex 6.2**.

10.25 The results of the exploratory investigation indicated that whilst the potential for some residual contamination to exist on site could not be ruled out, the risks associated with future residential development appeared to be low. However, a more comprehensive investigation of the contamination status of the soils will be required to provide a robust characterisation of the contamination status of the soils.

10.26 The conceptual site model indicates a very low or negligible risk to the proposed development associated with ground gas, as no potential sources of ground gas have been identified and the proposed development will be underlain by a basement or (it is expected) will be founded directly on the London Clay. Consequently, no further assessment of the ground gas regime is expected to be necessary, unless further intrusive investigations beneath the footprint of the proposed buildings indicate a need to revise the conceptual site model.

Predicted Effects

Construction

10.27 Demolition and construction work will involve the use of heavy plant, necessitating the use of temporary on-site fuel storage and refuelling facilities. The demolition works will involve breaking up the existing reservoir structure; outside the footprint of the proposed new residential structures, the inert arisings from the demolished structure will remain in situ. Associated infrastructure, i.e. pipe work, ducts and redundant services, will also be removed.

10.28 Without appropriate controls in place, these works could result in the release and spread of contaminated building materials and dust, e.g. asbestos, or the release of liquid contaminants into the soils. The construction works will also involve the use of heavy plant, necessitating the use of temporary on-site fuel storage and refuelling facilities. In addition, the works are expected to involve bulk earthworks, which could result in the spread of any existing soil contaminants.

10.29 Potential impacts associated with the demolition and construction phase, with respect to neighbouring properties and residents, comprise the risk of release of contaminated dust and asbestos fibres, and the potential spread of Japanese Knotweed if soils containing rhizomes were to be excavated and re-deposited adjacent to boundaries. The significance of these impacts is categorised as Minor.

10.30 These potential impacts will be mitigated by conducting further investigations into the possible presence of hazardous building materials within the reservoir structure and associated infrastructure and by implementing appropriate controlled removal in advance of or during the demolition works.

10.31 Additional sampling and laboratory analysis of the shallow soils scheduled for excavation prior to demolition will be conducted to determine the need for any specific control measures and to establish suitability for re-use on-site. A remediation strategy will be developed for the treatment or removal of the Japanese Knotweed and to prevent the potential spread of rhizome-contaminated soils during excavations.

10.32 Where the construction works involve the excavation of treated or untreated soils containing residual contamination, any temporary stockpiles will be located on impermeable surfacing and will be bunded to ensure that no runoff of potentially contaminated water occurs.

10.33 Facilities for the storage of fuels, lubricants and any chemicals will be sited to avoid locations where rapid pathways could exist to neighbouring properties or the surface water drainage system. Storage will be on surfaced areas with appropriate bunding, and spill kits will be available on site.

10.34 A Construction Environmental Management Plan (CEMP) will be prepared which clearly sets out the methods of managing environmental issues for all involved with the construction works. The CEMP will also include methods for the prevention and/or monitoring of runoff of silt-contaminated water into the surfacewater drainage system or onto third party land, and the release of contaminated dust or asbestos.

Operation

10.35 Potential impacts due to the completed development will comprise the risk of residents, other site users, maintenance workers and flora/fauna coming into contact with contaminated ground, especially in areas of communal open space.

10.36 These impacts will be mitigated by the further sampling (see above) and laboratory analysis of the shallow soils remaining in situ or due to be stripped and redeposited within the soft landscaped areas of the site. If potentially significant contamination were identified, an appropriate remediation strategy would be designed to ensure that a suitable depth of clean, validated soils is present in all areas of soft landscaping.

Residual and Cumulative Effects

10.37 All potential impacts will be eliminated through the application of the mitigation measures identified above. Consequently, there will be no residual impacts related to ground conditions and contamination. No risk of cumulative effects arising from interaction with other developments has been identified.

11. Noise and Vibration

Introduction

11.1 This chapter considers potential impacts relating to noise and vibration. These impacts relate to construction noise and vibration, noise from development traffic, noise from building services plant and the implications of background noise levels for the amenity of new residents. The chapter is supported by the following Technical Annexes:

- 7.1: Environmental Noise Survey;
- 7.2: BS5228 Noise Impact Assessment;
- 7.3: BS5228 Vibration Impact Assessment;
- 7.4: Road Noise Impact Assessment; and
- 7.5: Car Lift Noise Assessment.

Scope and Methodology

Environmental Noise

11.2 An environmental noise survey of the site was undertaken using the guidance and method in Planning Policy Guidance 24: Planning and Noise: 1994. The sound pressure data, which cover a full 24 hour weekday period, are detailed in **Technical Annex 7.1**.

11.3 The site was assessed using the "noise exposure categories" (NEC's) for road noise, as this is the dominant source in the area. The site is classified as NEC A for the daytime period 0700-2300hrs and NEC B for the night time period.

Construction Noise and Vibration

11.4 Construction noise and vibration have been assessed using the advice and guidance given in BS5228: 2009 Part 1: Noise and Part 2: Vibration. Noise impact was modelled using a proprietary software package which predicts sound pressure levels propagated across site and illustrates the impact using noise contours. The sound pressure level predictions are detailed in **Technical Annex 7.2**.

11.5 The data inputs into the noise model were determined by the demolition and construction work schedule defined by the client and containing information on operation, type of plant and machinery and work duration (on-time). Plant sound power levels were taken from manufacturer's data and the reference tables in BS5228.

11.6 Construction vibration was assessed using the methods and guidance detailed in BS5228: 2009: Part 2. The findings are detailed in **Technical Annex 7.3**, which contains all the required parts of the BS5228 vibration impact assessment including the proposed work schedule, the type of plant and machinery, work duration (on-time) and vibration levels for plant & machinery used.

11.7 The assessment has considered both the human response to vibration relying on guidance given in BS6472: 2008 and the building damage criteria which is covered in BS7385:1990 Part 2.

