Hillingdon Hospital

Ecological Impact Assessment

Hillingdon Hospitals NHS Foundation Trust

Project number: 60642181
THHR_01-ACM-ZZ-XX-RP-Y-000018

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Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
V1	16.12.2021	Draft for comments		Paul Stannard	Regional Director
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Executive Summary

This Ecological Impact Assessment has been prepared by AECOM Ltd to accompany hybrid planning application being submitted by the Applicant, Hillingdon Hospitals NHS Foundation Trust, to the London Borough of Hillingdon.

The Ecological Impact Assessment has been produced to inform the redevelopment of the existing Hillingdon Hospital site (the Site) within the London Borough of Hillingdon to compile the results of the terrestrial ecology surveys carried out at the Site including, mitigation measures and enhancements for the Proposed Development.

This report compiles the assessment results of the biodiversity features identified within the Site from the results of the Preliminary Ecological Appraisal (PEA) and the further species surveys carried out in 2021. These features included sites designated for their biodiversity value, notable habitats, legally protected and notable species (bats, mammals, breeding birds inclusive of Wildlife and Countryside Act Schedule 1 bird species, stag beetle), and invasive non-native plant species.

A summary of the effects, impacts, mitigation and the resulting residual impact is provided for each of the biodiversity features within Table 9. The detailed survey reports for each of the receptors are appended to this report and cross referenced within Table 2.

Following implementation of the mitigation measures outlined in Table 9 and Section 5 and detailed within the relevant survey reports, there are unlikely to be any adverse significant negative effects to biodiversity as a result of the Proposed Development. There will be positive effects for woodland and watercourse habitats, common (i.e. urban associated) breeding birds, and commuting and foraging bats.

Additional biodiversity enhancements are proposed in Section 6 to further provide benefits to wildlife, apart from the current extent of habitat creation embedded in the landscape strategy.

Overall, there will be a net gain in biodiversity value.

1. Introduction

1.1 Background

This Ecological Impact Assessment (EcIA) has been prepared by AECOM Ltd to inform a hybrid planning application being submitted by the Applicant, Hillingdon Hospitals NHS Foundation Trust, to the London Borough of Hillingdon. The EcIA is to inform the hybrid planning application for the redevelopment of the Hillingdon Hospital site (hereafter referred to as the Proposed Development). The footprint of the Proposed Development (hereafter referred to as the Site) is shown by the red line boundary on Figure 1 in Appendix A.

The hybrid planning application is for:

- full application for planning permission to demolish the existing buildings and redevelopment of the Site to provide the new Hillingdon Hospital, multi-storey car park and mobility hub, vehicle access, highways works, associated plant, generators, substation, new internal roads, landscaping and public open space, utilities, servicing area, surface car park/ expansion space, and other works incidental to the proposed development; and
- outline planning application (all matters reserved, except for access) for the demolition of buildings and structures on the remaining site (excluding the Grade II Furze and Tudor Centre) for a mixed-use development comprising residential (Class C3) and supporting Commercial, Business and Service uses (Class E), new pedestrian and vehicular access; public realm, amenity space, car and cycling parking.

The purpose of this EcIA is to demonstrate how the Proposed Development accords with relevant national and local planning policy and legislation. Further details on relevant planning policy and legislation are provided in Section 2 and Appendix B.

This EcIA also details the method followed to undertake for the assessment, describes the biodiversity baseline relevant to the Proposed Development and evaluates the importance of the biodiversity features present within the Study Area (see Section 3.3). The EcIA characterises the impacts (both positive and negative) of the Proposed Development on important biodiversity features or also known as Important Ecological Features (IEF)[1], and where necessary, sets out appropriate and proportionate avoidance, mitigation and compensation measures that will be delivered by the Applicant. The significance of any residual effects (both positive and negative) of the Proposed Development on the IEFs has been assessed, and opportunities for enhancement are identified with the overall aim of achieving biodiversity net gain through the Proposed Development.

1.2 The Application Site

The Site is located at Pield Heath Rd, Uxbridge, postcode UB8 3NN, in the London Borough of Hillingdon, at approximate central Ordnance Survey national grid reference TQ 06826 81850.

Hillingdon Hospital is located to the south of Pield Heath Road, bound by Royal Lane to the west, and Colham Green Road to the east. The Site is located within the Brunel Ward. The site comprises a ten storey block built in the 1960s and a mix of other hospital buildings scattered across the Site. Many of the acute beds are in single storey wards built in the 1940s, which are in very poor condition.

The remainder of the Site consists mainly of surface level car parking, interspersed with pockets of landscaping.

There are two Tree Preservation Orders (TPOs) within the Site: one south of the Furze and the second is west of the Woodlands Centre. A watercourse flows west-east crossing both TPOs and culverted under the service road and partially under the Woodlands Centre. On the east of the Site is a Grade II Listed Building, the Furze.

There are several points of access to the Site; the main entrance is from Pield Heath Road with a separate access for the Accident and Emergency (A&E) department. There are three separate access points from Royal Lane and a separate access from Colham Green Road. Cycle access is only through the vehicular traffic road path. Uxbridge town centre is approximately 2km to the north west.

[1] Important Ecological Features are habitats, species, ecosystems and their functions and processes that are of conservation importance and could potentially be affected by the Scheme. Various characteristics contribute to a feature's importance including its rarity, diversity, size, population trend, distinctiveness, naturalness, fragility, typicalness, recorded history, potential value and intrinsic appeal.

The west of the Site along Royal Lane comprises two storey detached and semi-detached residential properties, to the north-west corner of the Site, there is a three-four storey flatted residential block along Pield Health Road opposite the entrance to the Outpatient Department. The Site is shown in Figure 1 in Appendix A.

1.3 The Proposed Development

The Proposed Development will comprise the demolition of buildings and the redevelopment of the Site to provide a new Hillingdon Hospital, a mixed-use development (residential and commercial), multi-storey and surface car and cycle parks, vehicle access improvements, landscaping and public open spaces, utilities and associated works (see Image 1of the Site below).

The detail planning application comprises:

- replacement hospital building (79,603.6 sqm gross internal area or GIA) of basement, ground plus seven storeys on the western extent of the site incorporating a linked mobility hub and multi storey car park (MSCP) for 781 car spaces;
- high quality landscaping buffer fronting Royal Lane;
- new bus stop arrangements and improved connections to the hospital on Pield Heath Road;
- large central green open space for use by the hospital and wider community;
- 161 surface level car parking spaces with the ability to cater for up to 14,000 sqm of expansion space for future hospital expansion (if required).

The outline planning application includes:

- up to 31,503 square metres of residential, comprising 327 dwellings;
- Plots – P01, P02, P04 (mixed use blocks with supporting provision of 800sqm of town centre uses (Use Class E) at ground floor level):
- up to 302 car parking spaces, and 515 cycle parking spaces;
- improved permeability and public access routes through the Site; and
- high quality public realm and landscaped gardens throughout the Site.

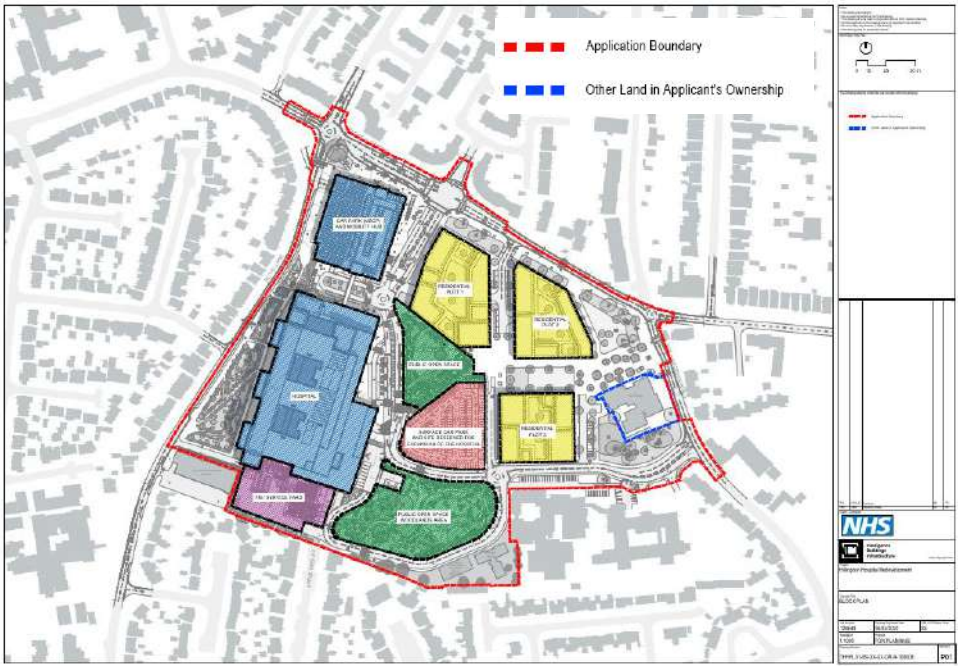

Image 1. Block Plan. IBI Drawing reference THHR_01-IBI-XX-XX-DR-A-100008

The Proposed Development will be carried out in phases (see Image 2 below).

- Phase 1A – comprising the demolition of the western buildings and construction of the new hospital, multi storey car park and access;
- Phase 1B – interim elements that will eventually be modified or replaced by the final part (Phase 1C) of the detailed application being built;
- Phase 1C – construction of elements that can only be built post demolition of the hospital i.e. the triangle of public open space, surface car park, woodland, new road/ junction and bus stops and roads.; and
- Phase 2 – comprising the demolition of the current hospital and the construction of the outline application for the residential buildings.

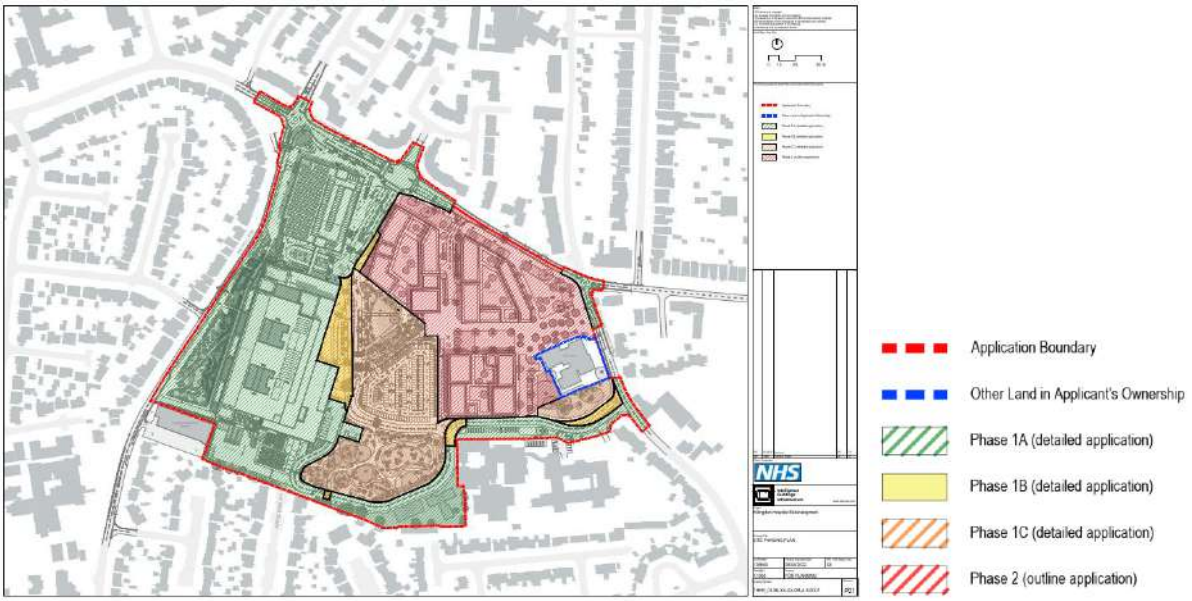

Image 2. Site Phasing Plan. IBI Drawing reference THHR_01-IBI-XX-XX-DR-A-100007

The landscape strategy includes the retention of woodland habitat to the south and south-east of the Site and new planting and seeding, including the creation of green areas as follows:

- along the south western boundary (east of the new Hospital building) comprising a wetland attenuation park, including depressions with grasses for damp conditions, rain gardens, new tree planting and footpaths;
- at the centre of the Site (central green space), including water attenuation basins with damp grasses and rain gardens and tree planting to the west and south and a central amenity grassland surrounded by an area of bulbs and wildflowers;
- green space to the northeast of the existing woodland, extending the southern green area. It will include a fluvial flood mitigation basin with grasses for damp conditions and plants for rain gardens. A mixed planting, including trees will be also included;
- to the northeast of the Site (corner Pield Heath Rd with Colham Green Rd);
- green wall (approximately 10m wide and 9m in height) to the southeast of the new hospital, near the ambulance yard;
- within the residential courtyards; and
- green roofs on the hospital and most of the residential new buildings.

See Intelligence Buildings Infrastructure (IBI) Design and Access Statement (DAS), document THHR_01-IBI-ZZ-ZZ-RP-A-250010) for more details and Image 3.

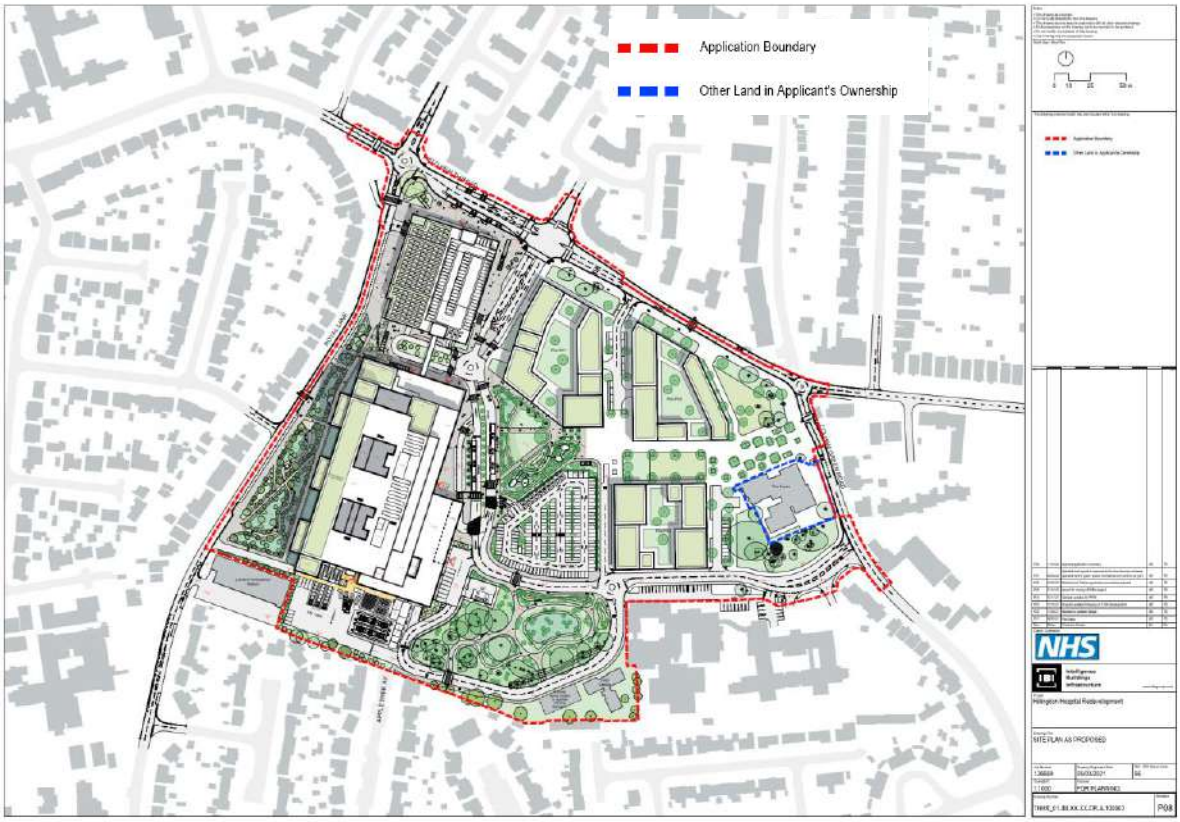

Image 3. Site Plan including landscaping. IBI Drawing reference THHR_01-IBI-XX-XX-DR-A-100003

2. Legislative and Planning Context

2.1 Introduction

The below legislation and planning policy documents were considered when planning and undertaking this EcIA using the methods described in Section 3 when identifying potential constraints to the Proposed Development, and when making recommendation for design options and mitigation as discussed in Section 5. Compliance with legislation may require the attainment of relevant protected species licences prior to implementation of the Proposed Development.

Further information on the requirements of the below legislation and planning policies are provided in Appendix B.

2.2 Wildlife Legislation

The following wildlife legislation is potentially relevant to the Site:

- Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitat Regulations)[2];
- Wildlife and Countryside Act (WCA) 1981 (as amended)[3];
- Environment Act 2021[4];
- Countryside and Rights of Way (CRoW) Act 2000[5];
- Natural Environment and Rural Communities (NERC) Act 2006[6];
- The Wild Mammals (Protection) Act 1996[7];
- Protection of Badgers Act 1992[8];
- The Hedgerows Regulations 1997[9]; and
- Invasive Alien Species (Enforcement and Permitting) Order 2019[10].

2.3 Planning Policy

The following Planning Policy is potentially relevant to the Site:

- National:
  - National Planning Policy Framework (NPPF)[11];
- Regional:
  - Mayor's Biodiversity Strategy (2002)[12];
  - Mayor's London Environment Strategy (2018)[13]; and
  - London Plan. The Spatial Development Strategy for Greater London (2021)[14].
- Local:
  - London Borough of Hillingdon Local Plan Part 1: Strategic Policies (Adopted 2012)[15]; and

[2] HMSO (2018). Conservation of Habitats and Species Regulations 2017 (as amended). HMSO, London. http://www.legislation.gov.uk/uksi/2017/1012/contents/made
[3] HMSO (1981). Wildlife & Countryside Act 1981 (as amended). https://www.legislation.gov.uk/ukpga/1981/69
[4] Parliament, House of Commons. Environment Act (2021). London: The Stationery Office. https://bills.parliament.uk/bills/2593
[5] HMSO (2000). Countryside and Rights of Way Act 2000. https://www.legislation.gov.uk/ukpga/2000/37/contents
[6] HMSO (2006). Natural Environment and Rural Communities Act 2006. https://www.legislation.gov.uk/ukpga/2006/16/contents
[7] HMSO (1996). Wild Mammals (Protection) Act 1996. https://www.legislation.gov.uk/ukpga/1996/3/contents
[8] HMSO (1992). Protection of Badgers Act 1992.https://www.legislation.gov.uk/ukpga/1992/51/contents
[9] HMSO (1997). Hedgerow Regulations 1997. http://www.legislation.gov.uk/uksi/1997/1160/contents/made
[10] HMSO (2019). Invasive Alien Species (Enforcement and Permitting) Order 2019. https://www.legislation.gov.uk/uksi/2019/1213/contents/made
[11] Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework. https://www.gov.uk/government/collections/revised-national-planning-policy-framework
[12] Mayor of London (2002). Connecting with London's nature. The Mayor's Biodiversity Strategy. https://www.london.gov.uk/sites/default/files/biodiversity_strategy.pdf
[13] Mayor of London (2018). London Environment Strategy. https://www.london.gov.uk/what-we-do/environment/london-environment-strategy
[14] Greater London Authority (2021). The London Plan. The spatial development strategy for Greater London. March 2021. https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/london-plan-2021
[15] https://www.hillingdon.gov.uk/local-plan

– London Borough of Hillingdon Local Plan Part 2: Development Management Policies (January 2020)[16].

2.4 Other Relevant Local Guidance

- London Biodiversity Action Plan (Greenspace Information for Greater London, 2007)

3. Methods

3.1 Scope of the EcIA

The EcIA has been undertaken with reference to the Charted Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the United Kingdom[17]. The aim of the assessment is to:

- define the Study Area for the assessment, which considers the Zone of Influence[18] (ZoI) of the Proposed Development;
- determine the ecological baseline for the Proposed Development within the Study Area;
- determine the biodiversity importance of each ecological feature recorded during the desk and field-based assessments to determine which of those features are IEFs in the context of the EcIA;
- assess the potential impacts on IEFs because of the Proposed Development;
- design suitable avoidance and mitigation measures to address potential impacts;
- determine the significance of any residual effects and, if necessary, design suitable compensation measures to address significant residual effects; and
- identify opportunities for biodiversity enhancements.

3.2 Important Ecological Features

The EcIA has focused on the potential impacts to important ecological features (habitats, species, ecosystems and their functions/ processes) that are considered important and potentially affected by the Proposed Development. The EcIA has not carried out detailed assessments of features that are sufficiently widespread, unthreatened and resilient to impacts and which will remain viable and sustainable should the Proposed Development proceed as detailed in Section 1.3.

For this EcIA, the following are considered IEFs requiring detailed assessment:

- sites statutorily designated for their biodiversity value;
- sites non-statutorily designated for their biodiversity value;
- habitats and species of principal importance (HoPI / SoPI) for the conservation of biodiversity in England[19];
- ancient woodland and veteran trees;
- individual habitat types or mosaics that may not quality as HoPI but form an important part of ecosystems and their function;
- legally protected species[20];
- Local Biodiversity Action Plan (LBAP) priority species and habitats[21];

[16] https://www.hillingdon.gov.uk/local-plan
[17] CIEEM (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Chartered Institute of Ecology and Environmental Management, Winchester.
[18] The Zone of Influence is the area over which ecological features may be affected by biophysical changes because of the Proposed Development and associated activities.
[19] Listed under S41 of the *Natural Environment and Rural Communities Act 2006*. http://publications.naturalengland.org.uk/publication/4958719460769792.
[20] Legally protected species are those listed on the *Wildlife and Countryside Act 1981, The Conservation of Habitats and Species Regulations 2017*, *Protection of Badgers 1992*.
[21] Greenspace Information for Greater London, 2007. London Biodiversity Action Plan.

- Species of conservation concern, Red Data Book (RDB) species – UK[22]; and
- Birds of Conservation Concern – UK[23].

The EcIA has also considered plant species listed as invasive on Schedule 9 of the Wildlife and Countryside Act 1981 in Britain (e.g. Japanese knotweed and giant hogweed) and on Schedule 2 of the Invasive Alien Species (Enforcement and Permitting) Order (e.g. Himalayan balsam).

3.3 Study Area

Desk and field-based studies have been undertaken to establish the biodiversity baseline that may be impacted by the Proposed Development. The scale of the Study Areas varies dependent upon the ecology of the feature being assessed and its vulnerability to change resulting from construction and operation of the Proposed Development. Ecological features outside of the Study Area are unlikely to be affected by the Proposed Development and are not considered in this EcIA.

Table 1 summarises the Study Area for the Proposed Development.

Table 1. Background Records and Field Surveys Study Areas

Ecological Feature	Background Records Study Area (km from the red line boundary)	Field Survey Study Area
International statutory designations (SAC, SPA, Ramsar)	5	NA
National statutory designations (SSSI, NNR)	5	NA
Other statutory designations (LNR)	2	NA
Non-statutory designations (SINC, LWS)	1	Red line boundary
Ancient woodlands	0.5	Red line boundary
Priority Habitats (HoPI)	0.5	Red line boundary
Protected species and Priority Species (SoPI)	1	Red line boundary

3.4 Desk Study

A desk study was undertaken to obtain background records relevant to the Proposed Development and the EcIA, including records of sites statutorily and non-statutorily designated for their biodiversity value and protected and notable species within the Study Areas detailed above in Table 1. The data obtained provide contextual information for the scope of field surveys, to aid the evaluation of field survey results, and to provide supplementary information where complete field survey coverage has not been possible.

Data were obtained from the following organisations in November 2020 and 2022:

- Multi-Agency Geographic Information for the Countryside (MAGIC) website[24] (accessed several times from November 2020 to March 2022);
- Greenspace Institute for Greater London[25] (GiGL) (records received in November 2020); and
- The London Bat Atlas[26].

[22] Species Status Assessment project published by Joint Nature Conservation Committee (JNCC) in 1999. http://jncc.defra.gov.uk/default.aspx?page=3352
[23] (Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015). Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man.
[24] https://magic.defra.gov.uk/
[25] GiGL, 2020. An Ecological Data Search for Hillingdon Hospital. Report ref. 14385. 24 November 2020.
[26] Law, R. (2015) The London Bat Atlas, London Bat Group.

3.5 Field Surveys

Field surveys were designed to collect information on the habitats and species present that may be affected by the Proposed Development. The geographical areas across which field surveys were undertaken were the areas over which ecological features are likely to be subject to impacts from the construction or operation of the Proposed Development.

Table 2 summarises the field surveys that were undertaken to inform the EcIA.

Detailed methods for collection of field survey data, and any specific limitations and deviations encountered during these surveys are included in the reports appended to this EcIA.

Table 2. Field surveys undertaken to inform the EcIA

Ecological Feature	Survey Type	Date(s) of Survey(s)	Method
Habitats	Extended Phase 1 Habitat Survey (see Appendix D[27])	November 2020	JNCC (2010)[28]
	River Condition Assessment	July 2021	Modular River Physical (MoRPh) Survey[29]
Bats	Ground Level Preliminary Roost Assessment (see Appendix E[30])	November 2020	Bat Conservation Trust (BCT) Guidelines (2016)[31]
	Bat Emergence / Re-entry Surveys (see Appendix E)	May – September 2021	
	Internal Inspection of The Furze (see Appendix E)	February 2021	
Birds	Peregrine falcon and Breeding Bird Survey (common birds census) (Appendix F[32])	February – July 2021	Hardey *et al*. (2009)[33] Bibby *et al.* (2000)[34]
Invasive Non-native Species	Invasive Non-native Species Walkover (Appendix G[35])	November 2020 and June 2021	Environment Agency (2013)[36] Royal Institute of Chartered Surveyors (RICS, 2012)[37] Property Care Association (PCA, 2018)[38]

3.6 Assessment criteria

This EcIA broadly follows CIEEM's Guidelines for Ecological Impact Assessment in the United Kingdom with the following clarifications specific to the Proposed Development.

3.6.1 Nature conservation evaluation

Several criteria have become accepted as a means of assessing the nature conservation importance of a defined area of land which are set out in *A Nature Conservation Review*[39] and include diversity, rarity and naturalness.

[2727] AECOM (2022). Hillingdon Hospital. Preliminary Ecological Appraisal. THHR-ACM-ZZ-XX-RP-Y-000010.
[28] Joint Nature Conservation Committee (2010). *Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit.* Joint Nature Conservancy Committee: Peterborough
[29] https://modularriversurvey.org/river-condition/
[30] AECOM (2022). Hillingdon Hospital. Bat Survey Report. THHR-ACM-ZZ-XX-RP-Y-000013.
[31] Collins, J. (editor) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (*3rd Edition). Bat Conservation Trust: London.
[32] AECOM (2022). Hillingdon Hospital. Peregrine Falcon and Breeding Bird Report - CONFIDENTIAL report. THHR-ACM-ZZ-XX-RP-Y-000012.
[33] Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2009). Raptors: A Field Guide for Surveys and Monitoring
[34] Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S.H. (2000). Bird Census Techniques, 2nd Edition. British Trust for Ornithology (BTO)
[35] AECOM (2022). Hillingdon Hospital. Non Native Invasive Plant Species Assessment. Biosecurity and Management Plan. THHR-ACM-ZZ-XX-RP-Y-000011.
[36] Environment Agency (2013). *Managing Japanese Knotweed on Development Sites: The Knotweed Code of Practice.* Environment Agency, Bristol.
[37] RICS (2012). *Japanese Knotweed and Residential Property Information Paper*.
[38] PCA (2018). *Code of practice for the management of Japanese knotweed.* PCA, Huntingdon.
[39] Ratcliffe, D. (1977). *A Nature Conservation Review*.

For this EcIA, the nature conservation importance (or for this EcIA equivalent to biodiversity importance) or potential value of an ecological feature is determined within the following geographic context:

- **International** (i.e. Europe): such as Special Areas of Conservation (SAC) or Special Protection Areas (SPA);
- **National** (i.e. England): such as Sites of Special Scientific Interest (SSSI);
- **Regional** (i.e. Southern England): such as populations of species which enrich biodiversity on a regional scale and whose loss would significantly affect the species national distribution;
- **County** (i.e. Greater London and Buckinghamshire): such as Local Nature Reserves (LNR) or populations of species which qualify for Local Wildlife Site (LWS) designation;
- **District** (i.e. Hillingdon): ecological features at borough level such as Sites of Importance for Nature Conservation (SINCs);
- **Local** (i.e. the Site and surroundings)**:** undesignated ecological features such as old hedges, woodlands, ponds; and,
- **Negligible**: the feature either has little or no importance for biodiversity, or is considered sufficiently widespread, unthreatened and resilient to impacts and will remain viable and sustainable.

Ecological features of Local or higher biodiversity importance are considered IEFs requiring detailed assessment. In addition, for the EcIA to demonstrate how the Proposed Development will comply with statutory requirements and policy objectives for biodiversity, some ecological features present within the Study Area are IEFs even if they are not of Local or higher biodiversity importance. These features are:

- Badgers, legally protected through the Protection of Badgers Act, 1992;
- Nesting Birds, legally protected through the Wildlife and Countryside Act, 1981; and,
- Non-native invasive plant species, listed on Schedule 9 of the Wildlife and Countryside Act, 1981.

3.6.2 Assessment (Significance) criteria

When describing potential impacts (and where relevant the resultant effects) reference is made to the following characteristics:

- Beneficial/adverse: i.e. is the change likely to be in accordance with biodiversity objectives and policy:
  - Beneficial (i.e. positive) – a change that improves the quality of the environment, or halts or slows an existing decline in quality e.g. increasing the extent of a habitat of conservation value;
  - Adverse (i.e. negative) – a change that reduces the quality of the environment. e.g. destruction of habitat or increased noise disturbance.
- Magnitude: the size, amount or intensity of an impact, described on a quantitative basis where possible;
- Spatial extent: the spatial or geographical area or distance over which the impact/effect occurs;
- Duration: the time over which an impact is expected to last prior to recovery or replacement of the resource or feature. The likely duration of the impact should be quantified, and consideration given to how this duration relates to relevant ecological characteristics such as a species' lifecycle. However, it is not always appropriate to report the duration of impacts in these terms. The duration of an effect may be longer than the duration of an activity or impact;
- Reversibility: i.e. is the impact temporary or permanent.
  - Temporary impact – is one from which recovery is possible or for which effective mitigation is both possible and enforceable.
  - Permanent effect – is one from which recovery is either not possible, or cannot be achieved within a reasonable timescale (in the context of the feature being assessed); and
- Timing and frequency: consideration of the point at which the impact occurs in relation to critical life-stages or seasons.

Potential impacts on relevant ecological features are assessed and a judgement reached on whether or not the resultant effect on conservation status or structure and function is likely to be significant. This process takes into

consideration the characteristics of the impact, the sensitivity of the ecological feature concerned, and the geographic scale at which the feature is considered important. The CIEEM guidance state that:

'*For the purposes of [assessment] a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general…*'

In broad terms, significant effects encompass impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution).

For designated sites, defined sites and ecosystems, the assessment considers how the proposed development is likely to affect the conservation objectives for the site and/or its interest/qualifying features. For ecosystems, consideration is given to whether the proposed development is likely to result in a change in ecosystem structure and/or function.

For species and habitats, the effects of impacts on individual habitats and species are considered in relation to 'conservation status' which is defined in the CIEEM guidance as follows:

- Species: conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area; and
- Habitats: conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.

Conclusions on the significance of effects are either:

- Not significant (i.e. no effect on structure and function, or conservation status); or
- Significant (i.e. structure and function, or conservation status is affected).

Such judgements are based, wherever possible, on quantitative evidence. However, where necessary the professional judgement of an experienced ecologist has been applied consistent with CIEEM guidance.

For those effects considered significant, the effect has also been characterised as either adverse or beneficial and qualified with reference to the geographic scale at which the effect is significant (e.g. an adverse effect significant at a national level).

The scale of significance of an effect may not be the same as the geographic context in which the feature is considered important. For example, an effect on a SoPI for nature conservation at the national level may not have a significant effect on the conservation status of the national population of that species.

CIEEM guidance discourages the use of the matrix approach for determining the significance of effects on ecological features. It is considered that this approach can lead to value-based judgements and an evaluation which is subjective and not underpinned and supported by a clear evidence base. Accordingly, for the purposes of this assessment professional judgement has been used.

3.6.3 Approach to mitigation

Where impacts on IEFs are predicted, the approach to mitigation engages the following hierarchy:

1. avoid features where possible;
2. minimise impact by design, method of working or other measures, for example by enhancing existing features; and
3. compensate for significant residual impacts (e.g. by providing suitable habitats elsewhere).

The highest level of the hierarchy has been applied where possible. Only where this cannot reasonably be adopted have lower levels been considered. The rationale for the proposed level of mitigation has been detailed in Section 4, including sufficient detail to show that these measures are feasible and will be provided by the Applicant.

NPPF (2018) states that "*opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity*". Throughout this EcIA, the potential to secure biodiversity enhancement, and therefore overall net gain, has been considered.

3.7 Limitations to the Assessment

The ecological surveys undertaken to support this EcIA have not produced a complete list of plants and animals and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future. However, the results of these surveys have been reviewed and are considered to be sufficient to undertake this EcIA.

Limitations to the undertaking of habitat or protected species surveys were identified and these are set out in the survey reports attached at this EcIA. No significant limitations were identified that were considered material to data collected or the ecological impact assessment presented in this report.

None of these limitations either singly or in combination is significant enough to affect the baseline, impact assessment and resulting mitigation or enhancement referenced in this report.

4. Baseline Conditions and Biodiversity Importance

The following sections provide a summary of the baseline conditions relevant to the Proposed Development and the assessment of potential impacts of the Proposed Development on biodiversity. The baseline is based on the results of the desk and field-based studies undertaken within the Study Area to inform this EcIA.

With regard to background data, recent records are those no older than 10 years from the date of the desk study. Records outside of this period are historical and have only been reported where more recent records do not exist.

Ecological features which are present or considered likely to be present within the Study Area have been assigned a geographical scale of biodiversity importance in line with the criteria detailed in Section 3.6.1.

Where it has not been possible to achieve 100% survey coverage for a habitat or species, the baseline conditions have been based on a reasonable precautionary approach.

4.1 Sites Designated for their Biodiversity Value

Table 3 summarises the sites designated for their biodiversity value situated within the Study Area. They are in biodiversity importance order and then distance (closest in each importance category first).

Table 3. Designated Sites for their Biodiversity Value within Study Area (SSSI = Site of Special Scientific Intertest; SINC = Site of Interest for Nature Conservation)

Designated Site	Reason for Designation	Location of Designated Site[40]	Biodiversity Importance
SSSIs:			
Fray's Farm Meadows SSSI	One of the last remaining areas of relatively unimproved wet alluvial grassland habitat in the Greater London area and Colne Valley. The meadows contain a variety of grassland communities through to areas of tall sedge. The linear features of the site - ditches, hedges and railway embankment - add further habitat diversity, and contribute to the richness of plants and animals present.	3.8 km north of the Site	National
Kingcup Meadows and Oldhouse Woods SSSI	Consists of a mosaic of habitats adjacent to the River Alderbourne, which includes woodland, unimproved pastures and semi and unimproved meadowland. The fields are comprised of dry grassland, wet grassland and areas of fen and swampy vegetation. Oldhouse Wood has been managed in the past as coppice-with-standards and retains a wide range of native trees and shrubs, along with many woodland species indicative of ancient woodland.	4.2 km north west of the Site	National
Denham Lock Wood SSSI	Diverse area of open mire and wet woodland which shows a zonation of wetland habitats. The woodland herb flora is particularly varied and reflects subtle differences in topography and drainage.	4.3 km to the north of the Site	National
SINCs:			
The Grove SINC	A sequence of shaded ponds runs the length of this nature reserve, surrounded by lush grassland and woodland.	210 m to the north of the Site.	District
River Pinn and Manor Farm Pastures SINC	This stretch of the River Pinn is bordered on both sides by open grassland, much of which comprises rank grasses and tall herbs with scattered scrub, although some of it is managed as sports fields. The river is generally lined by trees and shrubs.	400 m to the west-north west of the Site.	District
Uxbridge and Hillingdon Cemeteries SINC	These two cemeteries contain flower-rich grassland. Patches of taller grasses and flowers provide variation. The gravestones and walls are well-vegetated with lichens and bryophytes. This SINC includes an area of woodland consisting of pedunculate oak (*Quercus robur*), ash (*Fraxinus excelsior*) and sycamore (*Acer pseudoplatanus*) with an understory of elder (*Sambucus nigra*) and rhododendron (*Rhododendron ponticum*).	650 m to the north-north west of the Site	District
Stockley Park Country Park SINC	This large, hilly country park contains extensive grassland and other habitats including tall herbs, scrub, trees and hedgerows, much of which has been planted. A small pond supports a dense stand of common reed (*Phragmites australis*).	675 m to the south-south-east of the Site	District

[40]Where designated sites are situated outside of the Application Site boundary, the distance and direction is given at the closest point of the designated site from the Application Site

4.2 Habitats

Table 4 summarises the records of HoPI[41], ancient woodlands, and protected and/or notable[42] flora[43] (including veteran trees[44]) within the Study Area. No ancient woodlands were within 500m of the Site.

Two woodland areas with Tree Protection Orders (TPOs) were present within the south and south-east of the Site (Figure 1 in Appendix A).

The River Pinn is located approximately 400m west of the Site.

Table 4. HoPI, Ancient Woodland and Protected and Notable Flora within Study Area

Habitat Feature	Habitat Type	Location of Habitat
Deciduous Woodland	HoPI	located 300m to the north of the Site
River	HoPI	Located 400m west of the Site
Traditional Orchards	HoPI	located 450m to the north west of the Site
Deciduous Woodland	HoPI	located 500m to the north west of the Site

Table 5 summarises the results of the Phase 1 Habitat Survey. Habitats are shown on Figure 1 provided in Appendix A, with specific features highlighted by target notes (TNs). TN descriptions are provided in Appendix C. See full details and photographs in the Preliminary Ecological Appraisal report (Appendix D).

Table 5. Habitats within Study Area

Habitat Type	Summary Description of Habitat	Location of Habitat	Area of Habitat/ Distance of Linear Feature	% of the Site
Hard Standing	Road, paths and car parks	Across the Site	4.26 ha	37.3%
Building	Buildings associated to the hospital	Across the Site	2.77 ha	24.2%
Not Accessed	Courtyards and existing construction zones	Amon buildings across the Site	1.82 ha	15.9%
Cultivated/ Disturbed Land - Amenity Grassland	Blocks of amenity grassland that forms part of the current landscaping of the Site around the buildings	Across the Site	1.29 ha	11.3%
Bare Ground	Mainly areas where buildings were removed. (TN11 and TN15)	West and south-eastern areas of the Site	0.58 ha	5.0%
Broadleaved Woodland - Semi-natural	Woodland suitable to qualify as the HoPI Lowland Mixed Deciduous Woodland. Few blocks dominated by pedunculate oak to the south and two blocks of woodland frequented by Turkey oak (*Quercus cerris*) to the east.	Eastern (TN5 and TN6) and southern areas	0.52 ha	4.5%
Introduced Shrubs	Several small blocks of shrubs that form part of the current landscaping of the Site	Across the Site	0.13 ha	1.2%
Scrub - Dense/ Continuous	Areas with dense scrub that comprises holly, Leyland Cypress (*Cupressus* × *leylandii*) or English ivy (*Hedera helix*).	To the east of the Site	0.03 ha	0.3%
Running Water	Tributary of the River Pinn, which is a HoPI (TN17)	Southern area	0.02 ha	0.2%

[41]Priority habitats are taken as principal habitats for the conservation of biodiversity listed under Section 41 of the Natural Environment and Rural Communities Act 2006.
[42] Protected and/or notable flora are taken as principal flora for the conservation of biodiversity listed under Section 41 of the Natural Environment and Rural Communities Act 2006; any flora listed in an IUCN Red Data Book; and any other flora listed under the County Rare and Scarce Plants in Buckinghamshire list (BMERC, 2012).
[43] For this assessment 'flora' includes vascular and non-vascular plants, fungi and lichens.
[44] For this assessment the definition of a veteran tree is taken from Annex 2 of the National Planning Policy Framework (glossary): "A tree which, because of its great age, size or condition is of exceptional value for wildlife, in the landscape, or culturally."

Habitat Type	Summary Description of Habitat	Location of Habitat	Area of Habitat/ Distance of Linear Feature	% of the Site
Hedgerow	One of them along the western boundary is species rich hedgerow, HoPI. Species poor hedge along the eastern boundary contained elder (*Sambucus nigra*)	Along boundaries of the Site	380 m	NA
Lines of trees / scattered trees	On traffic islands or within the amenity grassland	Across the Site	NA	NA

Habitats within the Site are, in general, fragmented. Most of the trees, grassland and introduced shrub on the Site are maintain by the Estates Management, with woodlands and green areas along the watercourse less heavily maintained (although the green area along the stream to the south of the Site was managed for invasive species in the recent past).

Main green spaces to the south, south-east and north-east of the Site were not well connected. The hedgerows along the boundaries (west and north) facilitate connectivity with adjacent gardens and street trees providing valuable corridors mainly for flying species such as bats, birds and insects. These corridors facilitate connectivity with wider green spaces such as Colham Green to the east or the River Pinn to the west.

Some areas of woodland, the hedge to the west of the Site and the watercourse were identified as Habitat of Principal Importance (HoPI) as defined by Section 41 of the NERC Act (2006) or to be linked to HoPI in the case of the watercourse. These habitats are described in brief below.

Lowland mixed deciduous woodland[45]

Woodland in the south/centre of the Site was dominated by English oak and was accompanied by ash trees, holly, yew, elder and hawthorn. The ground flora comprised nettle, cleavers, bramble, hemlock, cow parsley, lords-and-ladies and wood avens.

Woodland to the south of the Furze and east of the Site along the watercourse was also dominated by English oak, with also ash, willow and elder trees present. Nettle, white dead nettle, bramble, cow parsley and cleavers were recorded as a ground flora.

Those two woodlands are each protected by a TPO.

The north-eastern woodland (between the eastern boundary and the eastern car park), as is dominated by Turkey oak (an invasive species), is not considered as a priority habitat.

Hedgerow[46]

The hedgerow along the western boundary is a species rich hedge with trees with only 0-5% of the hedge with gaps. It is 1-1.5 wide and an average height of 5m. It does not show signs of maintenance. This line of trees was dominated by beech (*Fagus sylvatica*) trees, with frequent examples of field maple (*Acer campestre*) and occasional instances of hawthorn (*Crataegus monogyna*), large-leaved lime (*Tilia platyphyllos*) and willow (*Salix* species).

River[47]

The tributary of the River Pinn flows south-westerly through the southern boundary. It is quite straight, possibly having been historically realigned for urban development, although with some local sinuosity where unvegetated side bars have formed. The steep banks were predominantly vegetated by a mixture of trees, short-creeping herbaceous plants and short and tall grasses. The invasive non-native species Himalayan balsam (*Impatiens glandulifera*) and Japanese knotweed (*Reynoutria japonica*) were also present on the bank faces. While the watercourse present within the Site may not meet the criteria for HoPI (natural and near natural running water), it is however functionally linked to the River Pinn SINC which is known to meet these criteria. Some impacts on this habitat therefore could also impact on the River Pinn downstream (for example pollution travelling downstream).

[45] https://data.jncc.gov.uk/data/2829ce47-1ca5-41e7-bc1a-871c1cc0b3ae/UKBAP-BAPHabitats-30-LowlandMixedDecWood.pdf
[46] https://data.jncc.gov.uk/data/ca179c55-3e9d-4e95-abd9-4edb2347c3b6/UKBAP-BAPHabitats-17-Hedgerows.pdf
[47] https://data.jncc.gov.uk/data/01d6ab5b-6805-4c4c-8d84-16bfebe95d31/UKBAP-BAPHabitats-45-Rivers-2011.pdf

Buildings, introduced shrubs, scrub, hard standing and bare ground habitats are of **negligible** biodiversity importance and have been scoped out of further assessment.

4.3 Bats

The Site and its surrounds are suitable for roosting bats within trees and buildings, and also for bats commuting and foraging from both within the Site and from further afield.

A total of 73 records of at least eight species of bats were returned from the desk study search within last ten years (brown long-eared bat (*Plecotus auritus*), common pipistrelle (*Pipistrellus pipistrellus*), Leisler's bat (*Nyctalus leisleri*), *Myotis* species, Nathusius's pipistrelle (*Pipistrellus nathusii*), noctule bat (*Nyctalus noctula*), serotine (*Eptesicus serotinus*) and soprano pipistrelle (*Pipistrellus pygmaeus*)).

There were no records of bat roosts or sightings within the Site or from the immediate surrounds from the London Bat Atlas[48].

During the Preliminary Roost Assessment of buildings and trees, 16 buildings and 31 trees were assessed as suitable to support roosting bats:

- one building (B10) as high suitable;
- seven buildings (B16, B19, B21, B22, B24, B25 and B26) as moderate suitable;
- eight buildings (B6, B9, B14, B15, B17, B18, B23 and B30) as low suitable;
- eight trees (T4, T5, T8, T9, T10, T11, T12 and T14) as moderate suitable; and
- 23 trees as low suitable.

Buildings with suitability for bats and trees with moderate suitability were subject to further presence/absence bat surveys. Additionally, an internal inspection of the Furze building (B10) was also undertaken.

The results are that building B19 (Alderbourne Rehabilitation Centre, to the west of the Site) and trees T12 and T14 (south of the Furze, B10) had confirmed bat roosts:

- B19 is a day roost for a single common pipistrelle;
- T12 is a transitional roost in use during the summer by a number of noctule males/non-breeding females, and
- T14 is a transitional roost in use during the summer by a number of common pipistrelle males/non-breeding females.

An internal inspection was carried out on the high suitability Building 10 (the Furze). No sign of any bats was found in the three roof voids inspected. Access was also available to the roof space of Building 9 (Maternity) with low suitability for roosting bats and no sign of any bats were found. Roosts recorded to date within the Site are of small numbers of common and widespread species across the UK (common pipistrelle), as well as a small number of a rarer species (noctule), assessed as non-breeding. Based on survey results and in line with the assessment method outlined in Wray (2010)[49], the assemblage of roosting bats present within the Site is assessed as **County** Importance.

The Site had suitability for foraging and commuting bats, particularly the trees, scrub and a watercourse in the south of the Site, where the majority of passes were recorded. Although specific bat activity surveys were not carried out, a comprehensive emergence / re-entry survey programme was conducted throughout the active season which also recorded the use of the Site by commuting and foraging bats.

It was found that the Site supported an assemblage of five bat species, namely common pipistrelle, soprano pipistrelle, noctule, serotine, and brown long eared. In addition, there were recordings for *Pipistrellus* species and *Nyctalus* species that could not be identified to species level. The majority of bat passes consisted of three species: common pipistrelle, soprano pipistrelle and noctule during the survey season from May to September. There were infrequent passes of serotine and brown long eared bats on single nights in July and August 2021.

[48] Law, R. (2015) The London Bat Atlas, London Bat Group.
[49] Wray S, Wells D, Long E, & Mitchell-Jones T (2010) Valuing Bats in Ecological Impact Assessment, IEEM In-Practice issue 70, p 23-25.

Due to the limited species assemblage of five species recorded across the Site and in line with the assessment method outlined in Wray (2010)[49], the assemblage of foraging and commuting bats present within the Site is of **Local** Importance.

4.4 Other Notable Mammals

The following other notable mammals[50] have recently been recorded within the Study Area:

- eight records of hedgehog (*Erinaceus europaeus*); and
- two records of badger (*Meles meles*).

The woodland and gardens to the south of the Site are suitable for badger and hedgehog, both SoPI and protected species, respectively.

No evidence of badger was recorded within the Study Area. The habitat suitable for badgers within the Site is small and isolated; therefore, this species has not been assigned a geographical scale of biodiversity importance and is not considered further in this assessment.

Hedgehog could potentially be using the Site as they live within gardens in urban and suburban areas and there is presence of woodland and hedgerows on-site where they could rest and hibernate. The hedgehog map[51] shows presence of hedgehog close to the Site (south-east of the Site), though no hedgehog sightings were made as part of the bat emergence surveys. Based on the availability of suitable habitat on-site, the limited connectivity between parcels of suitable habitat, the presence of hedgehog records on adjacent areas and the level of protection for hedgehog as a SoPI, hedgehog is of **Local** biodiversity importance.

Evidence of fox (*Vulpes vulpes*) was recorded to the south of the Site. Foxes do not have a conservation status so they will be addressed within this assessment in terms of legal compliance only.

4.5 Notable Breeding Birds

There was suitable habitat for breeding birds on the Site in the form of trees, woodland, scrub, introduced shrub, gardens, watercourse and buildings.

A total of 23 species were recorded during the five visits of the bird survey undertaken within the Survey Area (see Table 6), with 19 species showing probable or confirmed evidence of breeding either within or adjacent to the Site. Of the species recorded on site, two are listed on Schedule 1 of the Wildlife and Countryside Act, peregrine falcon (*Falco peregrinus*) and red kite (*Milvus milvus*) and seven are listed as Birds of Conservation Concern (BoCC) including dunnock (*Prunella modularis*), house sparrow (*Passer domesticus*), mallard (*Anas platyrhynchos*), song thrush (*Turdus philomelos*), starling (*Sturnus vulgaris*), wood pigeon (*Columbus palumbus*) and wren (*Troglodytes troglodytes*).

The status of peregrine falcon is discussed within the confidential survey report (Appendix F) while red kite had no direct evidence of breeding recorded on Site.

Table 6. Species Recorded, Maximum Counts and Breeding Evidence within the Survey Area

Species	BOCC / NERC Section 41 Status	Highest Breeding Evidence Recorded	Territories / Breeding Pairs	Distribution / Comments
Blackbird *(Turdus merula)*	-	Probable - singing	5	Several territories using woodland and scrub.
Blackcap *Sylvia atricapilla)*	-	Probable – singing	1	One territory in the south woodland.
Blue tit *(Cyanistes caeruleus)*	-	Confirmed – young	3	Three territories using woodland and scrub.
Buzzard *(Buteo buteo)*	-	Non-breeding - flyover	0	Fly over, non-breeding.

[50] Listed under S41 of the *Natural Environment and Rural Communities Act 2006*. http://publications.naturalengland.org.uk/publication/4958719460769792.
[51] https://bighedgehogmap.org/

Species	BOCC / NERC Section 41 Status	Highest Breeding Evidence Recorded	Territories / Breeding Pairs	Distribution / Comments
Carrion crow *(Corvus corone)*	-	Probable	0	Feeding and overflying in suitable habitat but no direct evidence of breeding.
Chaffinch *(Fringilla coelebs)*	-	Possible – suitable habitat	0	No evidence of-breeding – recorded on one survey
Dunnock *(Prunella modularis)*	BOCC Amber / NERC Section 41	Probable - singing	2	Two territories using woodland and scrub.
Feral pigeon *(Columba livia)*	-	Confirmed – calls from young birds	Unknown - likely at least 10	A communal nester present in large groups on the buildings on the Site including buildings B6, B8, B9, B14, likely from nest sites on supporting struts / under maintenance.
Goldfinch *(Carduelis carduelis)*	-	Probable - singing	2	Two territories using scrub and woodland.
Great spotted woodpecker (*Dendrocopos major*)	-	Probable	1	One territory in south woodland.
Great tit *(Parus major)*	-	Probable	2	Two territories in areas of woodland and scrub.
House sparrow *(Passer domesticus)*	BOCC Red /NERC Section 41	Probable	3 colonies	At least three different colonies on residential properties on the south boundary of the Site.
Long tailed tit *(Aegithalos caudatus)*	-	Probable – young	1	One territory in southern woodland area.
Magpie *(Pica pica)*	-	Probable	1	One territory in southern woodland and scrub area.
Mallard *(Anas platyrhynchos)*	BOCC Amber	Non-breeding	0	Bird seen loafing on site next southern wet ditch, non-breeding.
Robin *(Erithacus rubecula)*	-	Confirmed - calls from young	5	Five territories throughout the site in area of woodland, scrub and gardens.
Pied wagtail *(Motacilla alba)*	-	Probable	2	Two territories on Site associated with buildings.
Peregrine falcon *(Falco peregrinus)*	Schedule 1	-		Detailed within survey report appendix
Red kite *(Milvus milvus)*	Schedule 1	Possible – suitable habitat	0	Flyovers but no recorded breeding evidence.
Song thrush *(Turdus philomelos)*	BOCC Amber /NERC Section 41	Probable	0	Passing through the Site. Non-breeding
Starling *(Sturnus vulgaris)*	BOCC Red /NERC Section 41	Probable – singing	2	Two territories associated with residential buildings on the south boundary of the Site.
Wood pigeon *(Columba palumbus)*	BOCC Amber	Confirmed – nest	8	At least eight territories through the site in trees, woodland, scrub and gardens.
Wren *(Troglodytes troglodytes)*	BOCC Amber	Probable – singing	2	Two territories associated with woodland, scrub and gardens.

The habitats present within the Survey Area are ubiquitous within the wider local area, which is dominated by a mix of buildings, gardens and a network of open spaces including parks and small wooded parcels. The breeding bird assemblage is therefore considered to be of no more than **Local** value, based on a reasonable worst case of supporting small numbers of BoCC red and amber list species, aside from peregrine falcon which has been assessed as **District** biodiversity importance.

4.6 Reptiles

The Site lacked hibernation and basking sites suitable for slow worms and all grassland was well-managed, i.e. maintained short. No evidence of reptile suitable habitat was recorded within the Study Area; therefore, this species has not been assigned a geographical scale of biodiversity importance and is not considered further in this assessment.

4.7 Amphibians

No records of amphibians were returned from the desk study and no suitable habitat for great crested newts or other amphibians was recorded within the Site. No evidence of great crested newts was recorded within the Study Area; therefore, this and other amphibian species have not been assigned a geographical scale of biodiversity importance and are not considered further in this assessment.

4.8 Terrestrial Invertebrates

Three records of small heath butterfly (*Coenonympha pamphilus*) and 55 records of stag beetle (*Lucanus cervus*) were recorded within 1 km of Site over the last 10 years.

Stag beetle was incidentally recorded on-site in June 2021 around the Furze building (B10) during one emergence survey for bats. Deadwood habitat suitable for stag beetle was present within the woodland parcels in the southern and southeast areas of the Site.

The Site lacked rough grassland suitable for small heath caterpillars.

Habitats within the Site do not provide botanical or structural diversity to support a range of invertebrates with SoPI status and so the expected supported range of common species within the Site has not been assigned a geographical scale of biodiversity importance and is not considered further in this assessment. An exception has been made for stag beetle due to the presence of suitable habitat on the Site and observations of this beetle. Stag beetle has been assessed of **Local** biodiversity importance.

4.9 Invasive Species

Fifteen invasive non-native species were recorded within the Site in November 2020 and June 2021. They are listed in Table 7. Seven of them are listed under the Schedule 9 of the Wildlife and Countryside Act. A further eight species were listed on the London and Invasive Species Lists (LISI).

Table 7. Records for scheduled invasive non-native plant species

Species	Wildlife and Countryside Act Schedule 9	Invasive Alien Species (Enforcement and Permitting) Act Schedule 2	LISI (Category)
Bearberry cotoneaster (*Cotoneaster dammeri*)			✓ (2)
Buddleia (*Buddleja davidii*)			✓ (3)
Cherry laurel (*Prunus laurocerasus*)			✓ (3)
Entire-leaved cotoneaster (*Cotoneaster integrifolius*)	✓		✓ (2)
False acacia (*Robinia pseudoacacia*)			✓ (4)
Green alkanet (*Pentaglottis sempervirens*)			✓ (6)
Himalayan balsam (*Impatiens glandulifera*)	✓	✓	✓ (3)
Himalayan cotoneaster (*Cotoneaster simonsii*)	✓		✓ (2)
Hollyberry cotoneaster (*Cotoneaster bullatus*)	✓		✓ (2)
Holm oak (*Quercus ilex*)			✓ (5)
Japanese knotweed (*Reynoutria japonica*)	✓		✓ (3)
Rhododendron (*Rhododendron ponticum*)	✓		✓ (3)
Snowberry (*Symphoricarpos albus*)			✓ (2)
Three-cornered garlic (*Allium triquetrum*)	✓		✓ (4)
Turkey oak (*Quercus cerris*)			✓ (5)

Species	Wildlife and Countryside Act Schedule 9	Invasive Alien Species (Enforcement and Permitting) Act Schedule 2	LISI (Category)

London Invasive Species Initiative (LISI) Categories[52]:
Category 2. Species of high impact or concern present at specific sites that require attention (control, management, eradication etc).
Category 3. Species of high impact or concern in London and require concentrated, coordinated and extensive action to control/eradicate)
Category 4. Species which are widespread for which eradication is not feasible but where avoiding spread to other sites may be required)
Category 5. Species for which insufficient data or evidence was available from those present to be able to priorities
Category 6. Species that were not currently considered to pose a threat or have the potential to cause problems in London.

Invasive species do not have a conservation status, they will be addressed within this assessment in terms of legal compliance only. Controlling invasive non-native plants has a beneficial impact on biodiversity.

4.10 Future Baseline

No changes are anticipated to the baseline conditions at the Site and the Study Area as a result of natural changes within the timescale of the Proposed Development. However, with no active management, the Site is susceptible to those invasive non-native species present continuing to spread and to further invasions of additional non-native species into the Site such as Japanese knotweed or giant hogweed. This presents a risk not only to the biodiversity value of the Site, but also were any of these species to be spread beyond the Site boundary, a breach of legislation in the form of the Wildlife and Countryside Act and, or the Invasive Alien species (Enforcement and Permitting) Order.

4.11 Summary of Biodiversity Importance

Table 8 summaries the IEFs that have been recorded in the Study Area.

Table 8. Summary of Biodiversity Importance

Ecological Feature	Geographical Scale of Biodiversity Importance
National designated sites for their biodiversity value (i.e. Fray's Farm Meadows, Kingcup Meadows and Oldhouse Woods, Denham Lock Wood SSSIs)	National
Sites of Importance for Nature Conservation (The Grove, River Pinn and Manor Farm Pastures, Uxbridge and Hillingdon Cemeteries and Stockley Park Country Park SINCs)	District
Habitats (woodland, hedges, watercourse, trees)	Local
Roosting bats	County
Foraging and commuting bats	Local
Hedgehog	Local
Fox	N/A - assessed for legislative compliance only
Notable Breeding Birds other than peregrine falcon	Local
Schedule 1 species (peregrine falcon)	District
Stag Beetle	Local
Invasive species	N/A - assessed for legislative compliance only

[52] http://www.londonisi.org.uk/

5. Impact Assessment, Agreed Mitigation Measures and Significance of Residual Effects

5.1 Scope of the Assessment

This Section characterises the impacts of the Proposed Development on IEFs during the construction and operation phases, sets out agreed avoidance and mitigation measures, and assesses the significance of the residual effects (both positive and negative). Where significant residual effects will occur, appropriate compensation measures are identified to offset those effects. Opportunities for enhancement are set out in Section 6.