Traffic Noise

11.8 Traffic noise was modelled using a proprietary software package which predicts sound pressure levels propagated across site and illustrates the impact using noise contours. The sound pressure level predictions are detailed in **Technical Annex 7.4**.

11.9 Data inputs to the model were determined by the predicted traffic flows based on current client data and standard growth criteria for traffic in the area. Baseline predictions were made of the traffic propagation model in the area for the year 2013 and compared with the traffic noise prediction model incorporating the noise from the development site.

Noise from Building Services Plant

11.10 It is understood that the only plant to be installed on the development is a car lift, which will take resident's vehicles to the basement car park. The system features a car lift hydraulic pump, which will be housed inside a basement level plant room. The car lift has been selected with a view to minimising the noise impact on both the new development and noise egress externally.

11.11 The mechanical noise in this system comes from the hydraulic system pump and motor set which feeds the ram pressurising the system when the lift goes up. It is understood that the pump is a submersible pump which sits inside a fluid reservoir. The pump noise is attenuated by being submerged in oil, making this a relatively low noise system.

11.12 An environmental noise assessment of the car lift is presented in **Technical Annex 7.5**. The assessment was carried out in line with the Local Authority requirements that M&E plant noise does not produce a sound pressure level at the nearest residential receiver (within the new development) which is greater than a level 10dB below the prevailing external minimum background noise (measured as an LA90).

Predicted Effects

Environmental Noise

11.13 The impact of the prevailing noise climate was assessed using the conclusions from PPG24 with respect to the noise exposure category as follows:

- Daytime: *"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".*

- Night-time: *" Noise should be taken into account when determining the planning applications and, where appropriate, conditions imposed to ensure and adequate level of protection against noise"*

Construction Noise

11.14 The predicted sound pressure levels are detailed in Figure 7 on p11 of Technical Annex 7.2. The results show that average daytime sound pressure level of 71dB LAeq,T will be generated at a small number of residential properties adjacent to the development site for a limited period. This mainly occurs during the demolition phase and when the concrete is cast on the superstructure of the development.

Construction Vibration

11.15 In general the use of percussive plant on the site will be limited to the demolition activities during breaking down of the roof and existing concrete sub-structure of the reservoir. The general risk of the percussive breakout techniques exceeding building damage criteria is seen as low, although it is noted that there is a small risk of falling masonry from the roof of the reservoir impacting the foundation slab 7m below exceeding the lower limits for cosmetic damage for transient vibration shock as detailed in BS7385.

11.16 Piling is the usual cause of raised vibration levels in the construction phase of a development and the selected method for the piling activity on this site uses the lowest vibration impact method based on continuous flight auger (CFA).

Traffic Noise

11.17 The predicted impact of the proposed development was assessed by using a difference contour based on a subtraction of levels from the "before" and "after" development cases. The difference calculations show that there would be part of the south-western corner of the site that has a predicted level increase of circa 2dB during both the day and night-time periods. This is a relatively small impact over a limited area.

11.18 The rest of the site would have levels which are the same and/or lower than the baseline prediction because of the additional screening provided by the proposed development. For a large proportion of the site, conservatively estimated as between 25-30%, the actual levels are predicted to be lower by 4dB or greater, which is significant. No noise mitigation is required for traffic noise generated by the development.

Noise from Building Services Plant

11.19 The impact of the car lift hydraulic pump noise is predicted to be 11dB below the minimum background sound pressure level at the closest residential receiver, which complies with Local Authority requirements for new mechanical and electrical noise. It should be noted that this is based on a worst-case condition when both car lifts are operating simultaneously at the quietest period at night, which is unlikely to occur frequently.

Mitigation and Residual Effects

Environmental Noise

11.20 The glazing design for the new dwellings will ensure that the "Good" criterion will be achieved in both bedrooms and living areas. In addition, mechanical

ventilation will be installed in all dwellings to avoid the need to open the windows for ventilation purposes, thereby preserving the acoustic efficacy of the glazing.

11.21 The environmental noise assessment of the site demonstrates that the area is suitable for residential development and that the impact of the current sources of noise in the area on the future residents will be relatively small. Suitable protection can be afforded by a modest glazing specification, ensuring that the superior "Good" internal design criteria will be achieved.

Construction Noise

11.22 The applicant will agree appropriate mitigation, as part of a Construction Management Plan, to ensure that the risk of significant effects is minimised as far as practicable at the nearby residential receptors. The mitigation will be based on suggestions and guidance in BS5228 as well as a pragmatic approach to working hours and scheduling of operations.

11.23 The mitigation will be designed to ensure that the operations producing the highest noise levels occur at the least sensitive times, i.e. avoiding early mornings or at weekends. In addition, localised screening of percussive hand tools and quasi-static operations (e.g. block cutting and breaking operations) will be applied where practicable, and can typically reduce noise impact by up to 10dB).

11.24 The predicted noise impact of the construction and demolition activities will be limited to a level of 71dB LAeq,T. This will be at the nearest residential receptors on the site boundary and limited to only a few specific activities in the demolition and construction process which form the "worst case" scenario.

Construction Vibration

11.25 The applicant will agree appropriate mitigation, as part of a Construction Management Plan, to ensure that the risk of significant effects is minimised as far as practicable at the nearby residential receptors. A cushion bed of rubble will be used when demolishing the roof structure to reduce the vibration transfer to the base slab, and best practical methods of operating the plant will be employed in order to reduce vibration transfer to the ground.

11.26 In addition to minimising vibration break-out from the site, monitoring will be undertaken at the closest relevant properties, whilst structural surveys will be undertaken to assess any current damage to buildings and to monitor this both during and after the development has been undertaken.

11.27 The vibration impact from the bored piling operation at the nearest residential receivers is predicted to reach levels of between 1-3mm/s peak particle velocity (worst case).

11.28 With respect to the demolition of the reservoir roof, measures will be implemented to ensure that the transient vibration egress from construction and demolition operations at the nearest residential receivers will be controlled within Line 2 from BS7385: Part 2: 1993.

Traffic Noise

11.29 The additional traffic noise generated by the site will be small, amounting to increases in sound pressure level of between +1dB to 2dB over a relatively small part of the Gondar Gardens frontage and the rear gardens in the south-western corner of the site. The majority of the area to the rear of the new dwellings will benefit from a reduction in overall sound pressure level due to the screening afforded by the development.

Noise from Building Services Plant

11.30 The assessment indicates that the car lift would not give rise to significant noise levels, and that no further mitigation is likely to be required.

12. Sunlight and Daylight

Introduction

12.1 This chapter considers potential effects relating to sunlight and daylight, and should be read in conjunction with the supporting material presented in **Technical Annex 8**. The assessment has been based on compliance with the Building Research Establishments publication "*Site Layout Planning for Daylight and Sunlight. A Guide to Good Practice.*"

Scope and Methodology

12.2 The assessment has used the scheme design drawings and has included a site inspection and photographic record to understand the relationship of the proposals to the neighbouring properties, and a review of online planning history. From this information, a 3D computer model was created of the existing site conditions, the proposals and the neighbouring properties, which was then used to run the required analysis.

12.3 It would appear that there are three neighbouring residential properties with windows serving habitable rooms overlooking the site: Chase Mansions, South Mansions and 9 Gondar Gardens.

Policy Context

12.4 Camden Core Strategy 2010 CS13 and CS14 refers to the Mayor of London's Housing Design Guide and Code for Sustainable Homes. We have also considered Camden Planning Guidance/Housing/Residential development standards. All these make reference to the BRE Guidelines either in relation to the proposed units or the neighbouring residential properties. A summary of the BRE Guidelines is contained in Technical Annex 8.

Baseline Conditions

12.5 As set out in the spread-sheet in the Technical Annex, based on a Vertical Sky Component (VSC) analysis for daylight, in the majority of instances the relevant windows of nearby properties achieve the recommended 27% VSC. This is unusual for properties in such an urban environment and located so close to the site boundary.

12.6 The only property that needs to be considered with regards to sunlight, due to orientation, is Chase Mansions. The analysis of the Annual Probable Sunlight Hours (APSH) enjoyed both in relation to total hours and hours during the winter months by the windows serving habitable rooms demonstrates that the BRE Guidelines are achieved. This is again unusual for a property in such an urban environment whose windows are located so close to the boundary.

Predicted Effects on Daylight

12.7 As set out in the spread sheet in the Technical Annex, with the implementation of the proposals there will be a reduction in the VSC to below 27% and the proposed values will be less than 0.8 times the existing. In accordance with the

BRE Guidelines we have therefore considered the Average Daylight Factor (ADF) for each of the neighbour's rooms.

12.8 The ADF analysis demonstrates that, taking account of room use, the recommended levels are exceeded. The No-Sky Line (NSL) analysis also shows that these rooms will enjoy good daylight distribution.

Predicted Effects on Sunlight

12.9 With regards to sunlight, the APSH analysis indicates that all except three windows achieve the BRE Guidelines. The three exceptions serve bedrooms, and the BRE Guidelines specifically state that bedrooms are "*… less important*". Taking this into account, and the fact that the windows are very close to the boundary, as stated "*…. care needs to be taken in applying these guidelines.*" We consider therefore that, since it is generally only in relation to the winter months that the specific numerical values are not met, the aims of the BRE Guidelines are achieved.

Proposed Accommodation Levels of Daylight

12.10 In relation to the proposed dwellings, we have considered the level of daylight these will achieve and the area of glazing for each room. As a result of careful consideration during the design process, all rooms will achieve or exceed the recommended ADF as recommended in The London Housing Design Guide and BS8206 referenced in the BRE Guidelines. These rooms will also achieve good daylight distribution, since a significant portion of each room is in front of the NSL.

Conclusion

12.11 In terms of neighbouring residential properties, the assessment demonstrates that the BRE Guidelines for daylight are met, in that the recommended ADF levels for each habitable room are achieved or exceeded and that they will also enjoy good daylight distribution.

12.12 In relation to sunlight, whilst the analysis demonstrates that the numerical values are not achieved in the case of three windows, taking into account the statements contained within the BRE Guidelines the aims of the guidelines are considered to be achieved.

12.13 Careful consideration taken during the design process has ensured that the criteria set out in The London Housing Design Guide and the Code for Sustainable Homes with regards to daylight are achieved. No potential for cumulative effects has been identified in relation to any other developments.

13. Townscape and Views

Introduction

13.1 This chapter assesses potential impacts relating to townscape and views. It should be read in conjunction with the modelled views presented in **Technical Annex 9**.

Scope and Methodology

13.2 The assessment has comprised the following tasks:

- a review of project details, baseline information sources and policy;
- a walkover inspection of the site and surrounding areas, in order to identify landscape character, receptors and potential visibility;
- definition of visual influence and identification of important views and potential receptors;
- analysis of townscape character;
- identification and evaluation of effects on townscape character and visual amenity;
- recommendation of mitigation where necessary; and
- identification of residual effects.

Townscape Character

13.3 Townscape character derives from interaction between physical elements such as buildings, spaces, topography and vegetation. The combination of these elements gives rise to aesthetic qualities that have differing perceptual values; for example, degrees of spatial enclosure/exposure or the balance between natural and man-made influences. Together, these make up what is often called the 'sense of place'.

13.4 Despite the inevitable reliance on value-judgements, there is a high degree of consensus as to what constitutes 'attractive' or 'unattractive' townscape. Distinctive topography, significant vegetation and historic buildings are generally regarded as positive elements; whilst uniform topography and built form, absence of vegetation, or the presence of 'intrusive' features, are generally regarded as negative.