5.2 Impacts and Effects on IEFs

The construction and operation of the Proposed Development could potentially result in the following impacts and effects on biodiversity features.

5.2.1 Construction

A summary of the impacts on IEFs during construction of the Proposed Development are:

- Habitat loss or gain – direct impacts associated with changes in land use resulting from ground preparation works, including the loss of vegetated habitats (used by nesting birds, bats, invertebrates and hedgehogs), buildings (used by roosting bats) and disturbance of vegetation or soils by heavy plant, or stockpiling of materials;
- Habitat degradation – direct or indirect impacts resulting in the reduction in the condition of a habitat and its suitability for some or all of the species it supports, for example changes in chemical water quality or changes in surface flow or groundwater, or shading and encroachment by invasive non-native species reducing habitat diversity;
- Fragmentation of populations or habitats – indirect impacts due to the Proposed Development by dividing a habitat, group of related habitats, site or ecological network, or the creation of partial or complete barriers to the movement of species, with a consequent impairment of ecological function;
- Species mortality – direct impacts on species populations associated with mortalities due to construction activities, for example vegetation removal, entrapment of animals in trenches; and
- Species displacement – visual, noise or vibration-related disturbance from vehicles/heavy plant, lighting, digging or piling. Habitat loss and degradation (see above) may also displace resident animals.

5.2.2 Operation

Impacts on biodiversity features during the operational phase of the Proposed Development are likely to include:

- Habitat degradation and disturbance – indirect impacts associated with the operation of new lighting and changes in human activity using habitats for recreational use, for example increased visitor pressure on woodland and river habitats leading to a reduction of habitat quality on identified IEFs, changes in animal behaviour, for example changes in roosting behaviour or nesting success; and
- Species mortality – direct impacts on species populations associated with mortalities from pets, such as cats and dogs from residential units.

5.3 Impact Assessment, Agreed Mitigation and Significance of Residual Effects

5.3.1 Designated Sites for their Biodiversity Value

There are three sites statutorily designated for their national biodiversity value within 5 km of the Site and four local non-statutorily designated sites within 1km of the Site, the closest more than 200m away.

Potential impacts on designated sites could be habitat degradation and displacement of species during construction works and due to increase in recreational pressure because of an increase of residents (up to 327 new dwellings) living within the Site once works in all the Site are completed. However, the sites are more than 200 m away from the Site. Increase of dust and pollutants during demolition or construction works are not expected to be significant at this distance. Compliance with industry good practice and environmental protection legislation during site establishment works e.g. prevention of surface and ground water pollution, and fugitive dust

management, noise prevention or amelioration, will be applied to minimise the potential for environmental pollution, lighting control to reduce spillage on habitats. These measures will be detailed in a Construction and Environmental Management Plan (CEMP) or similar document.

One of these designated sites, the River Pinn and Manor Farm Pastures (Borough Grade II), is designated for its floodplain habitats and is located 400m north-west. The watercourse within the Site is a tributary of the River Pinn, and is known to be hydrologically linked as the Site is upstream of the river. A Water Framework Directive Assessment[53] prepared for the Site (see Appendix H) concluded that the Proposed Development would not impact on the Water Framework Directive status or objectives of any associated surface water or groundwater bodies in proximity provided that the proposed mitigation (i.e. riparian enhancement including removal of invasive species and seeding with an appropriate species mix the area affected) is put in place.

The presence of open spaces nearby and the level of soft landscaping within the Site (three wetland areas, two woodlands, a central green space, courtyards and playgrounds) would contribute to disperse the recreational pressure of the new residents away from designated sites.

A significant impact upon designated sites during the construction or operation of the Proposed Development is not expected.

5.3.2 Habitats (woodland, hedges, watercourses, trees)

There were three habitats on-site that could afford a HoPI status under Section 41 of the NERC Act 2006: the watercourse (175m), a species-rich hedge with trees (220m) and deciduous woodland (4.5 ha). The level of loss and fragmentation is not expected to be significant due to retention of the highest value habitats on site (southern woodland parcels, watercourse and some of the western hedge).

Due to differing impacts upon these three habitats (limited impacts on woodland and watercourses but some loss of hedgerow and trees, these habitats are grouped in accordance with expected impacts.

5.3.2.1 Impacts on Southern Woodlands and Watercourse

The two woodlands to the south and south-east that are protected by TPOs, and a watercourse are due to be retained as part of the operational development.

A new green space connected to the southern woodland and watercourse will extend the green infrastructure on site.

The watercourse could potentially be impacted by a new small headwall structure to discharge water from the new flood storage area to the watercourse. However, this has been considered by the Water Frame Directive Assessment as not significant (see Appendix H).

To minimise the potential for impacts during construction (environmental pollution, lighting spillage on retained or adjacent habitats), measures detailed in a CEMP (or similar document) complying with industry good practice and environmental legislation will be applied.

While a short-term, adverse, minor effect during construction will occur, the overall effects on the southern woodlands and watercourse will be minor, beneficial during the operation phase.

5.3.2.2 Impacts on North-east Woodland, Hedgerow and Trees

The effects on the habitats will be minor, adverse, temporary during the construction phase.

The western hedge of approximately 250 m in length is expected to be removed in its northern section due to fire tender access requirements to the multistorey car park building. A section in the central part of the hedge will be coppiced to facilitate the works, but it will be allowed to regrow. The southern section of the hedge will be retained, with only a small number of trees to be removed. New tree and hedge planting will improve this section of the hedgerow.

The north-east woodland will be lost due to the new Colham Rd junction and some trees on the Site will be trimmed back or felled as a result of Proposed Development.

The effects on the habitats will be moderate, adverse, temporary during the construction phase and following implementation of mitigation will be minor adverse but not significant upon north-east woodland, hedgerows and scattered / street trees.

[53] AECOM (2022). The Hillingdon Hospital Redevelopment. Water Framework Directive Assessment.

5.3.2.3 Habitats Mitigation

Areas identified within the Site for soft landscaping would be used to contribute to the replacement of habitats lost during construction. The Proposed Development aims to achieve an overall biodiversity net gain following the Environment Act 2021[54]. The replacement of habitat that will be lost should be sought within the Site, and if not possible, in undertaken in locations close to the Site. A Biodiversity Net Gain assessment was prepared for the Proposed Development to assess the change in biodiversity units expected by the Proposed Development (please refer to the Biodiversity Net Gain assessment report[55] for details of the calculations).

An Arboricultural Impact Assessment[56] was prepared for the Site to assess impacts of the Proposed Development on trees. Measures to protect trees and its root protection areas will be considered and implemented during construction activities. Retained trees would be protected as per British Standard BS: 5837 Trees in relation to design, demolition and construction – Recommendations. The Proposed Development aims to replace the loss of trees in more than 1:1 ratio. The detailed application (Phase 1) of the Proposed Development proposes the planting of new 395 trees.

Habitat creation that will mitigate the loss of habitats will include:

- a wetland attenuation park to the west of the new Hospital building (southwest of the Site), including depressions with grasses for damp conditions, rain gardens, new tree planting and footpaths;
- a central green space at the centre of the Site, including water attenuation basins with grasses for damp conditions, rain gardens plants, tree planting, amenity grassland and an area of bulbs and wildflowers;
- green space to the north-east of the existing southern woodland, extending the southern green area. It will include a fluvial flood mitigation basin with grasses for damp conditions, plants for rain gardens, a mixed planting and trees;
- creation of a green area to the north-east of the Site (corner Pield Heath Rd with Colham Green Rd).
- landscaped areas within the residential courtyards;
- new planting of trees along the existing hedgerow to the south of the Site;
- new planting of trees and mixed planting within the central car park, accesses and small areas of amenity areas across the Proposed Development;
- a green wall near the ambulance yard (southeast of the new hospital); and
- green roofs on the hospital and most of the residential buildings.

See IBI Design and Access Statement (DAS), document THHR_01-IBI-ZZ-ZZ-RP-A-250010) for more details and IBI THHR_01-XX-XX-DR-A-100003 drawing.

To avoid negative effects on the new habitat during the operational phase, e.g. degradation due to recreational use, the Site will include defined pathways to be used by residents/members of the public and demarcated play areas will be created separately to reduce the risk of degradation of the more natural habitats.

5.3.3 Bats

5.3.3.1 Roosting bats

16 buildings within the Site were assessed as providing suitability for roosting bats at different levels. Only one building (Alderbourne Rehabilitation Centre, to the west of the Site, B19) was confirmed to support a day roost for a single common pipistrelle. All buildings within the Site will be demolished, with the exception of the Furze (B10) that will be refurbished under a different planning application.

Thirty-one trees were assessed as providing suitable habitat for bats at different levels. Two trees were confirmed to be bat transitional roosts (T12 and T14) by noctule and common pipistrelle bats.

A European Protected Species Mitigation Licence (EPSML) will be submitted to Natural England for the loss of the bat roost on building B19. The Proposed Development will retain trees T12 and T14, among other trees, reducing the significance of the loss of the bat roost within the Site.

The loss of a confirmed bat roost would cause an impact at district level due to the removal of a roost of common and widespread species (common pipistrelle) but retention of the rarer species (noctule) roost on the Site. The

[54] HMSO (2021). Environment Act 2021. https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted
[55] AECOM (2022). Hillingdon Hospital. Biodiversity Net Gain Assessment.
[56] Landmark Trees (2022). Hillingdon Hospital. Arboricultural Impact Assessment Report

impact will be temporary and short term and, without mitigation is considered significant. The potential for bat mortalities during works would however result in a permanent adverse impact.

Bat roost boxes will be installed within the Proposed Development to mitigate the loss of a confirmed roost, but also the loss of roosting opportunities for the local bat population. A Bat Mitigation Strategy should be prepared for the Site to inform the EPSML application, the design and the works.

To reduce risk of mortality, the work force, in advance of the building demolition works, will be briefed about the risk of discovering roosting bats unexpectedly during the works and to stop if bat is found.

Works on trees assessed with suitability for roosting bats that did not have a confirmed roost (T4, T5, T8, T9, T10, T11, T24, T49, T59, T68, T70, T95, T97, T99, T102, T107, T110, T114, T117, T128, T129, T130, T143, T176, T178a, T178b, T181, T182, T190, T191, T192 and G109) (see Appendix D, Appendix E or Arboricultural report[57] for location) and that require removal, this will be done by section felling under supervision by a Natural England licensed bat ecologist during the bat active season (March to October). A precautionary method of working (PMoW) to be prepared will detail how to proceed with these works.

If the mitigation detailed above is implemented the residual adverse impact on bats will be minor and not significant.

5.3.4 Foraging and Commuting Bats

Bats use the woodlands and hedgerows within the Site as a commuting corridors and foraging habitats. During the works, it could be a temporary displacement of bats due to disturbance and habitat loss of some scrub, trees and introduced shrub habitat. However, the retention of the woodland and watercourse habitats will reduce the negative effects on commuting and foraging bats.

The lighting scheme during the works and in the design of the Proposed Development consider bats to reduce the disturbance of the habitat and displacement of bats during construction and operational phases while taking also into account the need of specific level of lighting to align with security guidance for healthcare premises[58]. Although the lighting on the Site cannot be reduced to very low levels of lux for security reasons, the bats currently using the Site are habituated to a certain level of lighting.

The CEMP (or similar document) will incorporate measures to reduce lighting spills on bat roosting features identified on the Bat survey report prepared for the Site. Lighting during the operational phase will incorporate measures to reduce lighting spills on green spaces and hedgerows. The use of LED lamps and directional lighting under the horizontal line and use low level lighting (e.g. bollards) are considered. The Bat Conservation Trust lighting guidance[59] and its proposed measures have been considered altogether with the security guidance.

The creation of new and diverse habitats on site, including green roofs, grassland, attenuation basins, hedges, new tree planting along accesses and extension of retained green spaces, will increase the invertebrate population on site, i.e. the principal source of food for bats. The use of certain species of plant that are beneficial to nocturnal insects (e.g. moths) would additionally benefit bats through increased prey availability[60].

The creation of the new habitat on Site will provide new corridors within the Site and will enhance connectivity with areas outside of the Site.

The negative impact of the Proposed Development on bats is minor. With embedded mitigation (creation of habitats and reduction of lighting spill or use of directional lighting to avoid spill on woodland and hedges), the effect on commuting and foraging bats once the development is operational will be positive.

5.3.5 Mammals (hedgehog and fox)

There is suitable habitat for hedgehog and fox on site that will be reduced due to a loss of habitat, though is expected to be minimal (mainly a small area of woodland next to the Old Creche to the south of the Site and the western hedgerow). Therefore, the expected impact on hedgehog and fox is minor, short term and not significant during the construction phase, when they can be seen displaced due to disturbance (noise, human presence, etc).

[57] Landmark Trees (2022). Hillingdon Hospital. Arboricultural Impact Assessment Report
[58] Bukorovic, N. (2019). Lighting Guide 2: Lighting for healthcare premises. The Society of Light and Lighting: Hampshire, UK.
[59] Bat Conservation Trust (2018). Guidance Note 08/18 Bats and Artificial Lighting in the UK.
[60] Bat Conservation Trust (May 2007) Encouraging Bats: A guide for bat-friendly gardening and living https://www.worcester.ac.uk/documents/encouraging-bats-guide.pdf

Removal of woodland areas, hedges and dense scrub should be scheduled outside of the hibernation season for hedgehog (hibernation from November to March, approximately). Otherwise, an ecological supervision would be required to check for any hedgehog hibernating under leaf debris.

A CEMP should include the covering of all deep holes and trenches overnight and/or the provision of planked escape routes for any wildlife that may fall in. In addition, any liquids held on-site should be stored in a secure lock-up. Hoarding around the perimeter of the Site should also minimise the likelihood of any wild mammals gaining access to the Site.

The inclusion of access features in any not permeable boundary fencing (if any) (particularly in the south of the Site) of the operation development will be included to allow movement of hedgehog across the Site, by leaving a gap at the bottom of the fence to allow hedgehogs and other animals to pass through[61].

During the operational phase, displacement of mammals could occur due to the recreational use of the woodland habitat. The creation of new suitable habitat and the creation of play areas and network of paths within the Site, will mitigate the impact and provide benefits to mammals.

A potential increase in numbers of cats and dogs on the Site during the operational phase due to an increase of residential dwellings in the eastern section of the Proposed Development (Phase 2) will increase the risk of degradation of habitats and predation of small mammals. A network of pathways will encourage dogwalkers to stick on paths. The residents of the eastern residential blocks will need to be made aware of the presence of green spaces within the Site and the risk of predation from cats. This information could be issue with the information pack when acquiring the property.

The residual effect of the Proposed Development is not significant.

5.3.6 Nesting Birds (non-Schedule 1 species)

The impacts on nesting birds are mainly due to the loss of habitat and degradation during the works. It will be an adverse effect on local bird populations during the works. It is assessed as a minor effect due to the retention of woodland habitat and mainly loss of amenity grassland and some introduced shrub planting. The effect of the Proposed Development is not significant, creating a positive residual effect once mitigation is implemented.

Any necessary vegetation clearance will be undertaken (where possible) outside of the period that bird species are likely to be breeding (between March and August inclusive). If the vegetation is to be cleared between March and August inclusive, an ecologist will need to confirm the absence of active bird nests immediately prior to works commencing to avoid a breach of legislation. If a nest is discovered, clearance or other construction works should be stopped immediately within a species-specific exclusion zone. Once it is confirmed that all fledglings have flown and ceased to return to the nest, the vegetation can be removed.

Similar impacts explained for hedgehog and fox during the operational phase of the development are applicable to nesting birds (displacement of birds due to recreational use of the habitats and dogwalkers, presence of cats from new residential dwellings increasing the risk of disturbance and predation).

Creation of new green spaces on site will increase the available habitat suitable for nesting birds, potentially allowing an increase of the bird population within the Site. The installation of a diverse range of bird boxes and the planting of species that produce berries or attract insects, and, or provide roosting habitat will benefit also the Site for nesting birds.

Bird boxes for London priority species will be targeted to be mounted on buildings and trees, including multicavity boxes for house sparrow and swifts.

5.3.7 Schedule 1 Birds (peregrine falcon)

The status and proposed mitigation for peregrine falcon is outlined in the survey report (Appendix F). A Bird Mitigation Strategy is to be prepared to inform in detail the measures to be implemented for the works.

A peregrine falcon nest box will be installed on a high location (recommended higher than 20m) on the top of a building within the western side of the Proposed Development.

[61] British Hedgehog Preservation Society (2019) Hedgehogs and Development - Guidance Booklet. Produced in collaboration with the People's Trust for Endangered Species.

Following implementation of mitigation measures outlined within this report, the effect of disturbance, mortalities and loss of habitat impacts are assessed overall as Negligible, and not significant.

5.3.8 Terrestrial invertebrates (Stag beetle)

The impact of the Proposed Development on stag beetle will be due to the loss of larval habitat (i.e. dead wood) due to clearance and loss of habitat or disturbance during construction. The effect on stag beetle is assessed as temporary, adverse minor and not significant. The retention of woodland parcels will reduce the loss of the most suitable habitat on site. Deadwood identified within areas to be cleared during the works will be moved to woodland areas, when possible, to retain opportunities for stag beetles on site. Creation of new log piles targeting this species will be added into the design.

5.3.9 Invasive Species

Invasive non-native species present on-site could be spread within or off the Site during the construction activities on-site. Without mitigation, impacts are adverse, moderate (or high for species like Japanese knotweed and Himalayan balsam) and potentially significant for some of the other species. The impact could create a long term effect on habitats within the Site, but also outside if they are spread via the stream, wind or attached to construction vehicles with the risk of contravening legislation.

Invasive non-native species within the Site should be managed according to the Invasive Non-native Plant Species Biosecurity and Management Plan prepared for the Site[62] for reducing the spread into the wild as well as minimising the risk of species being brought onto the Site.

Species listed on the LISI list or Schedule 9 of the Wildlife and Countryside Act will be avoided in the landscape strategy in favour of native (or wildlife friendly) species.

5.3.10 Summary of Ecological Features, Impacts, Mitigation and Residual Effect

Table 9 shows the summary of ecological features, impacts, mitigation and residual effect detailed above.

[62] AECOM, 2022. Hillingdon Hospital. Non-native Invasive Plant Species Assessment Biosecurity and Management Plan.

Table 9. Summary of Ecological Features, Impacts, Mitigation and Residual effect

IEFs	Biodiversity Importance	Impact (C=construction; O=operation)	Impact Assessment	Significance	Mitigation	Residual effect
National designated sites for their biodiversity value	National	Habitat degradation (C, O)	Adverse, minor, temporary, short term	Not Significant	Implementation of measures of the Construction and Environmental Management Plan (CEMP). Habitat creation for recreation purpose.	Negligible Not Significant
Sites of Importance for Nature Conservation	District	Habitat degradation (C, O)	Adverse, minor, temporary, short term	Not Significant	Implementation of measures of the Construction and Environmental Management Plan (CEMP). Habitat creation for recreation purpose.	Negligible Not Significant
Habitats (southern woodlands, watercourse)	Local	Habitat degradation (C, O), Fragmentation of habitats (C)	Adverse, minor temporary, short term	Not Significant	Implementation of measures of the Construction and Environmental Management Plan (CEMP). Retention of deciduous woodland within the Site to provide habitat for wildlife.	Beneficial, minor Not significant
Habitats (northeast woodland, hedges, trees)	Local	Habitat loss (C), Habitat degradation (C, O), Fragmentation of habitats (C)	Adverse, moderate temporary, short term	Not Significant	Defined network of pathways and play areas to reduce impacts on natural habitats. Creation of new habitat and new tree planting to mitigate for habitat loss and to support Biodiversity Net Gain within the Site. Implementation of the Arboriculture Impact Assessment measures.	Adverse minor. Not significant
Roosting Bats	County	Habitat loss (C), Fragmentation of Population (C), Species mortality (C, O), Species displacement (C), Habitat disturbance (O)	Adverse, moderate, temporary, short term	Significant	EPSML application to Natural England for the loss of roost on B19. Retention of suitable trees to support roosting bats, when possible. Retention of confirmed roost on T12 and T14. Installation of bat boxes. Consideration to levels of lighting for bats within the CEMP and in the lighting scheme of the Proposed Development e.g. low-level security lighting on a timer at night, directional lighting, use of LED, bollards, etc. Toolbox talk to the work force in advance of works. Trees T4, T5, T8, T9, T10, T11, T24, T49, T59, T68, T70, T95, T97, T99, T102, T107, T110, T114, T117, T128, T129, T130, T143, T176, T178a, T178b, T181, T182, T190, T191, T192 and G109 if removed, to be section felled under supervision of bat ecologist and following a precautionary method of working (PMoW).	Adverse minor. Not significant
Foraging and Commuting Bats	Local	Habitat loss (C), Fragmentation of Population (C), Species displacement (C), Habitat disturbance (O)	Adverse, minor, temporary, short term	Not Significant	Retention of hedges and green areas on site for foraging and commuting bats. Consideration to levels of lighting for bats within the CEMP and in the lighting scheme of the Proposed Development e.g. low-level security lighting on a timer at night, LED, directional lighting, bollards, etc. Creation of new green areas and waterbodies.	Beneficial Not significant
Notable Mammals (hedgehog)	Local	Habitat loss (C), Fragmentation of Population (C),	Adverse, minor, temporary, short term	Not significant	Consideration of fox, badger and hedgehog within the CEMP e.g. covering excavations at night to prevent possible injury to mammals, provision of planked escape routes.	Negligible Not Significant

IEFs	Biodiversity Importance	Impact (C=construction; O=operation)	Impact Assessment	Significance	Mitigation	Residual effect
		Species mortality (C, O), Species displacement (C), Habitat disturbance (O)			Avoid site clearance during the hedgehog hibernation period (Nov-March). If clearing dense scrub, and-search for hedgehogs hibernating under leaf debris. Creation of new green spaces. Inclusion of access features in not permeable boundary fencing (if any) to the south of the Site. Definition of network of pathways to reduce impacts on natural habitats. Raise awareness to residents of the risk of predation from cats. .	
Birds other than peregrine falcon	Local	Habitat loss (C), Fragmentation of Population (C), Species mortality (C, O), Species displacement (C), Habitat disturbance (O)	Adverse, minor, temporary, short term	Not significant	Retention of woodland, hedges, dense scrub habitat. Any clearance of vegetation and trees to be undertaken outside the nesting season. If vegetation or trees are cleared during the nesting season (March to August inclusive), they should be checked by a suitably qualified ecologist. Definition of network of pathways and play areas to reduce impacts on natural habitats. Raise awareness to residents of the risk of predation from cats . Habitat creation, planting of berries producer species. Provision of alternative nesting habitat such as bird boxes (colony-nesting species) within the final design and plant species that provide berries and cover for birds.	Beneficial, minor Not Significant
Schedule 1 species (peregrine falcon)	District	Habitat loss (C), Species displacement (C), Habitat disturbance (O)	Adverse, high, temporary, short to medium term	Significant	Prepare a Bird Mitigation Strategy to plan the works. Installation of a peregrine nest box on a high location within a building of the western of the Site. Avoid works affecting peregrine habitat Feb-July. Provision of alternative nesting habitat (e.g. peregrine ledge) within the final design before the demolition of the building where the nest is located.	Not Significant
Stag beetle	Local	Habitat loss (C), Habitat disturbance (O)	Adverse, minor	Not Significant	Retention of deadwood within the woodland of the Site. Creation of log piles for stag beetle.	Negligible Not Significant
Invasive non-native plant species	N/A	Habitat degradation (C) Habitat degradation (O)	Adverse, moderate/minor	(Not) Significant	Implementation of the Invasive non-native Species management plan which will include biosecurity measures to prevent their spread (Appendix G[63])	Negligible Not Significant

[63] AECOM (2022). Hillingdon Hospital. Non Native Invasive Plant Species Assessment. Biosecurity and Management Plan. THHR-ACM-ZZ-XX-RP-Y-000011.

6. Biodiversity Enhancements

The landscape strategy for the Proposed Development incorporates habitats within the Site that are in line with the Environment Act 2021, NPPF, regional and local policies and the London BAP Action Plans (for habitats i.e.: Parks & urban green spaces, Private gardens, Reedbeds, Rivers and streams, Standing water, Woodland, Built Structures; and for species: Bats, house sparrow, stag beetle, black redstart, peregrine falcon). The landscape strategy will add wildlife value to the current Site.

In addition to the landscape strategy that will create a variety of habitats on the Site with a variety of species and mitigation detailed in Section 5 that will benefit the biodiversity of the Site, further biodiversity enhancements are proposed below:

- The landscape strategy should incorporate native or near native species or species that provides benefit for wildlife. Native and wildlife planting should include species, such as berry producing plants, that provide food for birds and flowers that provide pollen and nectar for invertebrates such as bees and butterflies. All plants should be of local provenance to reduce the risk of bringing diseases onto the Site. The plant species with benefit for wildlife should be listed by recognised organisations such as The Royal Horticultural Society, Butterfly Conservation, UK Butterflies, Bat Conservation Trust, Natural England or similar. Links to some of these lists are provided below:
  - Royal Horticultural Society: https://www.rhs.org.uk/science/conservation-biodiversity/wildlife/plants-for-pollinators; https://www.rhs.org.uk/advice/profile?PID=497 ; https://www.rhs.org.uk/advice/pdfs/plants-for-bats.pdf
  - Butterfly Conservation: https://butterfly-conservation.org/sites/default/files/butterflynectardownload.pdf
  - UK Butterflies: https://www.ukbutterflies.co.uk/foodplants.php
  - Bat Conservation Trust (May 2007) Encouraging Bats: A guide for bat-friendly gardening and living https://cdn.bats.org.uk/pdf/Resources/Encouraging_Bats.pdf?mtime=20181101151549
  - Natural England Plants for wildlife-friendly gardens http://www.wlgf.org/neplants.pdf
- At least 15 bat boxes catering towards common and widespread crevice-dwelling bat species such as common pipistrelle or soprano pipistrelle and catering for species that roost on trees (such as brown long eared, common pipistrelle, soprano pipistrelle or noctule) will be mounted on trees or buildings within the Site. Boxes should be installed facing south, southeast or southwest and at a height above 3m to reduce risk of vandalism.
- At least 15 multicavity boxes for house sparrow and swift will be provided within the buildings of the Site. Boxes on walls will be integrated on the buildings, when feasible. Multicavity boxes should be installed in groups of three as house sparrow and swift live in colonies. Boxes on buildings will face north or east and will be installed above 3m in height.
- 15 boxes with different diameter of hole will be installed within the ground level green areas to cater for a wide range of species. Boxes on buildings and trees will avoid sunny locations and will be installed above 3m in height.
- Four deadwood piles targeting stag beetles will be incorporated into the design to provide additional habitat for stag beetles. People's Trust for Endangered Species stag beetle guidance should be followed for its construction[64].
- Installation of 20 insect boxes across the Site will provide habitat for pollinators. Boxes to be installed in sunny locations facing south.
- Installation of two log piles and two mounds of rock/sand on each of the green roofs to be created on site to provide habitat for insects and other invertebrates.

[64] https://ptes.org/wp-content/uploads/2016/11/Build-a-log-pile-for-stag-beetles.pdf

7. Conclusion

The ecological impact assessment undertaken in this report identified a number of important biodiversity features within the Site, with bats and peregrine falcon as the features for which adverse significant effects are predicted during construction due to the Proposed Development. However, following implementation of the mitigation measures outlined, there are unlikely to be any adverse significant effects to biodiversity receptors as a result of the Proposed Development. Subject to the implementation of mitigation measures, the residual effects on biodiversity will be ‘Negligible’ or ‘Not Significant’.

Minor beneficial effects are considered likely for birds and commuting/foraging bats due to the increase of green spaces and waterbodies on-site and variety of habitats proposed within the landscape strategy.

A Biodiversity Management Plan should be implemented upon the completion of the works to ensure a long term management of the habitats created on site and ensure a successful outcome for the biodiversity of the Site and immediate surroundings.

Appendix A Phase 1 Habitat Map

Figure 1. Phase 1 Habitat Survey Map

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Drawn: VC Checked: TG Approved: EG Date: 21/03/2022
Revision: 01

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LEGEND
- Site Boundary
- Existing Construction Boundary
- Target Note

Phase 1 Habitat
- Individual Broad-leaved Tree
- Fence
- Hedge With Trees - Native Species-rich
- Bare Ground
- Broadleaved Woodland - Semi-natural
- Building
- Cultivated/ Disturbed Land - Amenity Grassland
- Hard Standing
- Introduced Shrub
- Not Accessed
- Running Water
- Scrub - Dense/ Continuous

NOTES

ISSUE PURPOSE
FOR INFORMATION

PROJECT NUMBER
60642181

SHEET TITLE
Phase 1 Habitat

SHEET NUMBER
Figure 01

Appendix B Relevant Legislation and Planning Policy

B.1 Legislation

The UK is no longer a member of the European Union (EU). EU legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation. EU legislation which applied directly or indirectly to the UK before 11.00 p.m. on 31 December 2020 has been retained in UK law as a form of domestic legislation known as 'retained EU legislation'.

The Secretary of State for the Environment, Food and Rural Affairs and Welsh Ministers have made changes to parts of the *Conservation of Habitats and Species Regulations 2017* (referred to as the 2017 Regulations*)* so that they operate effectively. Most of these changes involve transferring functions from the European Commission to the appropriate authorities in England. All other processes or terms in the 2017 Regulations remain unchanged and existing guidance is still relevant.