13.5 The presence of designated features or areas, such as listed buildings or conservation areas, automatically increases the value of the townscape. Such designations also affect the sensitivity of the surrounding area, since a degree of protection extends to their setting.

Views

13.6 The visual perception of an area results from the sequence of views which people experience during the course of their activities. A distinction can be made between 'opportunistic' views (i.e. those experienced on a day-to-day basis, such as from a person's home, car or place of work) and 'intentional' views (i.e. those sought out for amenity reasons). Views to/from designated areas are implicitly protected within the planning system.

13.7 Views can be affected in several ways. They may be obstructed by a development at close quarters or opened up by the removal of vegetation. Their character may be changed by a prominent development, to the extent that the latter may introduce a new landmark or create new visual relationships with surrounding features (e.g. the scale and form of existing buildings).

Visual Amenity

13.8 Visual amenity refers to that part of a person's wellbeing that depends on their visual perception of the environment. Impacts on visual amenity depend, in large part, on the concept of receptor sensitivity. This assumes that people's sensitivity to visual change varies according to their activity, which influences their degree of proprietorial interest in the views they experience. Other influences on visual amenity include viewing opportunity (i.e. the opportunity receptors may have to obtain particular views) and the importance of those views in amenity terms.

Predicting Effects

13.9 Effects are derived from the interaction between impacts (i.e. the degree of visible change) and the sensitivity or importance of the townscape, receptors or view. This interaction is conceived as a matrix, in which effects are identified on a semantic scale (major, substantial, moderate, minor, negligible).

13.10 Impact is defined as visible change. It has two aspects: physical impact on the townscape and impact on specific views. Both have been categorised on a three-point scale (high, medium, low). Physical impact has been categorised as follows:

- High: Fundamental change to the character of the site (e.g. development of an open site), or introduction of buildings substantially (at least three-times) taller than those typical of the surrounding area.

- Medium: Substantial change to site character (e.g. loss of mature trees, extension of built footprint); introduction of buildings at least double the height of those typical of the surrounding area.

- Low: Site character fundamentally unchanged (e.g. existing development replaced by development of similar extent/scale); new buildings slightly taller than existing/surrounding area.

13.11 Impact on views has been categorised as follows:

- High: View largely obstructed or its character fundamentally changed (e.g. development appears prominently at close quarters where none is currently visible) or view is created where none currently exists.

- Medium: View partially obstructed or its character partially changed (e.g. development provides new landmark).

- Low: View not perceptibly obstructed; development visible but insufficient to change character.

13.12 The sensitivity of a townscape reflects its ability to accommodate change of a particular type without adversely affecting its character. The sensitivity of the townscape in this case has been categorised as follows

- High: Designated areas (e.g. conservation areas) and their settings (including listed buildings); built-up areas of distinctive character with attractive open spaces or landmark buildings.

- Medium: Built-up areas of moderate scale, typically residential in character.

- Low: Built-up areas of commercial character and/or with tall buildings.

13.13 Receptor sensitivity is assumed to derive from their activity, and has been categorised as follows

- High: Residents at home;

- Medium: Recreational users of open space and rights of way; and

- Low: People at work, travelling, shopping or playing sport.

Evaluating Significance

13.14 The matrix used for deriving the significance of effects is shown below. The yellow shading denotes effects that are definitely significant and the blue shading denotes effects that are definitely not significant. The unshaded effects are potentially significant, depending on specific circumstances and professional judgement.

Sensitivity of townscape or receptors	**Degree of Impact**		
	Low	**Medium**	**High**
Low	Negligible	Minor	Moderate
Medium	Minor	Moderate	Substantial
High	Moderate	Substantial	Major
	Predicted Effects		

Distinguishing between Beneficial and Adverse Effects

13.15 Since visual assessment relies on perception and context, the decision as to whether an effect is beneficial or adverse can be problematic. In many cases, an impact may have both beneficial and adverse implications, and judgement is required as to the nature of the net effect. The following factors are typically assumed to give rise to beneficial effects:

- removal of existing “eyesores”, e.g. derelict land

- screening of unattractive views;
- substantial increase in the proportion or quality of landscaping within a site;
- introduction of landmark buildings into areas where they improve the legibility of the landscape; and
- introduction of architecture of demonstrable distinctiveness and quality.

13.16 The following factors are typically assumed to give rise to adverse effects:

- loss of trees or buildings that contribute to the character or amenity of the site/area;
- obstruction of/intrusion into important views; and
- introduction of buildings that conflict with existing landmarks or generate detrimental visual relationships with the surrounding area (e.g. perceived overlooking or dominance).

Policy Context

National Planning Policy Framework

13.17 The Core Planning Principles set out in the NPPF state (5th bullet on Page 5 of the NPPF) that planning should "…*take account of the different roles and character of different areas…".* NPPF Para 109 states that "*The planning system should contribute to and enhance the natural and local environment by* [inter alia] *Protecting and enhancing valued landscapes*." Para 131 refers to the need for local planning authorities to take account of "*the desirability of new development making a positive contribution to local character and distinctiveness*."

The London Plan (June 2011)

13.18 The Mayor's vision and objectives seek to ensure that London is:

- a city that meets the challenges of economic and population growth;
- an internationally competitive and successful city;
- a city of diverse, strong, secure and accessible neighbourhoods;
- a city that delights the senses'
- a city that becomes a world leader in improving the environment; and
- a city where it is easy, safe and convenient for everyone to access jobs, opportunities and facilities.

13.19 Policy 2.18 seeks to protect, promote, expand and manage the extent and quality of and access to London's green space infrastructure. Policy 3.3 seeks to increase housing supply and Policy 3.4 seeks to optimise housing potential. Policy 3.5 seeks quality and design in new housing developments.

Core Strategy and Development Control Policies

13.20 LB Camden adopted its Core Strategy and Development Policies Documents in December 2010. These form part of the development plan. Relevant policies are as follows:

- CS14 – Promoting high quality places and conserving our heritage. The Council will ensure that Camden's places and buildings are attractive, safe and easy to use.