Designated Sites for their Biodiversity Value

Special Protection Areas (SPA) / Special Areas of Conservation (SAC)

These sites in the UK no longer form part of the EU's Natura 2000 ecological network. The *Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019* (referred to as the 2019 Regulations) have created a national site network on land and at sea, including both the inshore and offshore marine areas in the UK. The national site network includes:

- existing Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)
- new SACs and SPAs designated under these Regulations

Any references to Natura 2000 in the 2017 Regulations and in guidance now refers to the new national site network.

Formal Appropriate Assessment is required to be undertaken by the competent authority before undertaking, or giving consent, permission or other authorisation for any work which are likely to have a significant effect on such a site.

Wetland of International Importance (Ramsar site)

Designated under the *Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971* (the Ramsar Convention), in the UK, these sites are treated as having the same level of protection as SPA's and SAC's.

Sites of Special Scientific Interest

Under the *Wildlife and Countryside Act 1981* (as amended), it is an offence to carry out or permit to be carried out any operations likely to damage the Site of Special Scientific Interest (SSSI). These operations are listed in the SSSI notification.

Owners, occupiers, public bodies and statutory undertakers must give notice and obtain the appropriate consent under S.28 of the *Wildlife and Countryside Act 1981* (as amended), before undertaking operations likely to damage a SSSI.

National Nature Reserve

National Nature Reserves (NNR) are established under the National Parks and Access to the Countryside Act 1949. Most NNRs are also underpinned by SSSIs and are therefore protected by the measures detailed above. For NNRs not underpinned by SSSIs it is still an offence to carry out or permit to be carried out any potentially damaging operation.

NNRs are given protection through policies in a local development plan.

Local Nature Reserve

A Local Nature Reserve (LNR) is a statutory designation made under National Parks and Access to the Countryside Act 1949, by principal local authorities (district, borough or unitary councils).

The local authority must control the LNR land - either through ownership, a lease or an agreement with the owner.

LNRs are given protection through policies in a local development plan.

Locally Designated Sites for their Biodiversity Value

Local Wildlife Sites (LWS) are sites with 'substantive nature conservation value'. They are defined areas, identified and selected for their nature conservation value, based on important, distinctive and threatened habitats and species with a region.

They are usually selected by the relevant Wildlife Trust, along with representatives of the local authority and other local wildlife conservation groups.

The LWS selection panel select all sites that meet the assigned criteria, unlike SSSIs, which for some habitats are a representative sample of sites that meet the national standard. Consequently, many sites of SSSI quality are not designated and instead are selected as LWSs. Consequently, LWSs can be amongst the best sites for biodiversity.

Protected Species

Bats

These species, known as European Protected Species, are protected under Regulation 43 of the 2017 Regulations as amended by the 2019 Regulations. This makes it an offence to deliberately capture, injure or kill an animal; deliberately disturb an animal; or damage or destroy a breeding site or resting place used by an animal.

Deliberate capture or killing is taken to include "accepting the possibility" of such capture or killing. Deliberate disturbance of animals includes in particular any disturbance which is likely a) to impair their ability (i) to survive, to breed or reproduce, or to rear or nurture their young, or (ii) in the case of animals of hibernating or migratory species, to hibernate or migrate; or b) to affect significantly the local distribution or abundance of the species to which they belong.

Where development works are at risk of causing one or more of the offences listed above, a mitigation licence from Natural England can be obtained to facilitate the works that would otherwise be illegal.

These species are also protected under Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended). This makes it an offence to intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb an animal in such a place.

Lower levels of disturbance not covered by the *Conservation of Habitats and Species Regulations 2017* remain an offence under the *Wildlife and Countryside Act 1981* although a defence is available where such actions are the incidental result of a lawful activity that could not reasonably be avoided.

Nesting Birds

All wild birds are protected under the *Wildlife and Countryside Act 1981* (as amended), with some species afforded greater protection under Schedule 1 of the *Wildlife and Countryside Act 1981* (as amended). In addition to the protection from killing or taking that all birds receive, Schedule 1 birds and their young must not be disturbed at the nest.

There are no licensing purposes that explicitly cover development activities affecting wild birds.

Common Species of Reptile (common lizard, slow worm, grass snake and adder)

Common species of reptile are protected against intentional killing and injury under Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended). There is no requirement for a licence where development works affect common species of reptiles. Instead, Natural England advise[33] that where reptiles are present, they should be protected from any harm that might arise during the development works through appropriate mitigation.

Badger

Badgers and their setts are protected under the *Protection of Badgers Act 1992* (as amended). This makes it an offence to wilfully kill, injure or take a badger; or intentionally or recklessly damage, destroy or obstruct access to a badger sett or disturb a badger in its sett.

It is not illegal to carry out disturbance activities near setts that are not occupied, i.e. those that do not show signs of current use.

Where required, licences for development activities involving disturbance or sett interference or closure are issued by Natural England. Licences for activities involving watercourse maintenance, drainage works or flood defences are issued under a separate process.

When assessing the requirement for a licence in respect of development, Natural England[34] state that badgers are relatively tolerant of moderate levels of noise and activity around their setts, and that a low or moderate level of apparent disturbing activity at or near to badger setts does not necessarily disturb the badgers occupying those setts.

Licences are normally not granted from December to June inclusive (the badger breeding season) because dependent cubs may be present within setts.

Species and Habitats of Principal Importance for the Conservation of Biodiversity

Section 40 of the Natural Environment & Rural Communities Act (NERC) 2006 sets out the duty for public authorities to conserve biodiversity in England.

Habitats and species of principal importance for the conservation of biodiversity are identified by the Secretary of State for England, in consultation with Natural England, are referred to in Section 41 of the NERC Act for England. The list, known as the 'England Biodiversity List', of habitats and species can be found on the Natural England web site.

The 'England Biodiversity List' is used as a guide for decision makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of the NERC Act 2006 to have regard to the conservation of biodiversity in England when carrying out their normal functions.

Hedgerows

Under the Hedgerows Regulations 1997, it is against the law to remove or destroy certain hedgerows without permission from the local planning authority. In general, permission will be required before removing hedges that are at least 20 metres in length, over 30 years old and contain certain species of plant. The local planning authority will assess the importance of the hedgerow using criteria set out in the regulations.

Non-native Invasive Plant Species

Under the Wildlife and Countryside Act 1981 (as amended), it is an offence to plant or otherwise cause these species to grow in the wild.

Any contaminated soil or plant material is classified as controlled waste and should be disposed of in a suitably licensed landfill site, accompanied by appropriate Waste Transfer documentation, and must comply with section 34 of the *Environmental Protection Act 1990*.

B.2 Planning Policy

National Planning Policy Framework, 2019

The National Planning Policy Framework (NPPF) sets out the Governments planning policies for England and how these are expected to be applied by Local Authorities within their Local Development Frameworks (LDF). Chapter 15 of the NPPF '*Conserving and enhancing the natural environment*' sets out the requirements to consider biodiversity in planning decisions.

Paragraph 174 states that *'Planning policies and decision should contribute to and enhance the natural and local environment by:*

- *protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*
- *recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*
- *maintaining the character of the undeveloped coast, while improving public access to it where appropriate;*
- *minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*
- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, considering relevant information such as river basin management plans; and*
- *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'*

Paragraph 175 states that '*Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.* '

Paragraph 179 states that '*To protect and enhance biodiversity and geodiversity, plans should:*

- *Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and*
- *promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity. '*

Paragraph 180 states that '*When determining planning application, local planning authorities should apply the following principles:*

- *if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
- *development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly*
- *outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;*

- *development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and*
- *development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.'*

Paragraph 181 states that '*The following should be given the same protection as habitats sites:*

- *potential Special Protection Areas and possible Special Areas of Conservation;*
- *listed or proposed Ramsar sites; and*
- *sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.'*

Paragraph 182 states that '*The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.'*

Regional

Table 10 provides a summary of the relevant regional planning policies. For a precise wording of each specific policy please refer back to the source document.

Table 10. Summary of Regional Planning Policy

Document	Planning Policy	Purpose
The Mayor's Biodiversity Strategy (2002)	Chapter 4: Policies and Proposals	Giving priority to the "protection of biodiversity, positive measures to encourage biodiversity action, promoting the management, enhancement and creation of valuable green space, incorporating biodiversity into new development, and access to nature and environmental education".
	Policy 1	Protection, management and enhancement of London's biodiversity. This will be implemented through a no net loss of important wildlife habitat, and a net increase in habitat through enhancement and habitat creation.
	Policy 5	Ensure that opportunities are taken to green the built environment within development proposals.
The Mayor's London Environment Strategy (2018)	Policy 5.1.1	Protect, enhance and increase green areas in the city, to provide green infrastructure services and benefits that London needs now and in the future.
	Policy 5.1.2	Protect, conserve, and enhance the landscape and cultural value of London's green infrastructure.
	Policy 5.2.1	Protect a core network of nature conservation sites and ensure a net gain in biodiversity.
	Policy 5.3.1	Address under investment, and improve the management of London's green infrastructure, by developing new business models and improving the awareness of the benefits of London's green infrastructure.
London Plan. The Spatial Development Strategy for Greater London (2021)	Policy G1 Green Infrastructure	London's network of green and open spaces, and green features in the built environment should be protected and enhanced. Green infrastructure should be planned, designed and managed in an integrated way to achieve multiple benefits. Development proposals should incorporate appropriate elements of green infrastructure that are integrated into London's wider green infrastructure network
	Policy G2 London's Green Belt	The Green Belt should be protected from inappropriate developments. The enhancement of the Green Belt to provide appropriate multi-functional beneficial uses for Londoners should be supported
	Policy G4 Open Space	Development Plans should promote the creation of new areas of publicly accessible open space particularly green space should not result in the loss of protected open space.
	Policy G5 Urban greening	Major development proposals should contribute to the greening of London by including urban greening as a fundamental element of site and building design, and by

Document	Planning Policy	Purpose
		incorporating measures such as high-quality landscaping (including trees), green roofs, green walls and nature-based sustainable drainage. In the interim, the Mayor recommends a target Urban Greening Factor (UGF) score of 0.4 for developments that are predominately residential, and a target score of 0.3 for predominately commercial development (excluding B2 and B8 uses).
	Policy G6 Biodiversity and access to nature	Sites of Importance for Nature Conservation (SINCs) should be protected. Development Plans should support the protection and conservation of priority species and habitats that sit outside the SINC network and promote opportunities for enhancing them using Biodiversity Action Plans and seek opportunities to create other habitats, or features such as artificial nest sites, that are of particular relevance and benefit in an urban context. Development proposals should manage impacts on biodiversity and aim to secure net biodiversity gain. This should be informed by the best available ecological information and addressed from the start of the development process.
	Policy G7 Trees and woodlands	London's urban forest and woodlands should be protected and maintained, and new trees and woodlands should be planted in appropriate locations in order to increase the extent of London's urban forest. 'Veteran' trees and ancient woodland should be protected and opportunities for tree planting in strategic locations identified. Development proposals should ensure that, wherever possible, existing trees of value are retained. If trees are removed there should be adequate replacement based on the existing value of the benefits of the trees removed

Local Planning Policy

Table 11 provides a summary of relevant local planning policies. For the precise wording of each specific policy please refer back to the source document.

Table 11. Summary of Local Planning Policy

Document	Planning Policy	Purpose
London Borough of Hillingdon Local Plan Part 1: Strategic Policies (2012)	EM3 Blue Ribbon Network	The Council will continue to promote and contribute to the positive enhancement of the strategic river and canal corridors and the associated wildlife and habitats through the Biodiversity Action Plan and the Thames River Basin Management Plan, and developer contributions where appropriate
	EM4 Open Space and Informal Recreation	The Council will seek to protect existing tree and landscape features and enhance open spaces with new areas of vegetation cover (including the linking of existing fragmented areas) including front and back gardens for the benefit of wildlife and a healthier lifestyle, mitigating climate change.
	EM7 Biological and Geological Conservation	The protection and enhancement of all Sites of Importance for Nature Conservation. Sites with Metropolitan and Borough Grade 1 importance will be protected from any adverse impacts and loss. Borough Grade 2 and Sites of Local Importance will be protected from loss with harmful impacts mitigated through appropriate compensation. The protection and enhancement of populations of protected species as well as priority species and habitats identified within the UK, London and the Hillingdon Biodiversity Action Plans. Appropriate contributions from developers to help enhance Sites of Importance for Nature Conservation in close proximity to development and to deliver/ assist in the delivery of actions within the Biodiversity Action Plan. The provision of biodiversity improvements from all development, where feasible. The provision of green roofs and living walls which contribute to biodiversity and help tackle climate change. The use of sustainable drainage systems that promote ecological connectivity and natural habitats.
London Borough of Hillingdon Local Plan Part 2: Development Management Policies (2020)	DMHB 11: Design of New Development	All new developments must include landscaping and tree planting to protect and enhance amenity, biodiversity and green infrastructure.
	DMHB 14: Trees and Landscaping	All developments will be expected to retain or enhance existing landscaping, trees, biodiversity or other natural features of merit. Development proposals will be required to provide a landscape scheme that includes hard and soft landscaping appropriate to the character of the area, which supports and enhances biodiversity, particularly in areas deficient of green infrastructure.

Document	Planning Policy	Purpose
		Where space for ground level planting is limited, such as high rise buildings, the inclusion of living walls and roofs will be expected where feasible. Where trees are to be removed, proposals for replanting of new trees on-site must be provided or include contributions to offsite provision.
	DMEI 1: Living walls and Roofs and on-site vegetation	All development proposals are required to comply with the following: All major development should incorporate living roofs and/or walls into the development. Suitable justification should be provided where living walls and roofs cannot be provided; Major development in Air Quality Management Areas must provide onsite provision of living roofs and/or walls. A suitable offsite contribution may be required where onsite provision is not appropriate.
	DMEI 5: Green Chains	Development in Green Chains will only be supported if it conserves and enhances the visual amenity and nature conservation value of the landscape, improve biodiversity in and around the area.
	DMEI 7: Biodiversity Protection and Enhancement	The design and layout of new development should retain and enhance any existing features of biodiversity or geological value within the site. Where loss of a significant existing feature of biodiversity is unavoidable, replacement features of equivalent biodiversity value should be provided on-site. Where development is constrained and cannot provide high quality biodiversity enhancements on-site, then appropriate contributions will be sought to deliver off-site improvements through a legal agreement. If development is proposed on or near to a site considered to have features of ecological or geological value, applicants must submit appropriate surveys and assessments to demonstrate that the proposed development will not have unacceptable effects. The development must provide a positive contribution to the protection and enhancement of the site or feature of ecological value. Proposals that result in significant harm to biodiversity which cannot be avoided, mitigated, or, as a last resort, compensated for, will normally be refused.

B.3 Local Biodiversity Action Plans

Table 12. Summary of Local Biodiversity Action Plan

Document	Purpose
London Biodiversity Action Plan (Greenspace Information for Greater London 2007)	The London Biodiversity Partnership delivers the London Biodiversity Action Plan for important habitats and species within the Greater London Area. This includes Habitat Action Plans for eleven habitats and Species Action Plans for eight species.

Appendix C Target Notes

TN Number	Target Notes
TN1	False Acacia in block of Introduced Shrub
TN2	Buddleia in block of Introduced Shrub
TN3	Himalayan Balsam growing along watercourse running through woodland
TN4	Species Poor Hedge growing along edge of Site
TN5	Semi-natural Broadleaved Woodland with emergent Turkey Oak and invasive species understory
TN6	Semi-natural Broadleaved Woodland with emergent Turkey Oak and invasive species understory
TN7	Bare ground – Amenity Grassland Mosaic Habitat
TN8	Cherry Laurel in block of Introduced Shrub
TN9	Himalayan Cotoneaster growing in Introduced Shrub
TN10	Three-cornered Garlic growing in planters
TN11	Bare ground where buildings have been removed
TN12	Entire-leaved Cotoneaster growing in line of trees
TN13	Garden area surveyed remotely by binoculars
TN14	Temporary water body in the centre of the woodland on site
TN15	No access to the active construction site. B11, B12 and B13 were demolished at the time of the site visit.
TN16	Mammal hole located in the block of woodland on site
TN17	Watercourse running through the woodland on site
TN18	Mammal commuting trails through area of scrub on Site
TN19	Japanese knotweed stand recorded in June 2021.

Appendix D Preliminary Ecological Appraisal

Hillingdon Hospital

Preliminary Ecological Appraisal

Hillingdon Hospitals NHS Foundation Trust

Project number: 60642181
THHR-ACM-ZZ-XX-RP-Y-000010

March 2022

Delivering a better world

Quality information

Prepared by	Checked by	Verified by	Approved by
			
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Revision History

Revision	Revision date	Details	Authorized	Name	Position
V1	17.12.2020	Draft for comment	18.12.2020	SG	Regional Director
V2	13.01.2021	Change of boundary and other minor changes	13.01.2021	SG	Regional Director
V3	30.07.2021	Update after further surveys started on site. DRAFT for review.	30.07.2021	PS	Regional Director
V4	11.11.2021	Issue	11.11.2021	PS	Regional Director
V5	25.03.2022	Issue after receipt of crib sheet	29.03.2022	PS	Regional Director

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Executive Summary

This Preliminary Ecological Appraisal (PEA) has been prepared by AECOM Ltd to accompany a hybrid planning application being submitted by the Client, Hillingdon Hospitals NHS Foundation Trust, to the London Borough of Hillingdon.

Hillingdon Hospital is located to the south of Pield Heath Road, bound by Royal Lane to the west, and Colham Green Road to the east. The Site is located within the Brunel Ward. The site comprises a ten-storey block built in the 1960s and a mix of other hospital buildings scattered across the site. Many of the acute beds are in single storey wards built in the 1940s, which are in very poor condition. The remainder of the site consists mainly of surface level car parking, interspersed with pockets of landscaping. The site layout is shown in Figure 1 within Appendix A.

The Proposed Development will comprise the demolition of the existing buildings and the redevelopment of the Site to provide a new Hillingdon Hospital, a mixed-use development (residential and commercial), multi-storey and surface car and cycle parks, vehicle access improvements, landscaping and public open spaces, utilities and associated works.

The PEA was commissioned to identify whether there are known or potential ecological receptors (defined as nature conservation designations and, or protected or notable species or habitats) that may constrain or influence the design and implementation of the Proposed Development.

Prior to the site visit, a desk study was carried out to check for the presence of any sites designated for their biodiversity value in the vicinity of the Site and protected and scheduled invasive non-native species records nearby. Greenspace Institute for Greater London (GiGL) was contacted for protected and scheduled invasive non-native species records within 1 km and statutory/non-statutory site designations for nature conservation within 1 km. Statutory site designations within 5 km were obtained from the Multi-Agency Government Information for the Countryside (MAGIC) website.

Two AECOM ecologists visited the Site on the 26th and 27th November 2020. It was found that the Site had value for biodiversity, containing habitats of principal importance and the potential for protected species. Deciduous woodland (0.52ha), hedgerow (376m) and a watercourse (175m) (tributary of the River Pinn, a main river) were found on-site and it is recommended that these habitats should be retained, protected and incorporated into the design of the development. Other habitats found on-site include hardstanding (4.26ha), buildings (2.77ha), amenity grassland (1.29ha), bare ground (0.58ha), introduced shrub (0.13ha), scrub (0.03%) and trees.

A peregrine falcon (*Falco peregrinus*) was seen perching close to the Site and it is reported that breeding occurred within the Site in 2020. Monitoring surveys prior to planning submission are recommended to confirm the presence of this specie, or not, within the Site and preparation of a Peregrine Mitigation Strategy is recommended for planning works within the Site. The peregrine falcon surveys would provide an opportunity to investigate the potential occurrence of two other Schedule 1 bird species potentially relevant to the Site – red kite (*Milvus milvus*) and black redstart (*Phoenicurus ochruros*). During the surveys undertaken for peregrine falcon and breeding birds in spring/summer 2021, peregrine falcon was confirmed breeding on site.

Several buildings and trees on the Site had the potential to support roosting bats. The woodland, hedgerow and watercourse provide foraging and commuting habitat for bats. Presence/absence roost surveys are recommended on 16 buildings and eight trees with suitability for roosting bats. An internal inspection is recommended on the High suitability building, The Furze (B10 in Figure 1 within Appendix A), and moderate suitability buildings (Pinewood Complex, B21-26). Further surveys will confirm the requirement for a Natural England European Protected Species (EPS) mitigation licence if bats are present or any other requirements for mitigation. 23 trees with low suitability for roosting bats will require ecological supervision by a bat licensed ecologist if their removal or trimming is required.

There were five invasive non-native plant species found on the Site (Himalayan balsam (*Impatiens glandulifera*), Himalayan cotoneaster (*Cotoneaster simonsii*), entire-leaved cotoneaster (*Cotoneaster integrifolius*)*, three-cornered garlic (Allium triquetrum) a*nd rhododendron (*Rhododendron ponticum*)) that are listed in Schedule 9 of the Wildlife and Countryside Act and Himalayan balsam is listed under the Invasive Alien Species (Enforcement and Permitting) Act 2019. It is recommended that an Invasive Non-native Plant Management Plan is produced to undertake a risk assessment and provide recommendations for their removal, where necessary, and biosecurity considerations during works. During an updated survey undertaken during the growing season for plants (June) 2021, Japanese knotweed (*Reynoutria japonica*) was also recorded within the Site, to the south-east, on the river

embankment and hollyberry cotoneaster (*Cotoneaster bullatus*) growing in a hedge south of the Elderly Day Hospital. Both species are also listed on schedule 9.

It is recommended that a Water Framework Directive Screening and Scoping is undertaken to assess any potential impacts on the watercourse on the Site as a result of the Proposed Development. The watercourse is a tributary of the River Pinn, which is a non-statutory designated site for nature conservation located 800m to the west.

The design for the Proposed Development will avoid woodland, watercourse and some of the hedgerow habitats.

Mitigation measures are recommended to avoid and reduce the risk of negative impacts on habitats and protected species during future works:

- Avoid works to the building where the peregrine falcon has nested during the peregrine nesting season (February-July);
- Use low level-lighting (e.g. bollards) and directional lighting during works and within final design to avoid disturbance to commuting and foraging bats.
- Check any vegetation or trees cleared during the bird nesting season (March to September inclusive) using a suitably qualified ecologist.
- Avoid scrub and vegetation clearance during the hedgehog hibernation period (Nov-March). If clearing dense scrub, hand-search for hedgehogs hibernating under leaf debris.
- Undertake biosecurity measures to prevent the spread of invasive species during works on Site.
- Implement a Construction Environmental Management Plan (CEMP) during the construction phase of the Proposed Development to avoid any indirect impact on the adjacent habitats, watercourses and nearby non-statutory sites.

In accordance with the National Planning Policy Framework (NPPF) and regional and local planning policies, biodiversity net gain and the provision for ecological protection, appropriate ecological enhancements are recommended for the Site.

The built environment could include green roof and artificial nest/roost boxes in the final building design. A peregrine nest box should be placed on the new hospital building before the demolition of the building where they nested in 2021. The associated soft landscaping should include native or wildlife-friendly plant species of benefit to biodiversity.

The woodland should be enhanced with the creation of log/brash piles for hedgehogs and artificial nest/roost boxes in trees and deadwood piles for stag beetles and removal of invasive species. The creation of three wetland areas with swales and attenuation basins has been designed by the landscape team. Fencing suitable to allow hedgehog transit across the Site will be established in the south of the Site if the boundary is not permeable.

1. Introduction

This Preliminary Ecological Appraisal (PEA) has been prepared by AECOM Ltd to accompany a hybrid planning application being submitted by the Client, Hillingdon Hospitals NHS Foundation Trust, to the London Borough of Hillingdon. AECOM was commissioned to carry out an extended Phase 1 Habitat Survey, a desk study, a preliminary roost assessment for bats and a preliminary bird nest assessment within the Site.

1.1 Site Location

Hillingdon Hospital is located to the south of Pield Heath Road, bound by Royal Lane to the west, and Colham Green Road to the east. The Site is located within the Brunel Ward. The site comprises a ten-storey block built in the 1960s and a mix of other hospital buildings scattered across the Site. Many of the acute beds are in single storey wards built in the 1940s, which are in very poor condition.

The remainder of the Site consists mainly of surface level car parking, interspersed with pockets of landscaping.

There are two areas covered by Tree Preservation Orders (TPOs) within the Site: one south of the Furze and the second is west of the Woodlands Centre. A culvert runs west-east crossing both TPOs. The culvert is canalised under the service road and partially under the Woodlands Centre.

There are several points of access to the Site: the main entrance is from Pield Heath Road with a separate access for the Accident and Emergency (A&E) department. There are three separate access points from Royal Lane and a separate access from Colham Green Road. Cycle access is only through the vehicular traffic road path. Uxbridge town centre is approximately 2 km to the north-west.

To the west of the Site along Royal Lane comprises two-storey detached and semi-detached residential properties, in the north-west corner of the Site lies a three-four storey flatted residential block rising to four-storeys along Pield Health Road opposite the entrance to the Outpatient Department.

The Site is shown in Figure 1 in Appendix A.

1.2 Proposed Development

The proposal (hereafter referred to as the Proposed Development) comprises a hybrid application for:

- Full application seeking planning permission for demolition of existing buildings and redevelopment of the site to provide the new Hillingdon Hospital, multi-storey car park and mobility hub, vehicle access, highways works, associated plant, generators, substation, new internal roads, landscaping and public open space, utilities, servicing area, surface car park/ expansion space, and other works incidental to the proposed development.
- Outline planning application (all matters reserved, except for access) for the demolition of buildings and structures on the remaining site (excluding the Grade II Furze and Tudor Centre) for a mixed-use development comprising residential (Class C3) and supporting Commercial, Business and Service uses (Class E), new pedestrian and vehicular access; public realm, amenity space, car and cycling parking.

1.3 Purpose

This PEA was commissioned to identify whether there are known or potential ecological receptors (defined as nature conservation designations and protected or notable species or habitats) that may contain or influence the design and implications of the Proposed Development. The approach applied when undertaking this PEA accords with the Guidelines for Preliminary Ecological Appraisal, Second Edition, published by the Chartered Institute of Ecology and Ecological Management (CIEEM, 2017).

In order to deliver the PEA, a desk study and an extended Phase 1 Habitat Survey was undertaken by a suitably qualified ecologist.

The purpose of the PEA was to:

- identify and categorise all habitats present within the Site and any areas immediately outside of the Site where there may be potential for direct or indirect effects (the zone of influence) as a result of the Proposed Development;

- carry out an appraisal of the potential of the habitats recorded to support protected or notable species of fauna and flora;
- provide advice on any potential ecological constraints and opportunities within the Site and its zone of influence, including the identification (where relevant) of any requirements for follow-up habitat and species surveys and/or requirements for ecological mitigation; and provide a map showing the location of the identified ecological receptors or relevance; and
- make recommendations such that the Proposed Development will achieve a net gain in biodiversity.

The PEA is intended for advice in respect of the design of the Proposed Development, site layout and / or site investigation. The report identifies the scope of further ecological surveys and/or ecological impact assessment (including detailed mitigation measures) that may be required in connection with a planning application or to contribute to an Ecological Impact Assessment (EcIA) once the Proposed Development proposals have been finalised and any required biodiversity surveys have been completed. High level recommendations are made to inform options for the avoidance, mitigation or compensation of the potential impacts of the Proposed Development (where known) on the identified ecological receptors, and of potential enhancements to biodiversity.

1.4 Quality Assurance

All AECOM ecologists follow the Chartered Institute of Ecology and Environmental Management (CIEEM) code of professional conduct when undertaking ecological work and many of them are Full Members. They are appropriately qualified and will conduct their work with all reasonable skill and care. Many senior ecologists are Chartered Environmentalists and Ecologists.

2. Wildlife Legislation and Planning Policy

2.1 Wildlife Legislation

The following wildlife legislation is potentially relevant to the Site:

- Wildlife and Countryside Act (WCA) 1981 (as amended);
- Countryside and Rights of Way (CRoW) Act 2000;
- Natural Environment and Rural Communities (NERC) Act 2006;
- Protection of Badgers Act 1992;
- Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitat Regulations)[1];
- The Hedgerows Regulations 1997;
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017; and
- Invasive Alien Species (Enforcement and Permitting) Order 2019.

The above legislation was considered when planning and undertaking this PEA using the methods described in Section 3 when identifying potential constraints to the Proposed Development, and when making recommendation for further surveys, design options and mitigation as discussed in Section 5. Compliance with legislation may require the attainment of relevant protected species licences prior to implementation of the Proposed Development.

Further information on the requirements of the above legislation is provided in Appendix D.

2.2 National Planning Policy

The National Planning Policy Framework (NPPF) was originally published on 27th March 2012 and detailed the Government's planning policies for England and how these are expected to be applied. The NPPF was then revised on the 24th July 2018, 19th February 2019 and 20th July 2021.

The NPPF stated the commitment of the UK Government to minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity.

It specifies the obligations that Local Authorities and the UK Government have regarding statutory designated sites and protected species under UK and international legislation and how this is to be delivered in the planning system. Protected or notable habitats and species can be a material consideration in the planning system. Protected or notable habitats and species can be a material consideration in planning decisions and may therefore make some sites unsuitable for particular types of development. If development is permitted, mitigation measures may be required to avoid or minimise impacts on certain habitats and species, or where impact is unavoidable, compensation may be required.

The NPPF is clear that pursuing sustainable development includes moving from no net loss of biodiversity to achieving net gains for nature, and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution.

Further information in the relevant parts of the NPPF is provided in Appendix D.