- CS15 – Protecting and improving our parks and open spaces and encouraging biodiversity – particularly e) protecting other green areas with nature conservation value; including gardens, where possible.

- DP24 – Securing high quality design, the Council will expect developments to consider – character, setting, context and the form and scale of neighbouring buildings; the quality of materials to be used, the provision of visually interesting frontages at street level, the appropriate location for building services equipment, existing natural features such as topography and trees, the provision of appropriate hard and soft landscaping including boundary treatments; the provision of appropriate amenity space; accessibility.

- DP26 - Managing the impact of development on occupiers and neighbours – the Council will protect the quality of life of occupiers and neighbours by only granting permission for development that does not cause harm to amenity, including visual privacy and overlooking.

Baseline Conditions

Site Character

13.21 The application site, formerly known as Shoot-Up Hill Reservoir, comprises 1.24 hectares (3.07 acres) of land. The front half of the site, which faces Gondar Gardens, contains a raised reservoir structure. Two thirds of the reservoir structure is below ground level with a third above, which is covered with a shallow depth of topsoil and grass. The south and west sides of the reservoir above ground are built up using soil banks and grassed.

13.22 The site is predominantly open in appearance, the raised reservoir structure is grassed over and there is little evidence of visible brick structure on the majority of the site; however the topography of the site with sloping embankments to a flat roof, which includes vents along the top of the reservoir structure, demonstrates that this is man-made contoured land.

13.23 To the west of the site is the access point to the reservoir where the brick structure is visible. This is effectively an entrance bunker, which includes a short ladder leading to brick stairs within the reservoir. There is also a vented area and railings on the southern wall of the reservoir which is visible externally.

13.24 The grassed area is mown regularly as part of a maintenance programme for the reservoir land. The embankment to the east and south has longer grasses and

some shrubs. There are also scattered trees around the perimeter of the site. Some trees on the south-eastern boundary benefit from Tree Preservation Orders.

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Townscape Character

13.25 The surrounding area comprises late C19th and early C20th terraced housing and mansion blocks, common throughout this part of London. The south side of the reservoir was developed for housing during the Victorian period, with the north side of Gondar Gardens developed for housing during the first part of the C20th.

13.26 During this time Hampstead Cemetery, to the north of Gondar Gardens, was also established. The housing in the area has a mix of family and purpose-built flatted developments. The surrounding streets are predominantly three-storey town houses; several of these have also been converted into flats.

13.27 Opposite the site entrance is the rear access to the garages of the two-storey terrace houses which front onto Sarre Road. The nearest shopping facilities are to the east of the site on Mill Lane, with the district centre of West Hampstead within walking distance. Beyond the immediate surrounding streets, Hampstead Cemetery is to the north and Hampstead Heath further to the north-east.

13.28 The approximate distances from the rear façade of the nearest properties to the site boundary are 35m (Gondar Gardens), 12m (Agamemnon Road) and 44m (Hillfield Road).:

Relevant Designations

13.29 The majority of the site is identified in the Core Strategy as Private Open Space and is also recognised as a Site of Nature Conservation Importance (Borough II). The front of the site facing Gondar Gardens is not part of either designation. The site also includes trees on the east and part of the southern boundary that benefit from Tree Preservation Orders. None of the land is within a Conservation Area. The reservoir has been added to the draft list of buildings of local interest.

Visual Influence and Receptors

13.30 The site is located at the top of Gondar Gardens (being the obvious location for a reservoir). Views of the site are therefore restricted predominantly to the surrounding residential streets which back onto the site or overlook the site from the west (Sarre Road and Gondar Gardens). The properties on Agamemnon Road to the east also overlook the site from upper floor windows, as do properties in Hillfield Road to the south.

13.31 The site itself is approximately 0.7m above ground level facing Gondar Gardens, which also restricts visibility into the site. Trees, hedgerows and fencing also limited views into and across the site. Receptors who may be affected by the development comprise some surrounding residents and users of Gondar Gardens. Whilst residents are conventionally assumed to be highly sensitive to visual impacts, users of roads are generally assumed to be of low sensitivity.

Future Changes

13.32 None of the existing trees and hedgerows around the northern, eastern and southern boundaries of the site will be affected by the development. As this vegetation matures, some may be lost, although a managed programme would ensure that replacement planting will be carried out. The grassland on the roof of the reservoir will be removed, with the majority replaced and the quality of the grassland improved within the reservoir bowl. The grassland beyond the reservoir will be retained and managed.

Predicted effects

Sources of Impact

13.33 Impacts on townscape and visual amenity will arise from the construction features and the completed development. Construction features are assumed to include a compound, site offices, storage and parking areas, and a range of fixed and mobile plant, which may include cranes. These features will be variously visible from outside the site; most activities will be visible from Gondar Gardens, with taller plant and vehicle warning lights potentially seen over a wider area. However, these features will be temporary, and are not considered to give rise to individually significant effects.

13.34 The completed development will be the principal and long-term source of impact. This impact will derive mainly from the new residential dwellings, although lighting and vehicle movements may also be influential. The reservoir roof will be removed, with the walls and buttresses retained, and the interior of the reservoir will then be landscaped to create a grassland bowl.

Effect on Site Character

13.35 The site is previously developed land of an open character. The safety hoarding surrounding the reservoir roof and security fencing to Gondar Gardens currently affects the character of the open space. The development will represent a major change to its character, due to the introduction of built features that are likely to be relatively prominent to Gondar Gardens.

13.36 The sensitivity of the site is, however, considered to be low, since it enjoys a substantial degree of visual containment from the surrounding buildings. In addition, over 95% of the open part of the site will be retained as open space. The effect on its character is therefore predicted to be moderate. This effect is not considered to be significant, since the site's prevailing character as open space will not be lost, and it does not exert a decisive influence on the character of the surrounding area.

Effect on Views

13.37 The likely impacts are predicted to be high on views from Gondar Gardens, medium to high in views from the rear of properties in Sarre Road, and low on views from other residential properties. This reflects the location of the development close to the Gondar Gardens frontage, preserving the open character of the remainder of the site. Viewing opportunities from further away from the site are constrained by the urban fabric, and the degree of impact from these areas is negligible.

Effect on Townscape Character

13.38 Redevelopment of the reservoir structure will require the interim loss of the grassed roof to the structure, which will then be replaced in the reservoir bowl. The site is generally not visible from beyond the surrounding properties, and therefore exerts little influence on the surrounding townscape. The trees around the site perimeter, some of which may be visible from the wider area, will be retained.

13.39 The resulting effect on surrounding townscape character will be minor and not significant. Whist grassland will be removed (and will likely be lost if nothing is done on the site due to degradation of the reservoir structure), the development will not result in the loss of any key characteristics of the area.

Effect on the Setting of Built Heritage Assets

13.40 The development will not be visible from any Conservation Area and there are no statutorily listed buildings or scheduled monuments in the vicinity of the site. The reservoir has been added to the draft list of buildings of local interest, and both its fabric and immediate setting would experience a high degree of impact. However, the reservoir is considered to be of very limited significance (see Chapter 7 and Technical Annex 3), and in setting terms the effect is considered to be moderate and not significant.

Effects on Views of Hampstead Heath

13.41 There are no public views across the site towards Hampstead Heath, although it is understood that such views are gained from the upper floors of some properties. The only such views likely to be affected are those from the rear of properties in Sarre Road. The development is therefore considered to have only a minor effect on the role of Hampstead Heath as a green space within the wider landscape.

Effects on Visual Amenity

13.42 Residents with properties that overlook the reservoir site will experience views of the development (the majority being from the upper floors of their homes, rather than at ground floor). Some of these views will be filtered by vegetation and boundary planting. None of the windows within the proposed development will overlook surrounding properties.

13.43 The development is located to the front of the site, filling in a gap in the townscape with development of comparable height to the adjoining properties. The degree of impact to residents of Sarre Road in such views is likely to vary from low to high, depending on the degree of visibility. Assuming a medium magnitude of impact overall, and high receptor sensitivity, the resulting effect will be substantial and thereby significant.

13.44 Users of Gondar Gardens (road) will still experience views across the site through the gap between the two residential blocks. Following development, the frontage to Gondar Gardens will be improved. A high magnitude of impact on receptors of low sensitivity would result in a moderate effect that is not significant.

Summary of Effects and Mitigation

13.45 The predicted effects may be summarised as follows:

- Site Character: Moderate
- Wider views: Negligible
- Cultural heritage assets in surrounding area: None
- Setting of reservoir: Moderate
- Local residents overlooking the site: Minor (Hillfield Road/Agamemnon Road) to Moderate (Gondar Gardens) to Substantial (Sarre Road)
- Users of Gondar Gardens: Moderate

13.46 The effects will have both positive and negative implications. The removal of the redundant structure and the redevelopment of the currently unattractive site frontage would be beneficial. At the same time, the minor reduction in open space and development of the white land would accentuate the urban character of Gondar Gardens.

13.47 A landscaping strategy has been developed for the scheme development, including green and brown roofs to the dwellings, and retention of most of the open space to the rear of the dwellings as a nature reserve. No cumulative effects have been identified in relation to other developments in the area.

14. Transport

Introduction

14.1 This chapter considers the transport implications of the proposed development. It should be read in conjunction with the original **Transport Statement**, and the **Transport Statement Addendum Report**, which are presented as **Technical Annex 10**.

14.2 In transport terms the revised scheme is virtually identical to the previous proposal, the impact of which was considered to be acceptable by LB Camden's highways officer. A wholly new transport assessment is therefore not deemed to be necessary. Instead, this assessment focuses on the changes in policy that have occurred since the previous submission, and reconsiders the impact of development traffic in the context of a later year-of-opening (2016).

Policy Context

National Planning Policy Framework

14.3 The NPPF, adopted in March 2012, establishes a presumption in favour of sustainable development at paragraph 14:
"At the heart of the National Planning Policy Framework is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking." (Ref: NPPF, paragraph 14).

14.4 With regard to determining planning applications, paragraph 14 goes on to state:

"*For decision-taking this means:*

- *Approving development proposals that accord with the development plan without delay; and*
- *Where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless:*
- *Any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole; or*
- *Specific policies in this Framework indicate development should be restricted*." (Ref: NPPF, paragraph 14, emphasis added)

14.5 On this basis, planning permission for development should be approved unless the proposal is not consistent with development plan policies; and where any adverse impacts 'significantly and demonstrably' outweigh the benefits; or the policies within the NPPF indicate that the proposal should be restricted.

14.6 The specific transport policies of the NPPF are contained within Section 4. This sets out the importance of facilitating sustainable development by reducing the need to travel and re-balancing the transport system in favour of sustainable transport modes. Paragraph 32 of the NPPF states that:
"All developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment. Plans and decisions should take account of whether:

- *The opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;*
- *Safe and suitable access to the site can be achieved for all people; and*
- *Improvements can be undertaken within the transport network that cost-effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe*." (Ref: NPPF, paragraph 32, emphasis added)

14.7 The NPPF does not provide a definition of what a 'severe' impact would be. It is however clear that de-minimis transport impacts should not be a reason for refusal of planning permission. The degree to which the development complies with NPPF requirements may be summarised as follows:

- The development proposal provides opportunities for future residents to travel sustainably as the site is well located with respect to existing bus routes, National Rail, London Overground, and London Underground services;

- The proposed access arrangement is safe and suitable for the development, specifically, the level of achievable visibility at the driveway access is appropriate for the location given the likely frequency of use of the driveway and the lightly trafficked nature of Gondar Gardens, and has been provided to the specification of the LBC highways officer (set out for the previous planning application); and

- The transport impact of the development in terms of traffic, on-street parking, and road safety has been assessed and is considered to be minimal, and certainly not 'severe'. This is detailed further in the following section.