[1] The UK is no longer a member of the European Union (EU). EU legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation. EU legislation which applied directly or indirectly to the UK before 11.00 p.m. on 31 December 2020 has been retained in UK law as a form of domestic legislation known as 'retained EU legislation'. The Secretary of State for the Environment, Food and Rural Affairs and Welsh Ministers have made changes to parts of the *Conservation of Habitats and Species Regulations 2017* (referred to as the 2017 Regulations) so that they operate effectively. Most of these changes involve transferring functions from the European Commission to the appropriate authorities in England. All other processes or terms in the 2017 Regulations remain unchanged and existing guidance is still relevant.

2.3 Regional Planning Policy

Relevant regional planning policies for the site is detailed in the following documents:

- Mayor's Biodiversity Strategy (2002);
- Mayor's London Environment Strategy (2018);
- London Biodiversity Action Plan (Greenspace Information for Greater London, 2007); and
- London Plan. The Spatial Development Strategy for Greater London (2021);

Table 1 provides a summary of the relevant regional planning policies. For a precise wording of each specific policy please refer back to the source document. This planning policy has been considered when assessing potential ecological constraints and opportunities identified by the desk study and field surveys; and, when assessing requirements for further survey, design options and ecological mitigation, as described in Section 5 (Identification of Ecological Constraints and Recommendations) and Section 6 (Opportunities for Ecological Enhancements).

Table 1. Summary of Regional Planning Policy

Document	Policy	Purpose
The Mayor's Biodiversity Strategy (2002)	Chapter 4: Policies and Proposals	Giving priority to the "protection of biodiversity, positive measures to encourage biodiversity action, promoting the management, enhancement and creation of valuable green space, incorporating biodiversity into new development, and access to nature and environmental education".
	Policy 1	Protection, management and enhancement of London's biodiversity. This will be implemented through a no net loss of important wildlife habitat, and a net increase in habitat through enhancement and habitat creation.
	Policy 5	Ensure that opportunities are taken to green the built environment within development proposals.
The Mayor's London Environment Strategy (2018)	Objective 5.1 Make more than half of London's area green by 2050:	Policy 5.1.1 Protect, enhance and increase green areas in the city, to provide green infrastructure services and benefits that London needs now and in the future. Policy 5.1.2 Protect, conserve, and enhance the landscape and cultural value of London's green infrastructure.
	Objective 5.2 Conserving and enhancing wildlife and natural habitats:	Policy 5.2.1 Protect a core network of nature conservation sites and ensure a net gain in biodiversity.
	Objective 5.3 Value London's natural capital as an economic asset and support greater investment in green infrastructure	Policy 5.3.1 Address under investment, and improve the management of London's green infrastructure, by developing new business models and improving the awareness of the benefits of London's green infrastructure.
London Biodiversity Action Plan (Greenspace Information for Greater London 2007)	Protected Species	Habitats and species that are of importance for biodiversity in London. Priority habitats of relevance to the Site are "Parks and urban green spaces", which support biodiversity and provide contact with nature. Measures to conserve and enhance biodiversity in London are contained within a document entitled Design of Biodiversity in London, which includes recommendations such as the inclusion of green and brown roofs with new developers.
London Plan. The Spatial Development Strategy for Greater London (2021)	Policy G1 Green Infrastructure	London's network of green and open spaces, and green features in the built environment should be protected and enhanced. Green infrastructure should be planned, designed and managed in an integrated way to achieve multiple benefits. Development proposals should incorporate appropriate elements of green infrastructure that are integrated into London's wider green infrastructure network
	Policy G2 London's Green Belt	The Green Belt should be protected from inappropriate developments. The enhancement of the Green Belt to provide appropriate multi-functional beneficial uses for Londoners should be supported

Document	Policy	Purpose
	Policy G4 Open Space	Development Plans should promote the creation of new areas of publicly accessible open space particularly green space should not result in the loss of protected open space.
	Policy G5 Urban greening	Major development proposals should contribute to the greening of London by including urban greening as a fundamental element of site and building design, and by incorporating measures such as high-quality landscaping (including trees), green roofs, green walls and nature-based sustainable drainage. In the interim, the Mayor recommends a target Urban Greening Factor (UGF) score of 0.4 for developments that are predominately residential, and a target score of 0.3 for predominately commercial development (excluding B2 and B8 uses).
	Policy G6 Biodiversity and access to nature	Sites of Importance for Nature Conservation (SINCs) should be protected. Development Plans should support the protection and conservation of priority species and habitats that sit outside the SINC network and promote opportunities for enhancing them using Biodiversity Action Plans and seek opportunities to create other habitats, or features such as artificial nest sites, that are of particular relevance and benefit in an urban context. Development proposals should manage impacts on biodiversity and aim to secure net biodiversity gain. This should be informed by the best available ecological information and addressed from the start of the development process.
	Policy G7 Trees and woodlands	London's urban forest and woodlands should be protected and maintained, and new trees and woodlands should be planted in appropriate locations in order to increase the extent of London's urban forest. 'Veteran' trees and ancient woodland should be protected and opportunities for tree planting in strategic locations identified. Development proposals should ensure that, wherever possible, existing trees of value are retained. If trees are removed there should be adequate replacement based on the existing value of the benefits of the trees removed

2.4 Local Planning Policy

Relevant local planning policies[2] for the development within the Site are detailed in the following documents:

- London Borough of Hillingdon Local Plan Part 1: Strategic Policies (Adopted 2012); and
- London Borough of Hillingdon Local Plan Part 2: Development Management Policies (January 2020).
- London Borough of Hillingdon Local Plan Part 2: Site Allocations and Designations (January 2020).

Table 2 provides a summary of relevant local planning policies. For the precise wording of each specific policy please refer back to the source document. This planning policy has been considered when assessing potential ecological constraints and opportunities identified by the desk study and field surveys; and, when assessing requirements for further survey, design options and ecological mitigation, as described in Section 5 (Identification of Ecological Constraints and Recommendations) and Section 6 (Opportunities for Ecological Enhancements).

Table 2. Summary of Local Planning Policy

Document	Planning Policy	Purpose
London Borough of Hillingdon Local Plan Part 1: Strategic Policies (2012)	EM3 Blue Ribbon Network	The Council will continue to promote and contribute to the positive enhancement of the strategic river and canal corridors and the associated wildlife and habitats through the Biodiversity Action Plan and the Thames River Basin Management Plan, and developer contributions where appropriate
	EM4 Open Space and Informal Recreation	The Council will seek to protect existing tree and landscape features and enhance open spaces with new areas of vegetation cover (including the linking of existing fragmented areas) including front and back gardens for the benefit of wildlife and a healthier lifestyle, mitigating climate change.
	EM7 Biological and Geological Conservation	The protection and enhancement of all Sites of Importance for Nature Conservation. Sites with Metropolitan and Borough Grade 1 importance will be protected from any adverse impacts and loss. Borough Grade 2 and Sites of Local Importance will be protected from loss with harmful impacts mitigated through appropriate compensation. The protection and enhancement of populations of protected species as well as priority species and habitats identified within the UK, London and the Hillingdon Biodiversity Action Plans.

[2] https://www.hillingdon.gov.uk/local-plan

Document	Planning Policy	Purpose
		Appropriate contributions from developers to help enhance Sites of Importance for Nature Conservation in close proximity to development and to deliver/ assist in the delivery of actions within the Biodiversity Action Plan. The provision of biodiversity improvements from all development, where feasible. The provision of green roofs and living walls which contribute to biodiversity and help tackle climate change. The use of sustainable drainage systems that promote ecological connectivity and natural habitats.
London Borough of Hillingdon Local Plan Part 2: Development Management Policies (2020)	DMHB 11: Design of New Development	All new developments must include landscaping and tree planting to protect and enhance amenity, biodiversity and green infrastructure.
	DMHB 14: Trees and Landscaping	All developments will be expected to retain or enhance existing landscaping, trees, biodiversity or other natural features of merit. Development proposals will be required to provide a landscape scheme that includes hard and soft landscaping appropriate to the character of the area, which supports and enhances biodiversity, particularly in areas deficient of green infrastructure. Where space for ground level planting is limited, such as high rise buildings, the inclusion of living walls and roofs will be expected where feasible. Where trees are to be removed, proposals for replanting of new trees on-site must be provided or include contributions to offsite provision.
	DMEI 1: Living walls and Roofs and on-site vegetation	All development proposals are required to comply with the following: All major development should incorporate living roofs and/or walls into the development. Suitable justification should be provided where living walls and roofs cannot be provided; Major development in Air Quality Management Areas must provide onsite provision of living roofs and/or walls. A suitable offsite contribution may be required where onsite provision is not appropriate.
	DMEI 5: Green Chains	Development in Green Chains will only be supported if it conserves and enhances the visual amenity and nature conservation value of the landscape, improve biodiversity in and around the area.
	DMEI 7: Biodiversity Protection and Enhancement	The design and layout of new development should retain and enhance any existing features of biodiversity or geological value within the site. Where loss of a significant existing feature of biodiversity is unavoidable, replacement features of equivalent biodiversity value should be provided on-site. Where development is constrained and cannot provide high quality biodiversity enhancements on-site, then appropriate contributions will be sought to deliver off-site improvements through a legal agreement. If development is proposed on or near to a site considered to have features of ecological or geological value, applicants must submit appropriate surveys and assessments to demonstrate that the proposed development will not have unacceptable effects. The development must provide a positive contribution to the protection and enhancement of the site or feature of ecological value. Proposals that result in significant harm to biodiversity which cannot be avoided, mitigated, or, as a last resort, compensated for, will normally be refused.
London Borough of Hillingdon Local Plan Part 2: Site Allocations and Designations (2020)		All land designations are illustrated on the Hillingdon Policies Map.

3. Method

3.1 Desk Study

A desk study was carried out to identify nature conservation designations of notable habitats and species, including invasive non-native species potentially relevant to the Site and the Proposed Development.

A stratified approach was taken when defining the desk study based on the zone of influence of the Proposed Development on different ecological receptors and an understanding of the maximum distance typically considered by statutory consultees. Accordingly, the desk study identified any international and national nature conservation designations within 5km of the red line boundary, other non-statutory conservation designations, protected habitats and species within 1km of the red line boundary. The desk study was carried out using the data sources detailed in Table 3.

The search included statutory designated sites such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs), Ramsar sites, National Nature Reserves (NNRs) and Local Nature Reserves (LNRs).

Table 3. Desk Study Data Sources

Data Source	Accessed	Data Obtained
Multi-Agency Geographic Information for the Countryside (MAGIC) website	November 2020	International statutory designations within 5km. Other statutory designations within 5km. Ancient woodlands and notable habitats within 2km. Higher Level Environmental Stewardship agreements applied to the Site. Information on habitats and habitat connections (based of aerial photography) relevant to interpretation of planning policy can assessment of potential protected and notable species constraints.
Greenspace Institute for Greater London (GiGL)	November 2020	Non-statutory designations within 1km Protected and notable species records within 1km (records for the last 10 years only)
Hillingdon Policy Map	January 2022	Sites of Importance for Nature Conservation (SINCs)
Ordnance Survey 1:2500 Pathfinder maps and aerial photography	November 2020	Information on habitats and habitat connections (based of aerial photography) relevant to interpretation of planning policy can assessment of potential protected and notable species constraints.

3.2 Field Survey

A Phase 1 Habitat Survey was carried out on the 26th and 27th of November in accordance with the standard methods (Joint Nature Conservation Committee, 2010)[3]. Phase 1 Habitat Survey is a standard method of environmental audit which involves categorising different habitat types and habitat features within a survey area. The information gained for the survey was used to determine the likely ecological value of a site, and to direct any more specific survey work, which may need to be carried out prior to submission of a planning application. The standard Phase 1 Habitat Survey method was extended to record target notes on protected, notable and invasive non-native plant species.

The survey area encompassed all safely accessible parts of the Site. See section 3.3 for non-accessible areas.

3.2.1 Appraisal of Potential Suitability to Support Protected and Notable Species

An appraisal was made of the potential suitability of the habitats present to support protected and notable species of plants and/or animals. Field signs, habitat features with potential to support protected species and any sightings or auditory evidence were recorded when encountered, but no detailed surveys were carried out for any particular species.

A note was made of visible instances of invasive non-native plant species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) including Japanese knotweed (*Reynoutria japonica*) and likewise for

[3] JNCC (2010) Handbook for Phase 1 Habitat Survey - a technique for environmental audit. JNCC

species listed on the Invasive Alien Species (Enforcement and Permitting) Act 2019 (as amended). Locations of plants or stands of any such invasive non-native plant species found when recorded.

Section 6 of this report identifies further requirements for species survey based on the results of the Phase 1 Habitat Survey. These surveys should be completed prior to submission of a planning application as the results are likely to be material for determination of a planning application.

3.2.2 Plant Abundance (DAFOR)

Plant species were recorded for different habitat types and reflect the conditions at the time of the survey. Phase 1 Habitat Surveys are not aimed at providing a detailed inventory of the plant species present in the survey area, nor it is required to possess a full list of species found within the red-line boundary. The frequency of plant species present was recorded using the DAFOR scale, and the overall values of species within habitat blocks are recorded in Section 4.2.1 and expanded on in Appendix C. The DAFOR scale measures the relative abundance of plant species on site based on relative percentage cover as shown in Table 4.

Table 4. Plant Abundance (DAFOR) Scale Designations

Abundance	Relative Cover (percentage)
D = Dominant	50-100
A = Abundance	30-50
F = Frequent	15-30
O = Occasional	5-15
R = Rare	<5

Source: Guidance Notes for Recording DAFOR, source Norfolk Wildlife Trust[4]

3.2.3 Initial Bird Nesting Assessment

An assessment of the buildings, hedges and trees on the Site for their suitability to support nesting birds was carried out on the 26th and 27th of November concurrent with the Phase 1 Habitat Survey. Features searched for using close focusing binoculars included nests both in use and recently abandoned, as well as cavities in trees that could be used by larger species such as owls and woodpeckers.

3.2.4 Initial Bat Roosting Assessment

An assessment of the structures and trees on and surrounding Site was carried out on the 26th and 27th of November to determine their suitability to support roosting bats. The survey was conducted in line with the Bat Conservation Trust (BCT) survey guidelines[5].

Close focusing binoculars were used to conduct an external assessment of structures and trees where access was permitted. It should be noted that this only provided an initial assessment of features with suitability for roosting bats, through the presence of Potential Roost Features (PRFs). Checks of interior spaces of trees and structures were not completed.

On the basis of the external assessment, the overall suitability of these trees and structures to support roosting bats was classified according to the scale outlined in Table 5 with the follow up survey effort requirement outlined in Table 6 (based on Collins, 2016[3]).

Table 5. Criteria used to describe Bat Roost Suitability

Suitability Level	Type of Roost		
Habitat Suitability	Summer/Transitional Roost used by non-breeding bats	Maternity Roost	Hibernation Roost
Confirmed	Presence of bats or evidence of bats. Confirmation of roost status may require further survey.		
High	Feature with multiple roosting opportunities for one or more species of bats with good	Feature with multiple roosting opportunities for breeding bats (size, temperature), with close	Large site that offers cool stable conditions with multiple roosting

[4] https://www.norfolkwildlifetrust.org.uk/documents/downloads/cwa/handout-9-using-dafor
[5] Collins, J. (editor) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust: London

Suitability Level	Type of Roost		
Habitat Suitability	**Summer/Transitional Roost used by non-breeding bats**	**Maternity Roost**	**Hibernation Roost**
	connectivity to high quality foraging habitat.	proximity and connectivity to high quality foraging habitat.	opportunities in close proximity to high quality foraging habitat.
Moderate	Feature with some roosting opportunities and connectivity to moderate or high-quality foraging habitat.	Feature providing some roosting opportunities with some connectivity to moderate or high-quality foraging habitat.	Medium sized feature with some roosting opportunities and some connectivity to moderate or high-quality foraging habitat
Low	Feature with a limited number of roosting opportunities with poor connectivity to foraging habitat.	Feature with a limited number of roosting opportunities for breeding bats with low proximity and connectivity to low or moderate quality foraging habitat.	Small sized feature which may be subject to disturbance or environmental variations, with a limited number of roosting opportunities and poor connectivity to foraging habitat.

Table 6. Survey Effort for Bat Roosts based on Roost Suitability

Roost/Location	Low Suitability	Medium Suitability	High Suitability
Building/Structure	One survey visit; either a dusk emergence or dawn re-entry survey.	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey.	Three separate survey visits consisting of at least one dusk emergence and a separate dawn re-entry survey, with the third visit either a dusk or dawn survey.
Tree	No Survey Required, precautionary working methods only.	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey.	Three separate survey visits consisting of at least one dusk emergence and a separate dawn re-entry survey, with the third visit either a dusk or dawn survey.

3.3 Limitations

There were several enclosed courtyards and an existing construction site inaccessible to the surveyors within the hospital complex on the day of the survey. The area not accessed was 1.82 ha or 16% of the Site.

The survey was carried out in November which was within the sub-optimal season for plant identification. Identification of plants was made from available features such as leaves, twigs and berries.

The aim of a desk study was to help characterise the baseline context of a proposed development and provide valuable background information that would not be captured by a single site survey alone. Information obtained during the course of a desk study was dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a particular habitats or species does not necessarily mean that the habitats or species do not occur in the study area. Likewise, the presence of records for particular habitats and species does not automatically mean that these still occur within the area of interest or are relevant in the context of the proposed development.

Where habitat boundaries coincide with physical boundaries recorded on OS maps, the resolution is as determined by the scale of mapping. Elsewhere, habitat mapping is as estimated in the field and/or recorded by hand-held GPS. Where areas of habitat are given, they are approximate and should be verified by measurement on site where required for design or construction.

An ecological survey represents a ‘snapshot’ in time of the ecological condition of a site. The ecological character of a site can change substantially throughout both the course of a year, and from year to year impacting on the extent and quality of habitats potential to support protected species. As the survey was carried outside the main plant growing season for both native and invasive non-native species it is probable that some species weren’t present during the time of survey. A PEA is however not a detailed inventory of plant species present and the potential oversight of some species is not a constraint for this level of survey.

None of these limitations either singly or in combination is significant enough to affect the baseline, impact assessment and resulting mitigation or enhancement referenced in this report given the nature of the habitats and the experience of the ecologists undertaking the survey.

3.4 Report Lifespan

The findings and recommendations outlined here will need to be reassessed if there is a significant change to the type or scale of development proposed, or if there are any significant changes in the use or management of the land that would affect the habitats and species.

If a planning application is made 18 months or more after a PEA, it is advisable to review and update the survey data. This follows guidance from the Chartered Institute of Ecology and Environment Management (CIEEM, 2019[6]).

[6] CIEEM, 2019. Advice Note on the lifespan of Ecological Reports and Surveys. April 2019

4. Results

4.1 Nature Conservation Designations

4.1.1 Sites Statutorily Designated for their biodiversity value

Based on the methods given in Section 3.1 of this report, the desk study identified nine sites statutorily designated for their nature conservation value or ancient status within 5km of the red line boundary of the Site. There are no international designations within 5km of the Site. There are three nationally designated Sites (Sites of Special Scientific Interest (SSSIs)) and six Local Nature Reserves (LNRs) within 5km of the boundary of the Site. The statutorily designated sites within 5km are shown below in Table 7 and are listed with the closest sites in ascending order of distance.

Table 7. Statutory Designated Sites

Site and Designation	Reasons for Designations	Approximate Relationship to Site
Yeading Woods Local Nature Reserve (LNR) (31.59ha)	The reserve has a small meadow, river bank and coppiced woodland. Species include bluebells in spring, broad leaved helleborine orchid (*Epipactis helleborine*), kingfisher (*Alcedo atthis*) along the Yeading Brook, and the continental wasp spider (*Argiope bruennichi*).	2.9km north east of the Site
Yeading Meadows LNR (29.96ha)	The hundred year old pedunculate oak (*Quercus robur*) plantation over hazel (*Corylus avellana*) coppice which forms Ten Acre Wood adjoins the flower rich Yeading Brook Meadows. The woodland is mostly oak, planted in the late 19th Century with an understory of mainly hawthorn (*Crataegus monogyna*) and hazel	3km to the east of the Site
Yeading Brook Meadows LNR (5.69ha)	Wild flowers and grasses dominate this meadow, hosting an array of insect life from Roesel's bush-cricket and shield bugs to skipper butterflies and moths. Other species that can be seen are skylark and snipe; five-spotted burnet moth; narrow-leaved water-dropwort, small heath and common spotted-orchid; common frog	3.1km north east of the Site
Frays Valley LNR (71.87ha)	The wildlife-rich Frays River meanders through the Frays Farm Meadows SSSI. Species recorded to be present include marsh marigold (*Caltha palustris*) and ragged-robin (*Lychnis flos-cuculi*).	3.8km north of the Site
Denham Country Park LNR (19.82ha)	Located on the banks of the rivers Colne, Misbourne and Frays. Herons and kingfishers and damselflies and dragonflies can be seen at the wet meadows.	3.8km north of the Site
Fray's Farm Meadows SSSI (26.3ha)	The land was designated as SSSI because it represents one of the last remaining areas of relatively unimproved wet alluvial grassland habitat in the Greater London area and Colne Valley. The meadows contain a variety of grassland communities which range from the grazed grassland of sweet vernal-grass (*Anthoxanthum odoratum)*, crested dog's-tail (*Cynosurus cristatus)* and perennial rye-grass (*Lolium perenne)* through to areas of tall sedge dominated marshy grassland with lesser pond sedge (*Carex acutiformis)* and reed-grass (*Glyceria maxima)*. The linear features of the site - ditches, hedges and railway embankment - add further habitat diversity, and contribute to the richness of plants and animals present.	3.8km north of the Site
Kingcup Meadows and Oldhouse Woods SSSI (12.9ha)	Consisted of a mosaic of habitats adjacent to the River Alderbourne, which includes woodland, unimproved pastures and semi and unimproved meadowland. The fields are comprised of dry grassland, wet grassland and areas of fen and swampy vegetation. Oldhouse Wood has been managed in the past as coppice-with-standards and retains a wide range of native trees and shrubs, along with many woodland species indicative of ancient woodland The grassland has a high diversity throughout with a high proportion of forbs to grasses. The wetter patches are similarly rich. Characteristic plants present include meadowsweet (*Filipendula ulmaria*), knapweed (*Centaurea nigra*), water dropwort (*Oenanthe aquatica*) and greater trefoil (*Lotus pedunculatus*). The semi-improved field is recovering well as a result of the restoration management undertaken including the spreading of hay from the end field	4.2km north west of the Site
Dernham Quarry Park LNR (29.61ha)	The park is home to a mix of wildlife features and habitats including wet meadows and a flooded quarry. Denham Quarry Park is close by to Frays Valley Local Nature Reserve in the Greater London area.	4.3km north of the Site
Denham Lock Wood SSSI (6.82ha)	Diverse area of open mire and wet woodland which shows a zonation of wetland habitats. The woodland herb flora is particularly varied and reflects subtle differences in topography and drainage	4.3km to the north of the Site

4.1.2 Sites Non-statutorily Designated for their biodiversity value

Table 8 details the non-statutory nature conservations designations identified by the desk study methods as described in Section 3.1 of this report. The search included non-statutory designations within 1km such as Local Wildlife Sites (LWS) sometimes referred to as Sites of Importance for Nature Conservation (SINCs). These are recognised by the Greater London Authority and London borough councils as important wildlife sites.

There are three tiers of such sites:

- Sites of Metropolitan Importance (SMINC);
- Sites of Borough Importance (borough Grade I and borough Grade II) (SBINC); and
- Sites of Local Importance (SLINC).

The designations are listed in descending order of importance for each designation, with those closest to the Site listed first.

Table 8. Non-Statutory Designations

Site and Designation	Reasons for Designations	Approximate Relationship to Site
	Borough Grade II Sites	
The Grove SINC (2.99)	A sequence of shaded ponds runs the length of this nature reserve, surrounded by lush grassland and woodland. The smaller ponds and wet areas support a range of wetland plants including reed sweet-grass (*Glyceria maxima*), yellow iris (*Iris pseudacorus*) and water starwort (*Callitriche stagnalis*). Sparse willows (*Salix caprea* and *S. cinerea*), ash (*Fraxinus excelsior*) and hawthorn (*Crataegus monogyna*) grow around these ponds. The reserve consists of woodland, scrub and small patches of grassland, becoming overgrown with bramble (*Rubus fruticosus* aggregate) and dewberry (*Rubus caesius*). The woodland is mainly English oak (*Quercus robur*) with an understory of rowan (*Sorbus aucuparia*), cherry laurel (*Prunus laurocerasus*) and rhododendron (*Rhododendron ponticum*).	The SINC is located 210m to the north of the Site.
River Pinn and Manor Farm Pastures (33.32ha)	This stretch of the River Pinn is bordered on both sides by open grassland, much of which comprises rank grasses and tall herbs with scattered scrub, although some of it is managed as sports fields. The river is generally lined by trees and shrubs such as alder (*Alnus glutinosa*), crack willow (*Salix fragilis*) and blackthorn (*Prunus spinosa*). The heavy shade and competition has led to a dearth of aquatic and wetland plants except for the invasive non-native species, Japanese knotweed (*Reynoutria japonica*), giant hogweed (*Heracleum mantegazzianum*) and Indian balsam (*Impatiens glandulifera*). Two of the fields to the west of the River Pinn are grazed by horses and contain false oat-grass (*Arrhenatherum elatius*), bent (*Agrostis* sp.) and yarrow (*Achillea millefolium*). The rest are either mown infrequently or have been left unmanaged for a year or so.	The SINC is located 400m to the west-north west of the Site.
Uxbridge and Hillingdon Cemeteries SINC (7.66ha)	These two cemeteries contain flower-rich grassland with mouse-ear hawkweed (*Pilosella officinarum*), burnet saxifrage (*Pimpinella saxifraga*), germander speedwell (*Veronica chamaedrys*) and yarrow (*Achillea millefolium*) within a sward dominated by red fescue (*Festuca rubra*). Patches of taller grasses and flowers provide variation. The gravestones and walls are well-vegetated with lichens and bryophytes and are worthy of a further survey. This SINC includes an area of woodland consisting of pedunculate oak (*Quercus robur*), ash (*Fraxinus excelsior*) and sycamore (*Acer pseudoplatanus*) with an understory of elder (*Sambucus nigra*) and rhododendron (*Rhododendron ponticum*).	SINC is located 650m to the north-north west of the Site
Stockley Park Country Park SINC (17.73ha)	This large, hilly country park contains extensive grassland and other habitats including tall herbs, scrub, trees and hedgerows, much of which has been planted. The grasslands include perennial rye-grass (*Lolium perenne*), creeping bent (*Agrostis stolonifera*) and Yorkshire fog (*Holcus lanatus*). A large variety of flowers occur within a number of sown wildflower meadows including ox-eye daisy (*Leucanthemum vulgare*), meadow vetchling (*Lathyrus pratensis*) and hairy tare (*Ervilia hirsuta*). A small pond supports a dense stand of common reed (*Phragmites australis*).	SINC is located 675m to the south-south east of the Site

4.1.3 Notable Habitats

There were nine blocks of deciduous woodland listed on the National Forest Inventory within 2km of the Site. None of these blocks of woodland were directly connected to the hospital campus. These blocks of woodland are listed in Table 9 in ascending order distance away from the Site. No ancient woodland was found within 1 km of the Site.

Table 9. Blocks of Woodland within 2km of the Site

Habitat Type	Description	Approximate Relationship to Site
Deciduous Woodland (1.79ha)	Woodland listed on the National Forest Inventory 2014	Woodland is located 300m to the north of the Site
Traditional Orchards	HAP Inventory 2020	Woodland is located 450m to the north west of the Site
Deciduous Woodland (0.09ha)	Woodland listed on the National Forest Inventory 2014	Woodland is located 500m to the north west of the Site
Deciduous Woodland (0.699ha)	Woodland listed on the National Forest Inventory 2014	Woodland is located 600m to the south west of the Site
Deciduous Woodland (0.05ha)	Woodland listed on the National Forest Inventory 2014	Woodland is located 600m to the east of the Site.
Traditional Orchards	HAP Inventory 2020	Woodland is located 900m to the north west of the Site
Deciduous Woodland (0.49ha)	Woodland listed on the National Forest Inventory 2014	Woodland is located 900m to the south of the Site
Deciduous Woodland (0.48ha)	Woodland listed on the National Forest Inventory 2014	Woodland is located 900m to the north west of the Site.
Deciduous Woodland (0.63ha)	Woodland listed on the National Forest Inventory 2014	Woodland is located 1km to the north east of the Site
Deciduous Woodland (0.81ha)	Woodland listed on the National Forest Inventory 2014	Woodland is located 1.5km to the south west of the Site
Deciduous Woodland (0.8ha)	Woodland listed on the National Forest Inventory 2014	Woodland is located 1.6km to the north of the Site
Wood Pasture		Woodland is located 1.8km to the north of the Site
Parkland Habitat		Woodland is located 1.9km to the east of the Site

4.2 Field Survey

4.2.1 Habitats

The habitats recorded in the Phase 1 Habitat Survey, their extent and distribution are shown in Table 10 and in Appendix A, along with Target Notes (TN) in Appendix B. For a more comprehensive species list and their abundance within each of the following listed habitats; see Appendix C. The total area of habitats measured in hectares is listed in Table 11.The location of the different areas, Areas 1 to 13 can be found in Figure 1 in Appendix A.

Table 10. Habitats present on Site

Habitat	Brief Description
	Area 1 – Western Car Park
Hard Standing	The majority of this area comprised of car parking spaces and pavements.
Amenity Grassland	A single block of amenity grassland ran along the northern edge of the car park. This block of vegetation was dominated by perennial rye grass (*Lolium perenne*) with occasional greater plantain (*Plantago major*) and daisy (*Bellis perennis*). A single black poplar (*Populus nigra betulifolia*) and pedunculate oak (*Quercus robur*) were also present growing within this grassland.
Introduced Shrub	Three blocks of introduced shrub; one hedge running along the edge of the substation, and two islands within the car park were present within this area. The introduced hedge present was dominated by Portuguese laurel (*Prunus lusitanica*) with two silver birch trees (*Betulus pendula*) emergent from the hedgerow.

Habitat	Brief Description
	The most northern island of introduced shrub had an abundant canopy of Norway maple (*Acer platanoides*) with an understory comprising of frequent Himalayan cotoneaster (*Cotoneaster simonsii*) and buddleia (*Buddleja davidii*) (TN9). The southern island of introduced shrub was dominated by coralberry (*Symphoricarpos orbiculatus*) with a few specimens of silver birch in the understory.
Line of Trees	A defunct line of trees ran north to south along the western edge of the carpark. This line of trees was dominated by beech (*Fagus sylvatica*) trees, with frequent examples of field maple (*Acer campestre*) and occasional instances of hawthorn (*Crataegus monogyna*), large-leaved lime (*Tilia platyphyllos*) and willow (*Salix* species).

Area 2 – Accident and Emergency Department

Buildings	The large A&E Building (B6) and Education Centre (B30) were located within this area.
Hard Standing	Hard standing that comprised the roads and pathways of this areas was present on site.
Amenity Grassland	Two blocks of amenity grassland running along the northern edge of the A&E building. This block of amenity grassland was dominated by perennial rye grass with occasional instances of dandelion (*Taraxacum officinale* aggregate) and greater plantain (*Plantago major*). A few pedunculate oaks were also growing within this block of habitat.
Introduced Shrub	Two blocks of introduced shrub were present, one running along the north of the A&E Department behind the bare ground and amenity grassland, and the second block ran along the edge of the ramp up to the A&E Department. The first block of introduced shrub had frequent instances of Japanese spindle (*Euonymus japonicus*) and Mexican orange (*Choisya ternata*) with occasional examples of cherry laurel (*Prunus laurocerasus*) and Oregon-grape (*Mahonia japonica*). The second block of introduced shrub had frequent instances of *Viburnum tinus* with occasional examples of cherry laurel. Two large Norway spruce (*Picea abies*) trees were also present within this block of habitat.
Bare Ground	A strip of bare ground runs along the roadside of the A&E building, between the amenity grassland and the hard standing.
Line of Trees	A line of trees on the traffic islands on the western edge of the A&E Department. This line of trees is dominated by English oak with rare examples of blackthorn (*Prunus spinosa*) and lime.

Area 3 – Maternity Ward

Buildings	A single large building, the Maternity Ward (B9), was present within the area on site.
Hard Standing	The roads and pathways made up the majority of the hard standing on site.
Amenity Grassland	Two blocks of amenity grassland, one north of the Maternity Ward, and one within a courtyard were present within this block of habitat. The block of external grassland was dominated by perennial rye grass with occasional shining cranesbill (*Geranium lucidum*) and daisy. The courtyard block of grassland was also dominated by perennial rye grass with occasional specimens of daisy and dandelion with a single instance of buddleia.
Introduced Shrub	Two blocks of introduced shrub, one represented by a hedge and the other a block of vegetation within the amenity grassland on site. The introduced hedge had frequent examples of wintergreen barberry (*Berberis julianae*) with occasional instances of Portuguese laurel and bearberry cotoneaster. The block of introduced vegetation was dominated by New Zealand hebe (*Hebe speciosa*) with frequent Chinese photinia (*Photinia serratifolia*) and a single large false acacia (*Robinia pseudoacacia*) tree emergent from the vegetation (TN1)
Scrub	A single block of scrub was located to the north east of the Maternity building. This block of scrub was dominated by a covering of English ivy (*Hedera helix*), with a frequent tree cover of holly (*Ilex aquifolium*).

Area 4 – Eastern Car Park

Hard Standing	The car park and existing road network makes up the majority of the hard standing in this area.
Amenity Grassland	A block of amenity grassland was present to the east of the car park space. The block of grassland was dominated by perineal rye grass with frequent examples of shining cranesbill and occasional examples of daisy. Two specimens of elm (*Ulmus minor* aggregate) and one pedunculate oak and false acacia were also growing within this block of vegetation.
Introduced Shrub	A block of introduced shrub was present on the eastern edge of the site. This vegetation was dominated by bramble (*Rubus fruticosus* aggregate) with frequent examples of Atlantic ivy (*Hedera hibernica*) and green alkanet (*Pentaglottis sempervirens*) with occasional occurrences of mugwort (*Artemisia vulgaris*) and stinging nettle (*Urtica dioica*).

Habitat	Brief Description
Semi Natural Broadleaved Woodland	Two blocks of semi natural broad-leaved woodland (TN5 and TN6), one either side of the car park with the block of introduced shrub between them. Both blocks of vegetation had frequent Turkey oak (*Quercus cerris*) with occasional sycamore (*Acer pseudoplatanus*) and rare instances of ash (*Fraxinus excelsior*) trees. The understory of these areas had occasional instances of snowberry (*Symphoricarpos albus*), elm and rhododendron (*Rhododendron ponticum*).

Area 5 – Greenacre Building

Building	The Greenacre Building (B20) is present within this area.
Hard Standing	The paths and road around the Greenacre Building make up the hard standing on site.
Amenity Grassland	A block of amenity grassland is present on the eastern edge of the Greenacre Building. This block of habitat was dominated by perennial rye grass with occasional examples of greater plantain. A single large wayfaring tree (*Viburnum lantana*) was present within this habitat.
Line of Trees	A line of trees ran along the north of the Greenacre Building. This line of trees had frequent instances of field maple and occasional instances of bearberry cotoneaster and hawthorn with rare instances of entire-leaved cotoneaster (*Cotoneaster integrifolius*) (TN12).

Area 6 – Pinewood Building Complex

Building	The Pinewood Complex that consists of the SIM Centre, Pinewood Building, INR, Rehab Building, Middlesex Suite and Pagett Ward (B21-26) is located within this area on the Site.
Hard Standing	The hard standing comprises of the road and pathways on site. Several planters near the Rehab building (B24) contained specimens of Japanese spindle, New Zealand hebe and wax begonia (*Begonia semperflorens*).
Amenity Grassland	Multiple unconnected blocks of amenity grassland were present around the Pinewood Building. These blocks of grassland were dominated by perennial rye grass with other typical species such as ribwort plantain (*Plantago lanceolata*), daisy and shining cranesbill present.
Introduced Shrub	A small block of introduced shrub was present to the north of the Pinewood Building was dominated by three-cornered garlic (*Allium triquetrum*) with occasional instances of thyme (*Thymus vulgaris*) and dwarf mallow (*Malva neglecta*).
Bare Ground	A block of bare ground where two buildings (B27 & B28) had been demolished within this area of habitat.

Area 7 – Child Development Centre

Hard Standing	Hard standing comprising of the car park and pavement had a few rare examples of Norway maple growing in planters within this habitat.
Amenity Grassland	A block of amenity grassland surrounding the watercourse was dominated by perennial rye grass with frequent examples of creeping cinquefoil and occasional examples of greater plantain.
Bare Ground	A block of bare ground to the north of the car parking had occasional instances of cherry (*Prunus avium*) with rare specimens of ash and rose of Sharon (*Hypericum calycinum*) also present within this habitat.
Introduced Shrub	Two blocks of introduced shrub, one running along an access ramp and one hedge are present within this area. The ramp introduced shrub was dominated by cherry laurel with frequent examples of Atlantic ivy and occasional instances of Japanese spindle. The introduced hedge was dominated by box honeysuckle (*Lonicera nitida*) with occasional examples of cherry laurel.
Scrub	A block of scrub dominated by young sycamore trees with occasional examples of holly were present within this habitat.
Watercourse	A watercourse running through the amenity grassland and scrub had occasional instances of angelica (*Angelica sylvestris*) and bramble with rare examples of sycamore.

Area 8 – Furze Building

Building	The Furze (B9) building was located within this area.
Hard Standing	The roads, pavement and patio within this area makes up the hard standing of this area. A London plane tree (*Platanus* x *acerifolia*) is also present growing in the car park within this area.
Broad Leaved Woodland	A linear stretch of broad-leaved woodland was located south of the Furze building along the watercourse. The woodland canopy had frequent pedunculate oak and sycamore trees with occasional instances of ash. The understory had frequent holly and occasional cherry laurel and dogwood (*Cornus sanguinea*).

Habitat	Brief Description
	Rare cover of Himalayan balsam (*Impatiens glandulifera*) was present in close proximity to the watercourse (TN3).
Amenity Grassland	The amenity grassland south of the Furze building between the patio and woodland was dominated by perennial rye grass with frequent shining cranesbill and creeping cinquefoil. A single large Atlas cedar (*Cedrus atlantica*) with a holly tree growing from its trunk was also present within this block of habitat.
Introduced Shrub	An ornamental flower bed containing frequent Japanese spindle, with occasional yew (*Taxus baccata*) and English ivy was located south of the Furze building.
Species Poor Hedge	A species poor hedge runs along the eastern edge of the site contained elder (*Sambucus nigra*), English oak, holly and lime trees.
Watercourse	The watercourse running through the broad-leaved woodland had rare cover of yellow flag iris (*Iris pseudacorus*).
Area 9 – Busy Bees Centre	
Building	The Busy Bees Nursery Centre (B18) is located within this area of the Site.
Hard Standing	The pavement and car parking spaces make up the hard standing within this area of Site.
Amenity Grassland	The amenity grassland surrounding the Busy Bees Centre was dominated by perennial rye grass with occasional examples of ribwort plantain and dandelion. Multiple specimens of downy birch (*Betula pubescens*) were present within this block of grassland.
Line of Trees	A line of trees runs along the western edge of the Site. This line of trees was dominated by lime trees, with occasional English ivy and rare cover Norway maple, silver birch and copper beech (*Fagus sylvatica purpurea*).
Area 10 – Alderbourne Rehabilitation Centre	
Building	The Alderbourne Rehabilitation Centre (B19) and the Elderly Day Hospital (B17) were present within this area of Site.
Hard Standing	The road, car parking spaces and pavements make up the hard standing on the site.
Amenity Grassland	The amenity grassland was east of the Elderly Day Hospital was dominated by perennial rye grass with frequent greater plantain and occasional daisy and shining cranesbill. A single example of buddleia and a small block of cherry laurel were also present within this area.
Introduced Shrub	Two blocks of introduced shrub were located within this area, one to the south of the Alderbourne Rehabilitation Centre, and one within the amenity grassland within the area. The block of introduced shrub south of the Alderbourne Rehabilitation Centre had frequent Leyland cypress (*Cupressus* x *leylandii*) and Japanese mahonia (*Mahonia japonica*) with occasional firethorn (*Pyracantha angustifolium*) and Canadian fleabane (*Erigeron canadensis*). The block of vegetation within the amenity grassland was dominated by firethorn with occasional English ivy and Norway maple.
Area 11 – Woodland	
Broad-leaved Woodland	A large block of woodland was located to the south of the site. The canopy of this block of woodland is dominated by pedunculate oak with occasional ash trees, with an understory of occasional yew, field maple and hawthorn. The forest floor has frequent bramble and English ivy and occasional cleavers (*Galium aparine*) and pendulous sedge.
Amenity Grassland	A block of amenity grassland was located in the garden west of the woodland. This block of amenity grassland was dominated by perennial rye grass.
Introduced Shrub	Blocks of introduced shrub are present within the garden west of the woodland. These blocks of introduced shrub contain species such as Pampas-grass (*Cortaderia selloana*), Spanish dagger (*Yucca gloriosa*) and thyme.
Watercourse	The watercourse that runs through the woodland contains frequent pendulous sedge (*Carex pendula*) and rare cover of yellow flag iris (TN17).
Hard Standing	A path runs through the garden to the west of the broad-leaved woodland.
Area 12 - Site (South)	
Hard Standing	The road and carpark within this area makes up the hard standing on site.
Amenity Grassland	The amenity grassland on the eastern end of the area was dominated by perennial rye grass with occasional greater plantain. Multiple ash trees were also present growing within the habitat on site.

Habitat	Brief Description
Semi-Natural Woodland	A block of semi natural woodland on the eastern end of the line of trees was present within this area. The canopy of this block of woodland was dominated by English oak with an understory of frequent European spindle and holly.
Fence	A fence running along the edge of the site has a line of Norway maple and hawthorn running along its length.
Line of Trees	A line of trees runs along the southern edge of the habitat from the Busy Bees Centre to the woodland. This line of trees has frequent pedunculate oak with occasional examples of Norway maple and lime, with a ground cover of frequent cleavers and occasional instances of bramble and English ivy.
	Area 13 – Tudor Building
Buildings	Two buildings; the Tudor Building (T14) and the Old Creche (T15) are both located within this area.
Hard Standing	The pathway within this area makes up the hard standing in this area.
Amenity Grassland	Three blocks of amenity grassland were present within this area on site, one block south of the Old Creche building, one block south of the Tudor Building and the third block north of the buildings. The block of grassland south of the Tudor Building was dominated by perennial rye grass with frequent daisy and occasional ribwort plantain. Single examples of firethorn and Siberian dogwood (*Cornus alba*) were growing within this habitat. The block of grassland behind the Old Creche was dominated by perennial rye grass with occasional examples of greater plantain. The block north of the buildings was dominated by perennial rye grass with frequent examples of greater plantain.
Introduced Shrub	Two blocks of introduced shrub, one within the Tudor building garden, and one north of the same building on the banks of the watercourse. The block of introduced shrub in the Tudor garden was dominated by rosemary (*Salvia rosmarinus*) with frequent Chinese gooseberry (*Actinidia* species) and occasional examples of garden thyme (*Thymus vulgaris*) and shrubby St John's wort (*Hypericum prolificum*). The block of introduced shrub to the north of the Tudor building was dominated by firethorn with occasional staghorn sumac (*Rhus typhina*), ash and pendulous sedge.
Scrub	A single block of scrub was present within the Tudor Building garden. This scrub had frequent examples of Leyland cypress and occasional examples of green alkanet, bramble and holly.

Table 11. Habitats on Site listed by area

Habitat	Area (in hectares)	% of Site
Hard Standing	4.26	37.3%
Building	2.77	24.2%
Not Accessed	1.82	15.9%
Cultivated/ Disturbed Land - Amenity Grassland	1.29	11.3%
Bare Ground	0.58	5.0%
Broadleaved Woodland - Semi-natural	0.52	4.5%
Introduced Shrub	0.13	1.2%
Scrub - Dense/ Continuous	0.03	0.3%
Running Water	0.02	0.2%
Other Tall Herb and Fern - Ruderal	0.002	0.02%
Total	**11.42 ha**	**100%**

The total length of hedgerow is approximately 376metres.

4.2.2 Notable habitats

Table 12 provides a summary of notable habitats (or Habitats of Principal Importance, HoPI) found on the Site based on the results of the Phase 1 Habitat Survey and with reference to guidance for the recognition of NERC Act S41 and Site of Importance for Nature Conservation (SINC) quality habitats. These habitats should be retained, protected and incorporated into the design of the development. Table 13 contains photographs of notable habitats.

Table 12. Notable Habitats within the Site

Habitat	NERC Act	LBAP	LWS Quality	Supporting Comments
Rivers and streams	✓	X	X	The watercourse with the Site is a tributary of the River Pinn. The River Pinn is an HoPI.
Hedgerows	✓	X	X	There was one species-rich hedgerow along the western boundary of the Site that conforms to a HoPI of a 'hedgerow'.
Lowland mixed deciduous woodland	✓	X	X	Woodland bordered the northern, eastern and southern boundaries is suitable to qualify as the HoPI Lowland Mixed Deciduous Woodland.

Key to symbols: ✓ = yes, X = no

Table 13. Photographs of notable habitats

Broadleaved woodland

Watercourse

Hedgerow	
	

4.3 Protected and Notable Species

Table 14 provides a summary of potentially relevant protected and/or notable species identified through a combination of desk study and field surveys. The table summarises the conservation status of each species and provides comment on their likelihood of presence on and surrounding site. Where species are identified as likely or possible, they are likely to represent planning or legal constraints. Further surveys may be required to determine presence or probable absence. Requirements for further survey are identified in Section 5.4 of this report.

Table 14. Data Records for Protected and Notable Species

Species	Legally Protected Species	Species of Principal Importance	Other Notable Species	Present on Site?	Present/Potentially Present on Site	Supporting Comments
Notable Invertebrates Small Heath (*Coenonympha pamphilus*) Stag Beetle (*Lucanus cervus*)	-	✓	✓	-	X	Three records of small heath butterfly and 55 records of stag beetle were within 1 km of Site over the last 10 years. Stag beetle was recorded on site in June 2021 around the building B10 during one emergence survey for bats. Deadwood habitat suitable for stag beetle was present within the woodland parcels. The Site lacked rough grassland suitable for small heath caterpillars.
Reptiles Slowworm (*Anguis fragilis*)	✓	✓	✓	-	X	Six records of slowworms were recorded within 1 km of Site over the last 10 years. The site lacked hibernation and basking sites suitable for slow worms and all grassland was well-managed.
Breeding Birds Barn Swallow (*Hirundo rustica*) Bullfinch (*Pyrrhula pyrrhula*) Dunnock (*Prunella modularis*) Greater Spotted Woodpecker (*Dendrocopus major*) Grey Wagtail (*Motacilla cinerea*) House Martin (*Delichon urbicum*) House Sparrow	✓	✓	✓	✓	✓	Grey wagtail, dunnock and greater spotted woodpecker were recorded during the visit on site. Multiple breeding bird species were recorded within 1 km of Site over the last 10 years. There was suitable habitat for breeding birds on Site.

Species	Legally Protected Species	Species of Principal Importance	Other Notable Species	Present on Site?	Present/Potentially Present on Site	Supporting Comments
(*Passer domesticus*) Mistle Thrush (*Turdus viscivorus*) Song Thrush (*Turdus philomelos*) Swift (*Apus apus*) Willow Warbler (*Phylloscopus trochilus*)						
Schedule 1 Birds Kingfisher (*Alcedo atthis*) Red Kite (*Milvus milvus*) Peregrine Falcon (*Falco peregrinus*)	✓	✓	✓	-	✓	Sightings of red kite and peregrine falcon were recorded during the survey visit close to the Site. Three records of kingfisher and two records of red kite were recorded within 1km of the site over the last 10 years. During the breeding bird surveys undertaken in spring/summer 2021, peregrine falcon was recorded breeding within the Site.
Bats Brown Long-eared Bat (*Plecotus aurtus*) Common Pipistrelle (*Pipistrellus pipistrellus*) Leisler's Bat (*Nyctalus leisleri*) *Myotis* species Nathusius's Pipistrelle (*Pipistrellus nathusii*) Noctule Bat (*Nyctalus noctula*) Serotine (*Eptesicus serotinus*) Soprano Pipistrelle (*Pipistrellus pygmaeus*)	✓	✓	✓	-	✓	Multiple bat records were recorded within 1km of the site over the last 10 years. Buildings and trees on Site were suitable for bats.
Other Mammals (Excluding Bats) Badger (*Meles meles*) Hedgehog (*Erinaceus europaeus*)	✓	✓	✓	-	✓	Eight records of hedgehog and two records of badger were recorded within 1 km of the site over the last 10 years. The woodland and gardens were suitable for badger and hedgehog however these were isolated habitats in a wider urban context.
Invasive Non-native Species *Buddleia (*Buddleja davidii*) Cherry Laurel (*Prunus laurocerasus)* *Entire Leaved Cotoneaster (*Cotoneaster integrifolius*) *False Acacia (*Robinia pseudoacacia*) Floating Pennywort (*Hydrocotyle ranunculoides*) Giant Hogweed (*Heracleum mantegazzianum*) Goat's Rue (*Galega officinalis*) *Green Alkanet (*Pentaglottis sempervirens*) Highclere Holly (*Ilex* x *altaclerensis*) *Himalayan Balsam (*Impatiens glandulifera*) *Himalayan Cotoneaster (*Cotoneaster simonsii*) *Holm Oak (*Quercus ilex)* *Rhododendron	✓	-	✓	✓	✓	Multiple non-native invasive species were recorded on site during the survey visits. These are marked with an *****asterisk. In an updated invasive non-native species survey in June 2021, Japanese knotweed was recorded within the Site, within an area to the south of the Site (TN19). Multiple non-native invasive species were recorded within 1 km of the Site over the last 10 years.

Species	Legally Protected Species	Species of Principal Importance	Other Notable Species	Present on Site?	Present/Potentially Present on Site	Supporting Comments
(*Rhododendron ponticum*)						
*Snowberry (*Symphoricarpos albus*)						
*Three Cornered Garlic (*Allium triquetrum*)						
*Turkey Oak (*Quercus cerris*)						

4.3.1 Schedule 1 birds

There was a single peregrine falcon identified close to the Site during the survey. It was seen on the roof of a water tower and on the ledge of the chimney 200m north of the Site. The hospital staff confirmed that a pair of peregrine falcons had previously successfully nested on the Site.

Further bird surveys undertaken by AECOM within the Site in spring/summer 2021 confirmed the use of a building within the Site for breeding peregrine falcons. Due to confidentiality requirements around Schedule 1 bird species, this report that will be on public domain will not detail the location of the nest. A separate report is prepared for the peregrine falcon and breeding bird survey[7].

Other Schedule 1 birds identified within the desk study include kingfisher and red kite.

The watercourse on site was channelised and exposed and was unlikely to provide opportunity for kingfisher (*Alcedo atthis*) to create burrows for breeding. The shallow stream did not have much flowing water, was highly disturbed and was unlikely to contain fish for foraging, although it was connected to the River Pinn, located 800m west that provides more suitable habitat for kingfisher. No kingfisher was recorded during the breeding bird survey undertaken on site.

A pair of red kites was seen flying over the site during the survey. The area of woodland on-site contained some tall semi-mature trees that would be suitable for nesting red kites however this was a small isolated woodland within an urban context and it may be possible that red kites nest in more suitable woodlands nearby as identified in Table 9. Red kite pairs are known to have up to five nest sites within their breeding territory[8].

There were no black redstart (*Phoenicurus ochruros*) records within 1km of the Site within the last 10 years returned from GiGL, however the London Bird Atlas[9] indicates that there have been records from within the borough. The Site lacked extensive industrial brownfield habitat suitable for black redstart and the adjacent habitat was suburban with several green spaces that had less suitability for black redstart. No black redstart was recorded during the breeding bird survey undertaken on site.

4.3.2 Breeding birds

The trees, woodland, scrub, introduced shrub, gardens, watercourse and buildings on the Site were suitable to support breeding birds, including red/amber listed birds[10] records returned from GiGL (see Table 14). Grey wagtail, dunnock and greater spotted woodpecker were recorded during the site visit.

[7] AECOM, 2022. Hillingdon Hospital. Peregrine falcon and Breeding Bird Report. THHR-ACM-ZZ-XX-RP-Y-000012
[8] https://www.rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z/red-kite/nesting-and-breeding-habits/
[9] Woodward I., Arnold, R. & Smith N. (2017) The London Bird Atlas. Joint published by the British Trust for Ornithology and thee London Natural History Society.
[10] BTO (2015) Birds of Conservation Concern 4

4.3.3 Roosting bats

Preliminary Roost Assessment – Buildings

There were several buildings on Site with suitability for roosting bats. The suitability of the buildings along with Potential Roost Features (PRFs) present is summarised in Table 15 and shown in Appendix A, Figure 2.

There was one building with **High** suitability for roosting bats:

- The Furze building (B10) was a complex two storey building with multiple pitched roofs, covered with sections of slate and clay pitched tiles. There were gaps suitable for bats under lifted flashing, dormer windows, slipped tiles, gaps in brickwork and under guttering.

There were 7 buildings with **Moderate** suitability for roosting bats:

- The Beaconsfield building (B16) was an in-use, single-story building with a hipped bitumen roof and wooden panelling / barge boards on the walls with several gaps. A staff corridor connects it to several other hospital buildings.
- The Alderbourne Rehabilitation Centre (B19) was a complex, single-story building with a hipped bitumen roof and wooden panelling / barge boards on the walls with several gaps.
- The SIM Centre (B21), Pinewood (B22), Rehab (B24) Middlesex Suite (B25) and the Pagett Ward (B26) were several single-storey buildings connected by corridors with pitched bitumen and asbestos roof panels. There were several gaps suitable for roosting bats in the gables ends, barge boards and damaged soffits.

There were 8 buildings with **Low** suitability for roosting bats:

- The main hospital building and Tower Block (B6) was a large complex with a 10-storey section. No gaps were identified but due to the scale of the building there may be some unidentified gaps.
- The Maternity building (B9) was a large 6-storey L-shaped building with a flat roof. Some gaps were identified at the entrance porch but due to the scale of the building there may be some unidentified gaps.
- The Tudor building (B14) was a two-storey hospital residence with a pitched tiled clay roof and was constructed of red brickwork. There were several gaps in the ridge tiles suitable for roosting bats.
- The Old Creche (B15) was a single-storey flat-roofed temporary building in poor condition with gaps in the soffits suitable for roosting bats.
- The Elderly Day Hospital (B17) was a single-story building with a hipped bitumen roof and wooden panelling / barge boards on the walls with a few gaps suitable for roosting bats.
- The Nursery (B18) was a single-story building with a pitched tiled roof.
- The INR (B23) was a single-storey building connected by corridors with pitched bitumen and asbestos roof panels. There was a gap suitable for roosting bats under the barge boards.
- The Education Centre (B30) was a large two-storey building with a pitched tiled roof and wooden bargeboard panelling on the wall. There were gaps in damaged soffits suitable for roosting bats.

There were three other buildings with **Negligible** suitability for roosting bats, including the Bevan ward (B8), Green Acres (B20), and a plant room (B29). These buildings lacked suitable Potential Roost Features, or where suitable gaps existed, these were in unsuitable locations in well-used and well-lit areas.

Five buildings appearing on the Ordnance Survey base mapping had been demolished prior to the ecology survey (B7, B11, B12, B27, B28) and one building (B13) was within an active construction site and so was not assessed for its suitability to support roosting bats.

Table 15. Preliminary roost assessment – Buildings

ID	Name	PRF ID	PRF description	Overall BRP	Notes
B6	Main hospital & Tower Block		Not all PRFs could be identified due to building height	Low	
B7	Endoscopy				Not present, previously demolished
B8	Bevan Ward			Negligible	
B9	Maternity Building	9a	Gaps in porch soffit	Low	Entrance to busy maternity ward, well-lit. Not all PRFs could be identified due to building height
		9b	Gaps in porch soffit		
		9c	Lifted bitumen		Security lighting
B10	The Furze	10a	Slipped roof tiles & gaps in brickwork	High	Photo 2
		10b	Gaps in dormer windows		
		10c	Gaps in dormer windows		
		10d	Gap under gutter at roof level		
		10e	Gaps in dormer windows		
		10g-h	Various gaps in 3 pitched roofs		
		10i	Lifted lead flashing and gaps in brickwork		
B11	Sheds				Not present, previously demolished
B12	Paediatric Building 1				Not present, previously demolished
B13	Paediatric Building 2				Within a current construction zone. Not assessed
B14	Tudor Centre	14a-c	Ridge tiles with vents on pitched roof, no security lighting, adjacent to garden corridor	Low	
B15	Old Creche	15a	Damaged soffit	Low	
		15b	Gap in soffit		
B16	Beaconsfield	16a	Gap in barge boards on canopy	Moderate	Photo 3
		16b	Gap in barge boards on gable end		
B17	Elderly Day Hospital	17a	Ivy on barge boards	Low	
		17b	Gap in barge boards on gable end		
		17c	Gap in barge boards on canopy		
		17d	Gap in barge boards on roof hip		
		17e	Missing soffit panel on staff corridor		
B18	Nursery		No PRFs identified	Low	Survey recommended as a precaution
B19	Alderbourne Rehabilitation Centre	19a	Gaps in barge boards	Moderate	
		19b	Gaps in barge boards		
		19c	Hole leading to cavity wall		
		19d	Gap in lead flashing on ridge		

ID	Name	PRF ID	PRF description	Overall BRP	Notes
		19e	Gap in barge boards		
		19f	Gap in barge boards		
		19g	Gap in barge boards		
		19h	Gap in barge boards		
B20	Green Acres			Negligible	
B21	SIM Centre	21a	Lifted bitumen on west gable end	Moderate	
		21b	Gap in east gable end airing door		
		21c	Gap in barge boards on porch		
B22	Pinewood	22a	Gap in west gable end		
		22b	Gaps in east gable end		
B23	INR	23a	Gap in barge boards	Low	
B24	Rehab	24a	Gap in barge boards	Moderate	
		24b	Gap in barge boards		
		24c	Gap under soffit		
		24d	Gap in east gable end airing door		
		24e	Damaged soffit corner		
B25	Middlesex Suite	25a	Hole leading to cavity wall	Moderate	
		25b	Gap in west gable end		
		25c	Gap in barge boards		
		25d	Gap in barge boards on porch		
		25e	Gap in west gable end		
		25f	Gap in soffit		
B26	Pagett Ward	26a	Gap in under asbestos roof sheets at gable end	Moderate	Photo 4
		26b	Gap under eaves of asbestos roof sheets		
		26c	Gap in airing door at gable end apex		
B27					Not present, previously demolished
B28					Not present, previously demolished
B29	Plant room		Holes in panelling	Negligible	
B30	Education Centre	30a	Gap in damaged soffit	Low	Photo 1
		30b	Gap in damaged soffit		

The photographs below indicate some key potential roost features (PRFs) associated with the buildings (Table 16) as example of some of the PRFs identified.