Other Policy

14.8 Updates to the London Plan since the previous application include the Revised Early Minor Alterations (published June 2012) and Housing Supplementary Planning Guidance (adopted November 2012). In terms of transport these documents set out revised standards/guidance with respect to parking provision for new developments. Compliance of the scheme with these standards is demonstrated in the TS Addendum.

14.9 The Camden Core Strategy and Development Policies were adopted in November 2010 and have not been updated since the previous planning application.

Baseline Conditions

Highway Network

14.10 Gondar Gardens is a residential road with a 30mph speed restriction in place. It is approximately 7m wide with parking bays located along the edge of the carriageway. At present, parking restrictions are in place which allow permit holder parking only between 1000-1200. Footways run along both sides of

Gondar Gardens and are generally 2.5 metres wide. Where crossovers are present dropped kerbs are provided to enable continuous access by wheelchair and pushchair users.

14.11 Traffic surveys of Gondar Gardens were undertaken during October 2010 for the previous application. The surveys comprised an Automatic Traffic Count (ATC) installed between Friday 16 October and Friday 22 October 2010. The survey recorded traffic flow, speed and vehicle composition along the section of Gondar Gardens immediately adjacent to the site for a 24-hour period between the dates specified.

14.12 In addition, an on-street parking beat survey was undertaken along Gondar Gardens on Tuesday 19 October 2010. Its purpose was to identify the level of on-street parking demand at specific times during the day. The survey considered parking demand on the complete section of Gondar Gardens from its junction with Mill Lane to the south through to Agamemnon Road to the north. On street parking demand was recorded at the following times: 0530, 1000, 1400, 1800 and 2300.

Traffic Flows

14.13 The background two-way traffic flows recorded by the ATC survey in 2010 are provided in Table 14.1 below, together with the level of HGV traffic and 85th percentile traffic speed. These are 24-hour traffic flows that are taken to reflect AADT values.

Table 14.1: Background Two-Way traffic Flows 2010

Highway Link	Total Daily Vehicles	Total HGVs	Percentage HGV	85th%ile Traffic Speed
Gondar Gardens - Northbound	203	1	0.4%	25.4 mph
Gondar Gardens Southbound	190	1	0.4%	24.6 mph

14.14 The background traffic flows have been updated to reflect the later date of occupation of the development, which is now anticipated to be towards the end of 2016 (rather than 2014 which was previously assessed).

14.15 Growth factors have been applied to the traffic flows used previously (for 2010) to bring them in line with the current year (2013) and the anticipated year of completion/full occupation of the development (2016). Local growth factors have been derived for the weekday morning and evening peak hours using TEMPRO (version 6.2) and the National Transport Model (dataset AF09).

14.16 The growth factors and total daily two-way background traffic flows on Gondar Gardens in 2010, 2013, and 2016 are summarised in Table 14.2. The daily traffic flows provide a reasonable proxy for the average annual daily traffic (AADT) flows.

Table 14.2: Updated Background Daily Traffic Flows on Gondar Gardens

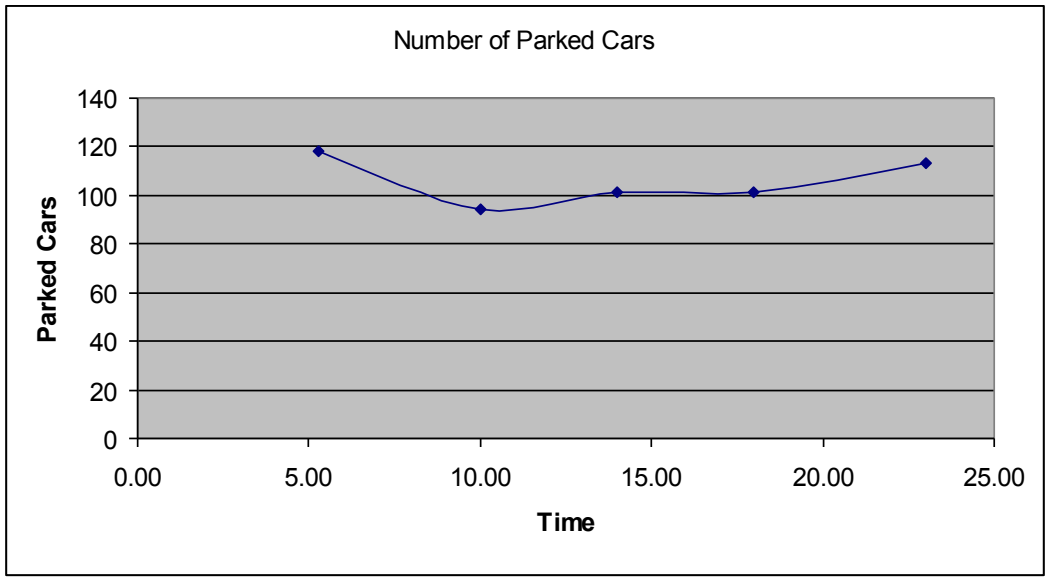
	Daily Traffic Flows (Total Vehicles)			Proportion of HGVs
	Northbound	Southbound	Two-Way	
2010 traffic flows (from ATC)	203 (inc. 1 HGV)	190 (inc. 1 HGV)	393 (inc. 2 HGVs)	0.5%
2010-2013 growth factor:	*1.0155*			
2013 traffic flows (estimated)	206	193	399	
2010-2016 growth factor:	*1.0444*			
2016 traffic flows (estimated)	212	198	410	

Source: 2010 traffic flows from previous ES, growth factors estimated using TEMPRO v.6.2

Parking

14.17 The level of parking demand, as indicated by the surveys, is shown in Fig 14.1. The survey suggests that parking demand is relatively consistent during the day and that the level of parking demand does not outstrip supply.