Table 16. Photographs of PRFs on Site

Photo 1. Gap in soffit (B30)

Photo 2 Slipped slates (B10)

Photo 3. Gaps in bargeboards (B16)

Photo 4 Gap in porch (B26)

Preliminary Roost Assessment – Trees

There were eight trees with **Moderate** suitability for roosting bats and 23 trees with **Low** suitability for roosting bats. Trees with Negligible suitability were omitted from the assessment as they did not comprise Potential Roost Features (PRFs), except for T165 which had suitable cavities but was downgraded to negligible as is located in a busy unsuitable location and comprised a small trunk (less than 15 cm diameter). The suitability of the trees along with PRFs present is summarised in Table 17 and shown in Appendix A, Figure 2.

Table 17. Preliminary roost assessment – Trees

ID	Species (check against arb survey)	PRF description	PRF height	PRF aspect	Overall BRP	Notes
T4	Yew	Dense ivy on trunk	n/a	n/a	Low	
T5	Yew	Dense ivy on trunk	n/a	n/a	Low	
T8	Sycamore	Dense ivy on trunk	n/a	n/a	Low	
T9	Dawn redwood	Dense ivy on trunk	n/a	n/a	Low	
T10	Sycamore	Dense ivy on trunk	n/a	n/a	Low	
T11	Oak	Dense ivy on trunk	n/a	n/a	Low	
T12	Cedar of Lebanon	Woodpecker hole	6m	West	Moderate	
		Healed wound	4m	East		

ID	Species (check against arb survey)	PRF description	PRF height	PRF aspect	Overall BRP	Notes
T14	Oak	Dense ivy on trunk			Moderate	
		Woodpecker hole	8m	East		
		Split branch	12m	South		
T24	Sycamore	Dense ivy on trunk	n/a	n/a	Low	
T49	False Acacia	Dense ivy on trunk	n/a	n/a	Low	
T59	Horse chestnut	Split trunk	3.5m	West	Moderate	
		Callus roll	2m	South		
T68	English oak	Split branch	12m	East	Low	Within wooded area
T70	English oak	Callus roll	8m	East	Low	Within wooded area
T95	Oak	Callus roll on branch	12m	South west	Moderate	
		Dense ivy on trunk	n/a	n/a		
T97	Ash	Dense ivy on trunk	n/a	n/a	Low	
T98	Ash	Dense ivy	n/a	n/a	Low	
T99	Oak	Woodpecker hole on trunk	6m	South	Moderate	
		Woodpecker hole on branch	3m	South west		
T102	Ash	Callus roll on branch	8m	East	Moderate	
T107	Ash	Dense ivy on trunk	n/a	n/a	Low	
T110	Oak	Dense ivy on trunk	n/a	n/a	Low	
T117	Oak	Dense ivy on trunk	n/a	n/a	Low	
T128	Oak	Dense ivy on trunk	n/a	n/a	Low	
T129	Oak	Dense ivy on trunk	n/a	n/a	Low	
T130	Ash	Rot hole on trunk extending vertically	2.5m	South	Moderate	
T143	Sycamore	Dense ivy on trunk	n/a	n/a	Low	2 trees
T154	Cherry	Trunk split	2m	South	Low	
T176	Oak	Gap in wound on branch	10m	South	Moderate	Tall mature street tree
T178a	Plum	Dense ivy on trunk	n/a	n/a	Low	Located close to well-disturbed, well-lit hospital entrance
T178b	Plum	Dense ivy on trunk	n/a	n/a	Low	
T165	Plum	Knothole and peeling bark	1.5m	East	Negligible	Well disturbed during the day, thin specimen (trunk less than 15cm diameter
T181	Oak	Rot hole in branch wound	5m	South-east	Low	Mature street tree close to street lights
T182	Oak	Split branch	15m	South	Low	Mature street tree close to street lights

At the time of writing this report, July 2021, some bat emergence and re-entry surveys have been undertaken on site for buildings and trees. Two suspected bat roost have been identified, one in a building to the west of the Site (B19) and the other in a tree (T14).

4.3.4 Other Mammals (excluding bats)

Eight records of hedgehog and two records of badger were recorded within 1km of the site over the last 10 years Hedgehog is a specie listed on section 41 of the NERC Act as a specie of Principal Importance and badger are protected under the Protection of Badgers Act 1992.

The woodland and gardens in the south of the Site were suitable for hedgehog and badger. However, these were small, isolated habitats in a wider urban context.

A mammal hole was found in the woodland (TN16 in Figure 1) and a single mammal path was seen in a garden in the south of the Site (TN18 in Figure 1). The hole looked small and not heavily used and more likely associated with a red fox (*Vulpes vulpes*).

4.3.5 Invertebrates

Stag beetles were recorded in different locations around the Furze (B10) in June 2021 during bat emergence surveys. Stag beetle is a species of Principal Importance listed on Section 41 of the NERC Act. Stag beetles live in woodland edges, hedgerows and parks. The larvae feed on decaying wood under the ground. Suitable habitat is present on site within the woodland areas.

4.3.6 Invasive species

Five invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act (WCA) and 8 species listed on the London Invasive Species Initiative were recorded on site in November 2020. Most of these species had become established in the wild and had the potential to spread into other areas of site if left unmanaged. Table 18 lists these species, as well as the relevant legislation or policy that covers them. Photographs are shown in Table 19.

Table 18. List of Invasive Non-Native Plants

Species Name	Legislation/Policy	Further Details
Bearberry Cotoneaster (*Cotoneaster dammeri*)	LISI	LISI Category 2: Species of high impact or concern present at specific sites that require attention (control, management, eradication etc).
Buddleia (*Buddleja davidii*)	LISI	Category 3: Species of high impact or concern which are widespread in London and require concerted, coordinated and extensive action to control/eradicate.
Cherry Laurel (*Prunus laurocerasus*)	LISI	Category 3: Species of high impact or concern which are widespread in London and require concerted, coordinated and extensive action to control/eradicate.
Entire-leaved Cotoneaster (*Cotoneaster integrifolius*)	Schedule 9/LISI	Schedule 9 plants are illegal to let spread into a neighbouring property. LISI Category 2: Species of high impact or concern present at specific sites that require attention (control, management, eradication etc).
False Acacia (*Robinia pseudoacacia*)	LISI	Category 4: Species which are widespread for which eradication is not feasible but where avoiding spread to other sites may be required
Green Alkanet (*Pentaglottis sempervirens*)	LISI	Category 6: Species that were not currently considered to pose a threat or have the potential to cause problems in London
Himalayan Cotoneaster (*Cotoneaster simonsii*)	Schedule 9/LISI	Schedule 9 plants are illegal to let spread into a neighbouring property. LISI Category 2: Species of high impact or concern present at specific sites that require attention (control, management, eradication etc).
Himalayan Balsam (*Impatiens glandulifera*)	Schedule 9/LISI	Schedule 9 plants are illegal to let spread into a neighbouring property. Category 3: Species of high impact or concern which are widespread in London and require concerted, coordinated and extensive action to control/eradicate.
Holm Oak (*Quercus ilex*)	LISI	Category 5: Species for which insufficient data or evidence was available from those present to be able to priorities

Species Name	Legislation/Policy	Further Details
Hollyberry cotoneaster	Schedule 9/LISI	Schedule 9 plants are illegal to let spread into a neighbouring property. LISI Category 2: Species of high impact or concern present at specific sites that require attention (control, management, eradication etc).
Japanese knotweed (*Reynoutria japonica*)	Schedule 9/LISI	Schedule 9 plants are illegal to let spread into a neighbouring property. Category 3: Species of high impact or concern which are widespread in London and require concerted, coordinated and extensive action to control/eradicate
Rhododendron (*Rhododendron ponticum*)	Schedule 9/LISI	Schedule 9 plants are illegal to let spread into a neighbouring property. LISI Category 2: Species of high impact or concern present at specific sites that require attention (control, management, eradication etc).
Snowberry (*Symphoricarpos albus*)	LISI	LISI Category 2: Species of high impact or concern present at specific sites that require attention (control, management, eradication etc).
Three Cornered Garlic (*Allium triquetrum*)	Schedule 9/LISI	Schedule 9 plants are illegal to let spread into a neighbouring property. Category 4: Species which are widespread for which eradication is not feasible but where avoiding spread to other sites may be required
Turkey Oak (*Quercus cerris*)	LISI	Category 5: Species for which insufficient data or evidence was available from those present to be able to priorities

There are two additional non-native species, coralberry (*Symphoricarpos orbiculatus*) and western snowberry (*Symphoricarpos occidentalis*) on site which are not included on either the Wildlife and Countryside Act or LISI, which also have the potential to become invasive and spread across site.

During an update survey in June 2021, Japanese knotweed (*Reynoutria japonica*) (see TN19 in Figure 1 in Appendix A) and hollyberry cotoneaster (*Cotoneaster bullatus*), both Schedule 9 species, were identified within the Site.

Table 19. Photographs of INNS

		
Himalayan balsam	Rhododendron	Cotoneaster species

5. Identification of Ecological Constraints and Recommendations

5.1 Approach to the Identification of Constraints

Relevant ecological receptors that may represent constraints to the Proposed Development, or that provide opportunities to deliver ecological enhancements in accordance with planning policy are identified in Section 2 of the report.

Compliance with the planning policy required that the Proposed Development considers and engaged the following mitigation hierarchy where they impact on relevant ecological receptors:

a. avoid biodiversity features where possible;

b. minimise impact by design, method of working or other measures (mitigation) e.g. by enhancing existing features; and

c. compensate for significant residual impacts, for example by providing suitable habitats elsewhere (whether in the confines of the Site or otherwise).

The hierarchy required the highest level to be applied where possible. Only where this cannot reasonably be adopted should lower levels be considered. The rationale for the proposed mitigation and/or compensation should be provided with planning applications, including significant detail to show that these measures are feasible and would be provided.

The likelihood of the relevant ecological features constraining the Proposed Development has been assessed with reference to the scale described in Table 20. The higher the importance of the ecological feature for the conservation of biodiversity at national and local scales, the more likely it is to be a material consideration during determination of a planning application. In pursuance of the NPFF of providing net gains in biodiversity where possible, consideration should be given to the scope for enhancement as part of the Proposed Development. This should represent biodiversity net gain over and above that achieved through mitigation and compensation. Enhancement can also be achieved within and/or outside the red line boundary of the Proposed Development.

Opportunities for ecological enhancement can be identified in the accompanying appraisal. There may be scope where existing habitat features could be improved or enhanced within the Proposed Development as designed, or with only minor amendment to the design. Ecological enhancement may not be possible where there is little scope to accommodate enhancement within the Proposed Development, e.g. due to a lack of utilisable space, or where the land is required for essential mitigation. Consideration could also be given to enhancing biodiversity in the vicinity of the Site.

Table 20. Scale of Constraint to Development

Likelihood	Definition
High	An actual or potential constraint that is subject to relevant legal protection and is likely to be a material consideration in determining the planning application (e.g. statutory nature conservation designations and European/nationally protected species). Further survey likely to be required (as detailed in this report) to support a planning application.
Medium	An actual or potential constraint that is covered by national or local planning policy and, depending on the level of the potential impact as a result of the proposed development, may be a material consideration in determining the planning application. Further survey may be required (as detailed in this report) to support a planning application.
Low	Unlikely to be a constraint to development or require further survey prior to submission of a planning application. Mitigation is likely to be covered under Construction Environmental Management Plan (CEMP) or precautionary working method statement (e.g. generic requirements for the management of nesting bird risks).

5.2 Constraints and Recommendations for Further Surveys – Designated Sites

5.2.1 Statutory designations

The desk study identified that there were nine sites with statutory designations within 5 km of the Site. The nearest is Yeading Woods LNR designated for its woodland, meadows and river habitats, located 2.9 km to the north-east.

There is unlikely to be any potential negative impacts on the statutorily designated sites within 5 km as there are a lack of pathways to the Proposed Development. No significant impacts on the designated sites by the increase of recreational pressure (up to 375 new dwellings) are expected due to distance from the Site and the retention and improvement of the woodland and river environs within the Site as on-site greenspace provision.

5.2.2 Non-statutory designations

The desk study identified that there were four sites with non-statutory designations within 1 km of the Site, the closest 210 m to the north of the Site (The Grove)

One of these sites, the River Pinn and Manor Farm Pastures (Borough Grade II), is designated for its floodplain habitats and is located 400m north-west. The watercourse within the Site is a tributary of the River Pinn and a separate aquatic ecological assessment should be undertaken to identify potential impacts.

Potential indirect impacts on the other three non-statutory sites will be avoided by preparing and implementing a CEMP detailing measures to control dust deposition, pollution/spillage, noise, vibration or lighting pollution during construction. No significant impacts on the designated sites by the increase of recreational pressure (up to 375 new dwellings) are expected due to distance from the Site and the retention and improvement of the woodland and river environs within the Site as on Site greenspace provision.

5.3 Constraints and Recommendations for Further Surveys – Habitats

There were three habitats on-site that are recognised as HoPI under Section 41 of the NERC Act 2006; the watercourse (175m), a species-rich hedge with trees (220m) and deciduous woodland (4.5 ha).

It is recommended that a Water Framework Directive Screening and Scoping is undertaken to assess any impacts on the watercourse.

It is recommended that the woodland and hedgerow should be retained, protected and incorporated into the design of the development.

Some trees on the Site may be trimmed back or felled as a result of Proposed Development. Trees are a material constraint in the planning process, therefore an Arboriculture Impact Assessment (AIA) should be prepared for the Site to support planning application and recommendations should be followed. A tree survey has been undertaken by Landmark Trees Ltd in November 2020 and January 2021. The arboricultural survey recorded a variety of trees, ranging from early mature to post mature age. Six trees were assigned category A (trees of high quality and value capable of making a significant contribution to the area for 40 or more years).

5.4 Constraints and Recommendations for Further Surveys – Protected and Notable Species

5.4.1 Schedule 1 Birds (Peregrine falcon)

There were no records of peregrine falcon in the desk study but it is understood that the peregrine falcons have recently bred on the Site and were seen during the Phase 1 Habitat Survey on site and resting on adjacent areas.

It is recommended that further surveys are carried out during the peregrine nesting season (February-July) and the results submitted in the planning application. Surveys spaced approximately one month apart are recommended from February to July 2021 (nesting season) to determine whether there is an active nest or not.

Peregrine falcon is listed on Schedule 1 of the W&CA and so are afforded special protection. A Schedule 1 licence may be required to protect the peregrines if they are nesting during the demolition and construction period. However, it is recommended that works commence either well before, or immediately after, the nesting period to avoid potential disturbance and the requirements for a licence.

The peregrine falcon surveys would provide an opportunity to investigate the potential occurrence of two other Schedule 1 bird species potentially relevant to the Site, red kite and black redstart.

Peregrine falcons were recorded breeding on site during the recommended surveys during spring and summer. Due to confidentiality requirements around Schedule 1 bird species, information around peregrines (such as exact location) will be reported separately. Please refer to the Peregrine falcon and Breeding Bird report for more details[7].

5.4.2 Breeding birds

Birds and their nests are protected by the Wildlife and Countryside Act 1981 (as amended).

It is recommended to retain all trees, woodland and scrub on Site. However, it is recommended that any necessary vegetation clearance is undertaken (where possible) outside of the period that bird species are likely to be breeding (between March and August inclusive). Although there is no legally defined breeding season, it is widely accepted that removal of suitable habitat should be avoided between the core nesting season from March to August inclusive.

If the vegetation is to be cleared between March and August inclusive, an ecologist will need to confirm the absence of active bird nests immediately prior to works commencing to avoid a breach of legislation. It is also recommended that the amenity grassland is continued to be mown to avoid ground nesting birds becoming established.

If a nest is discovered, clearance or other construction works should be stopped immediately within a species-specific exclusion zone. The exclusion zone will be demarcated appropriately. The nest will subsequently be monitored, typically on a weekly basis, by a suitably qualified ecologist. Once it is confirmed that all fledglings have flown and ceased to return to the nest, and that no other nests are in use within the exclusion zone, the vegetation can be removed.

5.4.3 Bats

As described in Section 4.3.3, several buildings and trees had suitability to support roosting bats due to suitable gaps in the buildings' structure and trees.

In order to investigate the presence / absence of roosting bats in the buildings, further surveys are recommended. Bat surveys should be carried out in the bat active season (May to August) by surveyors covering the potential roost features, as described in Table 15 and Table 17. Nocturnal emergence (dusk) or re-entry (dawn) surveys will be required and the number of surveys per building is recommended according to the methods outlined in Section 3.2.4. A summary of recommended surveys per building is provided in Table 21 and shown in Appendix A, Figure 2.

Further surveys for the 8 trees with **Moderate** suitability for roosting bats are recommended. The trees should be climbed (if safe to do so), and the potential roost features inspected by a bat-licensed ecologist. Where inspected features are found to be suitable for roosting bats but inconclusive for evidence of roosting bats, two dusk or dawn surveys between May and August will be required. The following trees: T12, T14, T59, T95, T99, T102, T130 and T176 are recommended for further surveys.

No further surveys are required for 23 trees with **Low** suitability for roosting bats and it is recommended to retain these trees. Where it is not possible to retain these, any works to these trees should be section felled under supervision by a Natural England-licenced bat ecologist.

In addition, an internal inspection for hibernating bats (focussing on the roof void) of the **High** suitability building (The Furze - B10) and moderate suitability buildings (Pinewood Complex B21-26) should be carried out (if safe to do, i.e. asbestos and internal access) to check for evidence of roosting bats. This should be undertaken between December and February to include the potential hibernation period.

Two suspected bat roosts were identified during the recommended bat surveys undertaken on site in July 2021, one in B19 and the other in T14. The completion of the bat surveys will confirm or not the presence of a bat roost on these locations.

Further surveys will confirm the requirement for a Natural England European Protected Species (EPS) mitigation licence if bats are present and/or any other requirements for mitigation. The bat survey report to be produced at the end of the scheduled bat surveys will identify the requirements.

Table 21. Summary of recommended number of bat surveys and surveyors per building

ID	Name	Overall bat suitability	No. of surveyors	Number of surveys
B6	Main hospital & Tower Block	Low	4	1
B8	Bevan Ward	Negligible		
B9	Maternity Building	Low	4	1
B10	The Furze	High	5	3
B14	Tudor Centre	Low	3	1
B15	Old Creche	Low	2	1
B16	Beaconsfield	Moderate	2	2
B17	Elderly Day Hospital	Low	3	1
B18	Nursery	Low	2	1
B19	Alderbourne Rehabilitation Centre	Moderate	5	2
B20	Green Acres	Negligible		
B21	SIM Centre	Moderate	2	2
B22	Pinewood	Moderate	2	2
B23	INR	Low	1	1
B24	Rehab	Moderate	2	2
B25	Middlesex Suite	Moderate	2	2
B26	Pagett Ward	Moderate	2	2
B29	Plant room	Negligible		
B30	Education Centre	Low	2	1
	Total		**43**	**25**

5.4.4 Other Mammals (excluding bats)

No further surveys for badger or hedgehog are required. However precautionary measures are recommended.

All wild mammals, including red fox, are protected by the Wild Mammals (Protection) Act 1996, which makes it an offence to intentionally cause any wild mammal unnecessary suffering by certain methods. A mammal hole has been identified within the site, and as there is a risk that a mammal may venture onto the site during ground preparation works.

Site clearance should be avoided during the hedgehog hibernation period (November to March). If clearing dense scrub during this period, a hand-search for hedgehogs hibernating under leaf debris should be undertaken.

A CEMP should include the covering of all deep holes and trenches overnight and/or the provision of planked escape routes for any wildlife that may fall in. In addition, any liquids held on-site should be stored in a secure lock-up. Hoarding around the perimeter of the site should also minimise the likelihood of any wild mammals gaining access to the site.

If the boundary of the Site is not permeable, the inclusion of access features in any boundary fencing (particularly in the south of the Site) should be included to allow movement of hedgehog across the Site, by leaving a gap at the bottom of the fence to allow hedgehogs and other animals to pass through[11].

[11] British Hedgehog Preservation Society (2019) Hedgehogs and Development - Guidance Booklet. Produced in collaboration with the People's Trust for Endangered Species.

5.4.5 Invertebrates

Stag beetles were recorded on-site. It is recommended to retain woodland habitat on the Site, including deadwood present at ground level, to retain suitable habitat for this species.

5.4.6 Invasive Non-native Species

Measures should be taken immediately to cordon off the stand of Japanese knotweed in order to ensure that it is not inadvertently spread within or beyond the Site boundary, the latter could be a contravention of the Wildlife and Countryside Act. It is recommended that an updated survey during the growing season of plants and an Invasive Non-Native Plant Management Plan is produced to undertake a risk assessment of those invasive non-native species of plants present on the Site, particularly the Schedule 9 listed species (Himalayan balsam, Himalayan cotoneaster, entire-leaved cotoneaster, three-cornered garlic, Japanese knotweed, hollyberry cotoneaster and rhododendron). This would provide advice on how to ensure that none of these plants are spread from the Site into the wild and detail the management to achieve this. The plan would recommend, where appropriate replacement areas of soft landscaping comprising native or near-native plant species that would help to achieve a net gain in biodiversity, e.g. of value to local invertebrates, birds and bats.

An Invasive Non-Native Plant Management Plan would also detail biosecurity measures to prevent the spread of invasive non-native plants to surrounding areas during the works and minimise the risk of any other invasive species being brought onto the Site.

Please refer to the Invasive Species Assessment: Biosecurity and Management Plan prepared for the Site for more details[12].

5.5 Summary Appraisal of Ecological Constraints and Recommended Further Surveys

Potential ecological constraints to the Proposed Development are summarised in Table 22 and Table 23 below.

Table 22. Summary Appraisal of Features of Ecological Constraints and Recommended Further Action

Receptor	Scale of constraint (see Table 20)	Further requirements (including potential mitigation)	Driver	When is action likely to be required: To inform design	Before planning application	Pre-construction onwards
Designated sites	Low	Implementation of measures of the Construction and Environmental Management Plan (CEMP).	Legislation and planning policy	-	-	✓
Water-course, woodland, hedgerow (habitats of principal importance)	High	Water Framework Directive Screening and Scoping Assessment for the watercourse[13]. Implementation of measures in the CEMP for protection of the watercourse. Retention of the hedgerow and deciduous woodland within the Site to provide habitat corridors for wildlife and to support Biodiversity Net Gain within the London Borough of Hillingdon.	Legislation and planning policy	✓	✓	✓
Bats	High	Undertake bat roost presence/absence surveys on suitable buildings on Site[14]. Where required, obtain EPSML for bats.	Legislation and planning policy	✓	✓	✓

[12] AECOM, 2022. Hillingdon Hospital. Invasive Species Assessment: Biosecurity and Management Plan. THHR-ACM-ZZ-XX-RP-Y-000011
[13] AECOM, 2022. Hillingdon Hospital. Water Framework Directive Assessment. THHR-ACM-ZZ-XX-RP-Y-000014
[14] AECOM, 2022. Hillingdon Hospital. Bat Survey Report. THHR-ACM-ZZ-XX-RP-Y-000013

Receptor	Scale of constraint (see Table 20)	Further requirements (including potential mitigation)	Driver	When is action likely to be required: To inform design	Before planning application	Pre-construction onwards
		Undertake an internal inspection of The Furze (B10) and moderate suitability buildings (Pinewood Complex, B21-26) for hibernating bats[14]. Retain trees, woodland and watercourse on Site for foraging and commuting bats. Consideration of bats within the CEMP e.g. low-level security lighting on a timer at night.				
Peregrine falcon	High	Undertake monthly survey visits (February and July) to determine the presence of peregrine, use of the Site as a breeding territory, location of any nest sites and confirmation of breeding success. If required, obtain a Schedule 1 licence for peregrine[15]. Prepare a Peregrine Mitigation Strategy to plan the works. Avoid works affecting peregrine habitat Feb-July. Provision of alternative nesting habitat (e.g. peregrine ledge) within the final design before the demolition of the building where the nest is located.	Legislation	-	✓	✓
Other species of breeding birds	Medium	Any clearance of vegetation and trees to be undertaken outside the nesting season. If vegetation or trees are cleared during the nesting season (March to August inclusive), they should be checked by a suitably qualified ecologist. Provision of alternative nesting habitat such as bird boxes (colony-nesting species) within the final design and plant species that provide berries and cover for birds.	Legislation and Planning policy	✓	✓	✓
Other mammals (excluding bats)	Low	Consideration of fox, badger and hedgehog within the CEMP e.g. covering excavations at night to prevent possible injury to mammals. Avoid site clearance during the hedgehog hibernation period (Nov-March). If clearing dense scrub, hand-search for hedgehogs hibernating under leaf debris. The final development design should include habitat features and planting suitable for hedgehog and enhancing connectivity.	Legislation and planning policy	✓	x	✓
Stag beetle	Low	Retention of deadwood within the woodlands of the Site	BAP	-	-	✓
Non-native invasive species (INNS)	Medium	A site walkover in the optimum season to check for aquatic and terrestrial INNS. Preparation of an INNS management plan which will include biosecurity measures to prevent the spread of invasive species[16].	Legislation	✓	✓	✓

[15] AECOM, 2022. Hillingdon Hospital. Peregrine Falcon and Breeding Bird Report - CONFIDENTIAL report. THHR-ACM-ZZ-XX-RP-Y-000012
[16] AECOM, 2022. Hillingdon Hospital. Invasive Species Assessment: Biosecurity and Management Plan. THHR-ACM-ZZ-XX-RP-Y-000011

Table 23. Summary of recommended further surveys and methods

Survey	Season	Method	Why required	When required		
				To Inform Design	Before Planning Application	Pre-construction Onwards
Peregrine falcon	Feb-July	Hardey *et al*. (2014). Raptors: A Field Guide for Surveys and Monitoring	To monitor the tall buildings for nesting peregrines	✓	✓	X
Bats – Presence/absence roost survey of buildings and trees	May to September	Collins (2016)	To investigate the buildings and trees for the potential to support roosting bats	✓	✓	X
Bat internal survey	December to February	Collins (2016)	To investigate the potential of the Furze (B10) and moderate suitability buildings (Pinewood Complex B21-26) for hibernating bats	✓	✓	X
Non-native invasive species (INNS)	May to September (optimal)		To investigate the need for an invasive species management plan	✓	✓	X

6. Opportunities for Ecological Enhancement

In accordance with the NPPF, regional and local planning policies, biodiversity net gains and the provision for ecological protection, enhancements, and creation are provided for below. Enhancements within the final design should be detailed within a Landscape and Ecological Management Plant (LEMP) for the Proposed Development, showing how enhancements are incorporated, their design, creation and maintenance.

A Biodiversity Net Gain assessment is being prepared for the Site to ensure a biodiversity net gain for the Proposed Development[17].

6.1 Green roof

A green roof or roofs could be installed on the top floors of the buildings within the Proposed Development. Green roofs provide benefits such as a reduction in water runoff, reduction of heating and cooling costs, an increase of roof lifespan as well as providing aesthetic and ecological benefits. They should follow the Green Roof Code of Practice[18]. Green roofs and the retained green infrastructure and the additional green areas will provide stepping-stones for commuting wildlife, increasing the connectivity with other green spaces of the borough.

A commercial seed mix, blanket system or plug planting scheme will provide species of native (and some non-native) flowering plants, grasses, sedges and sedum will provide a nectar and pollen rich habitat, providing foraging opportunities to a wide range of urban birds, butterflies, bees, other invertebrates and bat species. An opportunity present here is to choose species mix such as a Bauder Wildflower Blanket XF118 or similar, that can also mitigate city pollutants, such as CO_2 emissions, would be installed by a professional supplier such as Bauder, ANS, or LindumGreen.

Green roofs would be enhanced with a variable topography and features such as rubble/log piles, insect boxes or banks of exposed earth to increase their attractiveness to wildlife.

Extensive green roofs (low nutrient with a shallow substrate depth of less than 100mm) are compatible with the installation of solar panels and do not require intense maintenance. An intensive green roof would require irrigation as it would be more akin to a domestic garden and would have a substrate depth of +200mm.

6.2 Landscape Planting for Biodiversity

The woodland, hedgerow and watercourse should be retained within the Proposed Development's landscape design. These habitats can be enhanced for biodiversity, through the planting of native species and alternative management.

Providing native species or species of benefit to biodiversity (e.g. suitable for pollinating insects, nesting birds or providing berries as a food source) throughout any new or modified soft landscaping would greatly increase the value of the Site for biodiversity, in particular invertebrates.

These include suitable native plant species appropriate for an urban setting and also a range of non-native species of benefit for biodiversity as listed within RHS 'Plants for Pollinators[19]', Natural England advice notes for wildlife friendly gardening[20] or other comparable guides to gardening for biodiversity.

Specific examples could include:

- Planting native shrub species (e.g. blackthorn, hawthorn, hazel, field-maple) to provide nesting opportunities for some red/amber list bird species (dunnock, mistle thrush, song thrush, bullfinch) identified within the desk study (Table 14).
- Selection of suitable tree species as street specimens which support invertebrates as larval food sources, flowers as nectar sources, berries for wintering birds and to provide opportunity for nesting.
- Planting beds with flowering plants for pollinators, particularly to provide nectar sources throughout the year.
- Use of shrub species providing berries for birds or winter and / or dense structure for nesting.
- Use of rain gardens or minor drainage features planted with damp tolerant species to increase biodiversity.