Fig 14.1: Observed On-Street Parking Demand



Other Modes

14.18 An assessment of site accessibility has been undertaken using the PTAL tool. This provides a rating of 2, which is considered "Poor" by TfL. However, the PTAL assessment does have limitations, since it strictly applies distance thresholds to public transport facilities.

14.19 As an example, if a PTAL assessment is carried out at the junction of Mill Lane/ Gondar Gardens, a rating of 4 is achieved. This, together with the opportunities

to travel to every day services and amenities on foot from the site, suggests that the site benefits from a good level of accessibility.

Demolition and Construction Traffic

14.20 Construction traffic will consist of delivery and worker traffic. It is understood that traffic movement for this purpose to/from the site would be limited to 5–10 arrivals and departures per day during the groundworks and construction stage, comprising deliveries by HGV vehicles. Worker traffic during this time will consist of 8–10 traffic arrivals and departures per day.

14.21 Traffic during internal fit-out will comprise in the order of 8-10 arrivals and departures per day, mainly smaller vehicles such as Transit type vans. It is likely that a temporary on-street parking suspension notice will be sought during construction. This will only apply to the on-street parking adjacent to the southbound carriageway of Gondar Gardens, extending to approximately 65m, possibly accompanied by temporary closure of the adjoining footway.

14.22 A temporary negative effect will be experienced by users of Gondar gardens, due to the inconvenience caused by construction traffic; by users of on-street parking, due to the temporary suspension of spaces; and possibly by pedestrians, due to temporary closure of the footway. A Construction Management Plan will be developed in order to minimise these effects, based on experience at other sites and secured by way of a Section 106 Agreement.

14.23 Access to the site by large vehicles will be limited to deliveries by rigid delivery vehicles rather than articulated lorries, due to the geometric constraints of surrounding streets. These vehicles would arrive at Gondar Gardens from the south via Mill Lane and the A5. Construction staff would be advised of the parking restrictions surrounding the site and encouraged to travel by non-car modes, supplemented by a restricted regime of on-site parking. The existing on-street parking restrictions on Gondar Gardens will prevent all-day parking by workers.

14.24 The temporary suspension of on-street parking along the site frontage will result in the loss of parking for some 11 vehicles during construction. There is sufficient available on-street parking for local residents in the area surrounding the site in order to meet this temporary shortfall. The temporary footway closure will ensure that pedestrians are kept away from the area of construction, with a diversion provided to the footway on the opposite side of Gondar Gardens.

14.25 Peak hour traffic flows (0800-0900) along Gondar Gardens are a maximum of 14 vehicles per hour each way. It is anticipated that the majority of construction traffic would not be using the highway network at this time, as work would generally start earlier. This suggests that there is ample opportunity for pedestrians to cross Gondar Gardens safely.

Traffic from the Completed Development

14.26 The increase in traffic flows on the local highway network in 2016 as a result of the completed development is summarised in Table 14.3.

Table 14.3: Daily Traffic Flows on Gondar Gardens with Completed Development

	Daily Traffic Flows (Total Vehicles)		
	Northbound	Southbound	Two-Way
2016 background traffic flows, i.e. without development	212	198	410
Completed development traffic flows	40	40	80
2016 traffic flows with completed development	252	238	490
Proportional increase	19%	20%	20%

Source: Completed development traffic flows from previous ES

14.27 The traffic generated by the proposals would result in a maximum increase of 20% in the level of traffic on the surrounding road network on the basis of the AADT values considered. The "Guidelines for the Environmental Assessment of Road Traffic", published by the institute of Environmental Management and Assessment (IEMA), sets out the need for further assessment works in situations where development traffic results in an increase of 30% or more. No further assessment is therefore required in this case.

14.28 It is important to note that the increases in traffic shown are across the day as a whole; when considering the morning and evening peak hours of demand on the local highway network, the impact is even less – i.e. an increase of approximately seven vehicles in the morning peak hour (8-9am) and five vehicles in the evening peak hour (5-6pm) on a lower base flow.

14.29 The introduction of the proposed access into the development would require the permanent removal of 25m of on-street parking in order to ensure that adequate visibility is achieved. Since the existing access to the site would be closed, a section of replacement on-street parking could be provided here, resulting in a net loss of 18m of on- parking, which is equivalent to three vehicles.

14.30 This loss would not have a negative impact on the availability of on-street parking. Future residents of the development will not be permitted to purchase a parking permit and therefore will not be able to park on Gondar Gardens throughout the day. Visibility in terms of access arrangements have been assessed and will comply with the relevant guidance standards set out in Manual for Streets 2 (MfS). In light of the above, no further assessments are required and the impact of development traffic would be negligible.

Residual Effects

14.31 A Construction Management Plan will be agreed with LB Camden and will include measures to minimise adverse effects on traffic and accessibility, e.g. designated HGV routes and safe pedestrian diversions. With such measures in place, the residual effects during construction are not anticipated to be significant.

14.32 On the basis of the AADT calculations, the changes in traffic flow arising from the development would not be material and would not lead to a worsening of either

highway conditions or pedestrian access or safety. The operational effects are therefore considered to be negligible.

Cumulative Effects

14.33 It is understood, through liaison with the LBC planning officer, that a number of developments have been granted permission within the vicinity of the application site. The most significant of the permitted schemes is for 39 residential units on Mill Lane close to the junction with Gondar Gardens. An assessment of the transport impact of that scheme was not undertaken as part of the application. It is therefore considered that the transport impact of that scheme is negligible.

14.34 A further four small schemes have been permitted on Mill Lane, each providing fewer than six residential dwellings. These schemes are not envisaged to result in an increase in traffic flows on Gondar Gardens. In conclusion, no adverse cumulative effects are anticipated to arise as a result of interaction between the proposed development and other developments in the area.