[17] AECOM, 2022. Hillingdon Hospital. Biodiversity Net Gain Assessment. THHR-ACM-ZZ-XX-RP-Y-000015
[18] Available at: http://www.thegreenroofcentre.co.uk/Library/Default/Documents/GRO%20ONLINE.pdf
[19] https://www.rhs.org.uk/science/conservation-biodiversity/wildlife/plants-for-pollinators
[20] Berry, S (2007). Plants for Wildlife Friendly Gardens Natural England

- Providing native shrub or flowering species within planting beds as larval food sources for invertebrates.
- Minimising and avoiding use of pesticides wherever possible to increase landscaping habitat value for invertebrates.

6.3 Peregrine nest box/ledge

A suitable nesting site for peregrine falcons is recommended within the design of the Proposed Development. A new tall building to the west of the Site would be appropriate location. The box should be installed before the demolition of the current location. The nest box should be open fronted with a sheltered cavity containing a substrate such as gravel and pebbles, and enough space to allow the young to exercise in safety as they develop. A raised edge at the entrance to the nest box will help retain the substrate and eggs *in situ*, as well as the juveniles as they become more active. The box should face north-east or east, away from direct sunlight. In the UK, successful nest sites have been recorded at heights from 20m to 200m[21]. Once installed, the nest box should be monitored annually during the breeding season (Feb-July).

6.4 Bird boxes

Suitable boxes for common garden birds (e.g. wren, blue tit, great tit, greenfinch, goldfinch, blackbird) would be appropriate within the retained woodland and retained/new trees within the Proposed Development. Boxes such as the Schwegler 1B Nest Box (with either a 26/32mm hole, an oval hole or open fronted) would cater towards common garden birds.

Suitable boxes such as for a colony nesting species (house sparrow, starling or swift) would be appropriate for the buildings within the Proposed Development. There is potential to support breeding birds by installing bird boxes on the façade. In order to maximise these impacts, ecological enhancements will target local bird species that are in greatest need of support. Boxes such as the Schwegler 1SP Sparrow Terrace cater towards urban bird species such as house sparrow. Additional boxes incorporated into the building catering to swifts (*Apus apus*) on the upper floors could also be reviewed as an enhancement option.

6.5 Bat boxes

Suitable boxes for bats would be appropriate within the retained woodland and retained/new trees within the Proposed Development. Boxes such as the Schwegler 1FF large Bat Box or the 2F Schwegler Bat Box with Double Front Panel would cater towards common and widespread bat species such as brown long eared, common pipistrelle, soprano pipistrelle or noctule.

Suitable bat boxes appropriate for the external walls of new buildings within the Proposed Development would be 1FQ Schwegler Bat Roost or the 2FE Schwegler Wall-Mounted Bat Shelter and would cater towards common and widespread crevice-dwelling bat species such as common pipistrelle or soprano pipistrelle.

The bat survey report to be undertaken at the end of the bat surveys will identify any additional recommendations for enhancements.

6.6 Wetland areas

A temporary water body was recorded within the woodland (TN14 in Figure 1). If feasible and practical, it could form part of the Sustainable Drainage System (SuDS) strategy. However, it is known that this woodland is covered by a TPO and changes on water levels in this area could affect the TPO on this area.

To provide diversity of habitats for wildlife and assist to a sustainable drainage system, three wetland areas with swales and attenuation basins and damp vegetation has been designed to the south west of the Site, to the north of the southern woodland area and within the central green space of the Site.

The area should not be fully shaded and should have some sunlight throughout the day. It should consist of both shallow and deeper areas. Invasive non-native aquatic plant species should be avoided. Stocking the ponds with fish should be avoided. The wetland areas should be managed appropriately depending on the season, for example spring is the best time of year to clear surface duckweed and autumn is the best time of year to clear leaves and excess silt (taking care to leave some silt as it will contain developing invertebrate larvae)[22].

[21] Dixon, N and Shawyer, C. (undated). Peregrine Falcons. Provision of Artificial Nest Sites on Built Structures. RPSB
[22] Froglife (2013) How to build a wildlife pond.

Having wetland areas as well as retained woodland on the Site would enhance ecological connectivity within the immediate area providing stepping-stones to move from these locations to larger green open spaces.

6.7 Log/brash piles for hedgehogs

Piles of dead wood and brash piles can be created in the retained woodland in the south of the Site or other new landscaped areas, such as behind hedges out of the way, creating hibernation opportunities.

6.8 Insect refugia

There is potential to include insect boxes, either as part of a green roof or log/brash piles within the retained woodland within new areas of soft landscaping. Insect boxes provide shelter to a number of species, specifically solitary bees, which provide pollination services to plants included within the landscaping. Boxes catered towards solitary bees are safe to include on developments due to the non-swarming nature of the insects, and their generally placid nature. Insect boxes should be located in areas where chances of vandalization is reduced, but where maintenance can easily be carried out when required. Log/brash piles should be located in undisturbed areas, such as behind a hedge.

Deadwood piles targeting stag beetles could be incorporated into the design to provide additional habitat for stag beetles currently living in the area. People's Trust for Endangered Species stag beetle guidance should be followed for its construction[23].

[23] https://ptes.org/wp-content/uploads/2016/11/Build-a-log-pile-for-stag-beetles.pdf

7. Conclusions

The Site had value for biodiversity and contained three HoPI – watercourse, deciduous woodland and hedgerow. To avoid any impacts to these habitats, it is recommended that they are protected and retained within the final design.

The Site supports protected and notable species (i.e. peregrine falcon, nesting birds, bats and stag beetle. The Site has suitability to potentially support red fox, badger and hedgehog. There were several invasive non-native plant species growing on the Site.

Due to the ecological receptors identified and potential impact from the Proposed Development, it is recommended the production of an Ecological Impact Assessment (EcIA) once the Proposed Development proposals have been finalised and any required surveys have been completed.

The following further surveys are recommended to inform a EcIA:

- Peregrine falcon – Monitoring surveys
- Bats – Presence/absence roost survey of buildings and trees
- Bats – Tree climbing inspection
- Bats – Internal inspection of high suitability building The Furze (B10) and moderate suitability buildings (Pinewood Complex B21-26)
- Invasive non-native plants – Survey of invasive non-native plants in a different time of year

It is expected that the further detailed mitigations plans will be required:

- Peregrine Mitigation Strategy
- Bat Mitigation Strategy
- Invasive Non-Native Plant Management Plan
- Water Framework Directive Screening and Scoping Assessment for the watercourse

The following mitigation measures are recommended, any further mitigation measures will be required based on the results of further surveys:

- Avoid works to the building where the peregrine falcon has nested during the peregrine nesting season (February-July);
- Use low level-lighting (e.g. bollards) and directional lighting during works and within final design to avoid disturbance to commuting and foraging bats;
- supervise the removal of those trees with low suitability for roosting bats using a Natural England-licensed ecologist;
- Check that vegetation or trees are cleared during the bird nesting season (March to August inclusive) by a suitably qualified ecologist;
- Avoid scrub and vegetation clearance during the hedgehog hibernation period (November-March). If clearing dense scrub, hand-search for hedgehogs hibernating under leaf debris;
- Undertake biosecurity measures to prevent the spread of invasive species during works on the Site;
- Implement a CEMP during the construction phase of the Proposed Development to avoid any indirect impact on the adjacent habitats, watercourses and nearby non-statutory sites.

The following opportunities for ecological enhancements could be included in the design of the Site. The inclusion of biodiversity measures will support the local planning policies and objectives, as well as the National Planning Policy Framework:

- Enhance the deciduous woodland and hedgerows to provide habitat corridors for wildlife, by planting with native species;
- Create wetland areas to increase diversity of habitats on site;

- Create log/brash piles for hedgehogs within the woodland;
- Enhance the built environment on Site by designing green roofs on buildings;
- Install artificial nest/roost sites for peregrine falcon, bats, birds and invertebrates (including stag beetle) on buildings and trees;
- Undertake biodiverse planting within the soft landscaping; and
- Use fencing suitable for hedgehog transit in the south of the Site if the boundary is not permeable.

Appendix A Figures

Figure 1. Phase 1 Habitat Map

Filename: \\na.aecomnet.com\lfs\EMEA\Croydon-UKCRD1\Legacy\UKCRD1FP001\UKCRD1FP001-V1\E\projects\general\GIS\Projects\Hillingdon Hospital\02_Maps\AEC_ENV_ECO_Figure01_Phase1Habitat.mxd
Drawn: VC Checked: TG Approved: EG Date: 21/03/2022
Revision: 01

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LEGEND
- Site Boundary
- Existing Construction Boundary
- Target Note

Phase 1 Habitat
- Individual Broad-leaved Tree
- Fence
- Hedge With Trees - Native Species-rich
- Bare Ground
- Broadleaved Woodland - Semi-natural
- Building
- Cultivated/ Disturbed Land - Amenity Grassland
- Hard Standing
- Introduced Shrub
- Not Accessed
- Running Water
- Scrub - Dense/ Continuous

NOTES

ISSUE PURPOSE
FOR INFORMATION

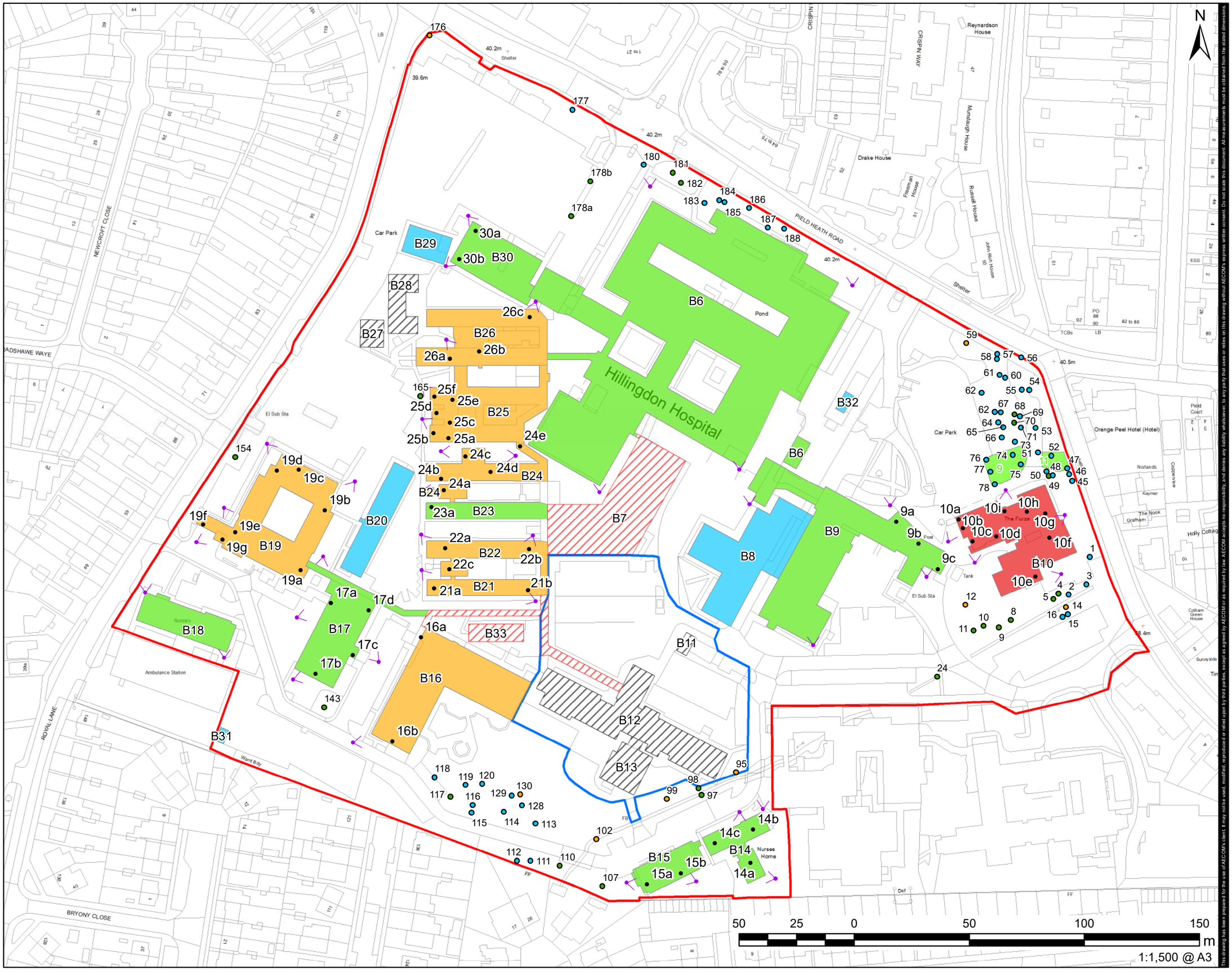
PROJECT NUMBER
60642181

SHEET TITLE
Phase 1 Habitat

SHEET NUMBER
Figure 01

Figure 2. Bat Roost Assessment

Filename: \\na.aecomnet.com\lfs\EMEA\Croydon-UKCRD1\Legacy\UKCRD1FP001\UKCRD1FP001-V1\IE\projects\general\GIS\Projects\Hillingdon Hospital\02_Maps\AEC_ENV_ECO_Figure02_BatRoosting.mxd
Revision: 01 Drawn: VC Checked: TG Approved: EG Date: 21/03/2022



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LEGEND
- Red Line Boundary
- Existing Construction Boundary
- Potential Roost Features on Buildings
- Proposed Surveyor Locations

Suitability for Bat Roost
- Moderate
- Low
- Negligible

Bat Roost Potential
- High
- Moderate
- Low
- Negligible
- Demolished
- Inaccessible

NOTES

ISSUE PURPOSE
FOR INFORMATION

PROJECT NUMBER
60642181

SHEET TITLE
Bat Roost Suitability Assessment

SHEET NUMBER
Figure 02

Appendix B Target Notes

TN Number	Target Notes
TN1	False Acacia in block of Introduced Shrub
TN2	Buddleia in block of Introduced Shrub
TN3	Himalayan Balsam growing along watercourse running through woodland
TN4	Species Poor Hedge growing along edge of Site
TN5	Semi-natural Broadleaved Woodland with emergent Turkey Oak and invasive species understory
TN6	Semi-natural Broadleaved Woodland with emergent Turkey Oak and invasive species understory
TN7	Bare ground – Amenity Grassland Mosaic Habitat
TN8	Cherry Laurel in block of Introduced Shrub
TN9	Himalayan Cotoneaster growing in Introduced Shrub
TN10	Three-cornered Garlic growing in planters
TN11	Bare ground where buildings have been removed
TN12	Entire-leaved Cotoneaster growing in line of trees
TN13	Garden area surveyed remotely by binoculars
TN14	Temporary water body in the centre of the woodland on site
TN15	No access to the active construction site. B11, B12 and B13 were demolished at the time of the site visit.
TN16	Mammal hole located in the block of woodland on site
TN17	Watercourse running through the woodland on site
TN18	Mammal commuting trails through area of scrub on Site
TN19	Japanese knotweed stand recorded in June 2021.

Appendix C DAFOR Plant List

Car Park - West

Species		Abundance (DAFOR)				
Common Name	**Latin Name**	**Amenity Grassland (North)**	**Line of Trees (West)**	**Introduced Shrub Island (North)**	**Introduced Island (South)**	**Introduced Shrub (Hedge)**
Ash	*Fraxinus excelsior*	-	Occasional	-	-	-
Beech	*Fagus sylvatica*	Occasional	Dominant	-	-	-
Black Poplar	*Populus nigra*	Rare	-	-	-	-
Box	*Buxus sempervirens*	-	Rare	-	-	-
Buddleia	*Buddleja davidii*	-	-	Frequent	-	-
Cherry	*Prunus avium*	-	Occasional	-	-	-
Cherry Laurel	*Prunus laurocerasus*	-	Rare	Occasional	-	-
Coralberry	*Symphoricarpos orbiculatus*	-	-	-	Dominant	-
Creeping Cinquefoil	*Potentilla repens*	Occasional	-	-	-	-
Daisy	*Bellis perennis*	Occasional	-	-	-	-
Dogwood	*Cornus sanguinea*	Rare	-	-	-	-
English Ivy	*Hedera helix*	-	Occasional	-	-	-
English Oak	*Quercus robur*	Rare	-	-	-	-
Field Elm	*Ulmus minor*	-	Occasional	-	-	-
Field Maple	*Acer campestre*	-	Frequent	-	-	-
Greater Plantain	*Plantago major*	Occasional	-	-	-	-
Hawthorn	*Crataegus monogyna*	-	Occasional	-	-	-
Hazel	*Corylus avellana*	-	Rare	-	-	-
Himalayan Cotoneaster	*Cotoneaster simonsii*	-	-	Frequent	-	-
Holly	*Ilex aquifolium*	-	Rare	-	-	-
Lime	*Tilia platyphyllos*	-	Occasional	-	-	-
Norway Maple	*Acer platanoides*	-	Rare	Abundant	-	-
Perennial Rye Grass	*Lolium perenne*	Dominant	-	-	-	-
Portuguese Laurel	*Prunus lusitanica*	-	-	-	-	Dominant
Ribwort Plantain	*Plantago lanceolata*	Occasional	-	-	-	-
Shining Cranesbill	*Geranium lucidum*	Occasional	-	-	-	-
Silver Birch	*Betula pendula*	-	-	Occasional	Rare	Rare
Turkey Oak	*Quercus cerris*	-	-	Occasional	-	-
Willow	*Salix* species	-	Occasional	-	-	-
Yarrow	*Achillea millefolium*	Rare	-	-	-	-

A&E Department

Species		Abundance				
Common Name	**Latin Name**	**Amenity Grassland - Front**	**Amenity Grassland/Bare Ground Mosaic**	**Introduced Shrub - Front**	**Line of Trees (Car Park)**	**Introduced Shrub - West**
Beech	*Fagus sylvatica*	-	Occasional	-	-	-
Blackthorn	*Prunus spinosa*	-	-	-	Rare	-
Cherry Laurel	*Prunus laurocerasus*	-	-	Occasional	-	Occasional
Daisy	*Bellis perennis*	-	-	-	-	Occasional
Dandelion	*Taraxacum officinale*	Occasional	-	-	-	-
Downy Birch	*Betula pubescens*	-	-	-	-	Frequent
English Ivy	*Hedera helix*	Occasional	-	-	Occasional	-
English Oak	*Quercus robur*	Rare	-	Frequent	Dominant	-
Firethorn	*Pyracantha angustifolium*	-	-	Rare	-	-
Greater Plantain	*Plantago major*	Occasional	-	-	-	-
Holly	*Ilex aquifolium*	-	-	Rare	-	Rare
Japanese Laurel	*Aucuba japonica*	-	-	Rare	-	-
Japanese Mahonia	*Mahonia japonica*	-	-	Occasional	-	Rare
Japanese Spindle	*Euonymus japonicus*	-	-	Frequent	-	-
Leyland Cypress	*Cupressus* x *leylandii*	-	-	Rare	-	-
Lime	*Tilia platyphyllos*	-	-	-	Rare	-
Mexican Orange	*Choisya ternata*	-	-	Frequent	-	-
Norway Maple	*Acer platanoides*	-	-	Occasional	-	-
Norway Spruce	*Picea abies*	-	-	-	-	Rare
Oregon Grape	*Berberis aquifolium*	-	-	Rare	-	-
Perennial Rye Grass	*Lolium perenne*	Dominant	Dominant	-	-	Occasional
Ribwort Plantain	*Plantago lanceolata*	-	-	-	-	Occasional
Shining Cranesbill	*Geranium lucidum*	Occasional	-	-	-	-
Silver Birch	*Betula pendula*	-	-	-	-	Frequent
Spear Thistle	*Cirsium vulgare*	-	-	-	-	Rare
Viburnum tinus	*Viburnum tinus*	-	-	-	-	Frequent
Yew	*Taxus baccata*	-	-	-	Rare	-

Maternity Ward

Species		Abundance				
Common Name	**Latin Name**	**Amenity Grassland - North**	**Amenity Grassland - Courtyard**	**Introduced Shrub**	**Introduced Hedge**	**Scrub**
Bearberry Cotoneaster	*Cotoneaster dammeri*	-	-	-	Occasional	-
Buddleia	*Buddleja davidii*	-	Rare	-	-	-
Chinese Photinia	*Photinia serratifolia*	-	-	Frequent	-	-

Species		Abundance				
Common Name	**Latin Name**	**Amenity Grassland - North**	**Amenity Grassland - Courtyard**	**Introduced Shrub**	**Introduced Hedge**	**Scrub**
Cleavers	*Galium aparine*	-	-	-	-	Rare
Daisy	*Bellis perennis*	Occasional	Occasional	-	-	-
Dandelion	*Taraxacum officinale*	-	Occasional	-	-	-
Dogwood	*Cornus sanguinea*	-	-	-	Rare	-
English Ivy	*Hedera helix*	-	-	-	Rare	Dominant
False Acacia	*Robinia pseudoacacia*	-	-	Rare	-	-
Field Elm	*Ulmus minor*	-	-	-	Rare	-
Garden Sage	*Salvia officinalis*	-	-	Occasional	-	-
Greater Plantain	*Plantago major*	Occasional	-	-	-	-
Hawthorn	*Crataegus monogyna*	-	-	-	Occasional	-
Holly	*Ilex aquifolium*	-	-	-	Occasional	Frequent
Hornbeam	*Carpinus betulus*	Rare	-	-	-	-
Japanese Barberry	*Berberis thunbergii*	-	-	-	Rare	-
Mock Orange	*Philadelphus coronarius*	-	-	-	Rare	-
New Zealand Hebe	*Hebe speciose*	-	-	Dominant	-	-
Pendulous Sedge	*Carex pendula*	-	-	-	-	Occasional
Perennial Rye Grass	*Lolium perenne*	Dominant	Dominant	-	-	-
Portuguese Laurel	*Prunus lusitanica*	-	-	-	Occasional	Occasional
Red Dead Nettle	*Lamium purpureum*	-	-	-	-	Rare
Ribwort Plantain	*Plantago lanceolata*	-	Occasional	-	-	-
Scarlet Firethorn	*Pyracantha coccinea*	-	-	-	Rare	-
Shining Cranesbill	*Geranium lucidum*	Occasional	-	-	-	-
Wintergreen Barberry	*Berberis julianae*	-	-	-	Frequent	-
Yarrow	*Achillea millefolium*	-	Rare	-	-	-
Yew	*Taxus baccata*	-	-	-		Rare

Carpark - East

Species Name		Abundance		
Common Name	**Latin Name**	**Amenity Grassland**	**Semi-Natural Broadleaved Woodland (w Introduced Shrub Understory)**	**Introduced Shrub**
Ash	*Fraxinus excelsior*	-	Rare	-
Atlantic Ivy	*Hedera hibernica*	-	-	Frequent
Bramble	*Rubus fruticosus* aggregate	-	-	Dominant
Buddleia	*Buddleja davidii*	-	-	Rare

Species Name		Abundance		
Common Name	Latin Name	Amenity Grassland	Semi-Natural Broadleaved Woodland (w Introduced Shrub Understory)	Introduced Shrub
Cleavers	*Galium aparine*	-	Frequent	-
Daisy	*Bellis perennis*	Occasional	-	-
English Ivy	*Hedera helix*	-	Occasional	Rare
False Acacia	*Robinia pseudoacacia*	Rare	Rare	-
Field Elm	*Ulmus minor*	Rare	Occasional	-
Green Alkanet	*Pentaglottis sempervirens*	-	-	Frequent
Herb Robert	*Geranium robertianum*	Rare	-	-
Holly	*Ilex aquifolium*	-	Frequent	-
Holm Oak	*Quercus ilex*	-	-	Rare
Lime	*Tilia platyphyllos*	-	Rare	-
Mugwort	*Artemisia vulgaris*	-	-	Occasional
Perennial Rye Grass	*Lolium perenne*	Dominant	-	-
Rhododendron	*Rhododendron ponticum*	-	Occasional	-
Shining Cranesbill	*Geranium lucidum*	Frequent	-	-
Snowberry	*Symphoricarpos albus*	-	Occasional	-
Sycamore	*Acer pseudoplatanus*	-	Occasional	-
Stinging Nettle	*Utica dioica*	-	-	Occasional
Turkey Oak	*Quercus cerris*	-	Frequent	-
Western Snowberry	*Symphoricarpos occidentalis*	-	Rare	-

Greenacre Building

Species		Abundance	
Common Name	Latin Name	Amenity Grassland	Line of Trees
Bearberry Cotoneaster	*Cotoneaster dammeri*	-	Occasional
Bramble	*Rubus fruticosus* aggregate	-	Occasional
Broad Leaved Dock	*Rumex obtusifolius*	Rare	-
Burnet Rose	*Rosa pimpinellifolia*	-	Rare
Creeping Cinquefoil	*Potentilla repens*	Rare	-
Dog Rose	*Rosa canina*	-	Rare
English Ivy	*Hedera helix*	-	Occasional
English Oak	*Quercus robur*	-	Rare
Entire-leaved Cotoneaster	*Cotoneaster integrifolius*	-	Rare
Field Maple	*Acer campestre*	-	Frequent
Greater Plantain	*Plantago major*	Occasional	-
Hawthorn	*Crataegus monogyna*	-	Occasional
Perennial Rye Grass	*Lolium perenne*	Dominant	-

Species		Abundance	
Common Name	**Latin Name**	**Amenity Grassland**	**Line of Trees**
Wayfaring Tree	*Viburnum lantana*	Rare	-

Pinewood Complex

Common Name	Latin Name	Amenity Grassland Pinewood	Amenity Grassland - Simgate	Amenity Grassland - Lister	Amenity Grassland - Haematology	Hard Standing - Haematology	Introduced Shrub - Pinewood
Bristly Oxtongue	*Helminthotheca echioides*	-	Rare	-	-	-	-
Copper Beech	*Fagus sylvatica purpurea*	-	-	-	-	Rare	-
Daisy	*Bellis perennis*	Occasional	Occasional	Occasional	Rare	-	-
Dandelion	*Taraxacum officinale*	-	Occasional	Occasional	-	-	-
Domestic Plum	*Prunus domestica*	-	-	-	-	Rare	-
Dwarf Mallow	*Malva neglecta*	Occasional	-	-	-	-	Occasional
Greater Plantain	*Plantago major*	Rare	-	-	Rare	-	-
Hawkbit	*Scorzoneroides autumnalis*	-	-	-	-	-	Rare
Japanese Spindle	*Euonymus japonicus*	-	-	-	-	Rare	-
New Zealand Hebe	*Hebe speciosa*	-	-	-	-	Rare	-
Perennial Rye Grass	*Lolium perenne*	Dominant	Dominant	Dominant	Dominant	-	-
Red Dead Nettle	*Lamium purpureum*	-	-	Rare	-	-	-
Ribwort Plantain	*Plantago lanceolata*	-	Occasional	Occasional	-	-	-
Shining Cranesbill	*Geranium lucidum*	Frequent	-	Frequent	-	-	-
Silver Birch	*Betula pendula*	-	-	-	-	Rare	-
Spear Thistle	*Cirsium vulgaris*	-	Rare	-	-	-	-
Three-Cornered Garlic	*Allium triquetrum*	-	-	-	-	-	Dominant
Thyme	*Thymus vulgaris*	-	-	-	-	-	Occasional
Wax Begonia	*Begonia semperflorens*	-	-	-	-	Rare	-

Child Development Centre

Common Name	Latin Name	Amenity Grassland	Bare Ground	Watercourse	Introduced Shrub – Ramp	Introduced Hedge	Scrub
Angelica	*Angelica sylvestris*	-	-	Occasional	-	-	-
Ash	*Fraxinus excelsior*	-	Rare	-	-	Rare	-

Common Name	Latin Name	Amenity Grassland	Bare Ground	Watercourse	Introduced Shrub – Ramp	Introduced Hedge	Scrub
Atlantic Ivy	*Hedera hibernica*	-	-	-	Frequent	-	-
Box	*Buxus sempervirens*	-	Rare	-	-	-	-
Box Honeysuckle	*Lonicera nitida*	-	-	-	-	Dominant	
Bramble	*Rubus fruticosus* aggregate	-	-	Occasional	-	-	-
Cherry	*Prunus avium*	-	Occasional	-	-	-	-
Cherry Laurel	*Prunus laurocerasus*	-	-	-	Dominant	Occasional	-
Creeping Cinquefoil	*Potentilla repens*	Frequent	-	-	-	-	-
Daisy	*Bellis perennis*	Rare	-	-	-	-	-
Dwarf Mallow	*Malva neglecta*	-	Rare	-	-	-	-
Elder	*Sambucus nigra*	-	-	-	Rare	-	-
English Oak	*Quercus robur*	-	-	-	Rare	-	Frequent
Greater Plantain	*Plantago major*	Occasional	-	-	-	-	-
Holly	*Ilex aquifolium*	-	-	-	-	-	Occasional
Japanese Spindle	*Euonymus japonicus*	-	-	-	Occasional	-	-
Leyland Cypress	*Cupressus x leylandii*	-	Rare	-	-	-	-
Perennial Rye Grass	*Lolium perenne*	Dominant	-	-	-	-	-
Prickly Sow Thistle	*Sonchus asper*	-	-	-	Rare	-	-
Reflexed Stonecrop	*Sedum reflexum*	-	Rare	-	-	-	-
Rose of Sharon	*Hypericum calycinum*	-	Rare	-	-	-	-
Shining Cranesbill	*Geranium lucidum*	Frequent	-	-	-	-	-
Silver Birch	*Betula pendula*	-	Occasional	-	-	-	-
Sycamore	*Acer pseudoplatanus*	-	Rare	Rare	-	-	Dominant
Vetch	*Vicia* species	-	-	Rare	-	-	-

Furze Building

Species		Abundance					
Common Name	Latin Name	Amenity Grassland	Broad Leaved Woodland	Watercourse	Hard Standing	Introduced Shrub	Species Poor Hedge
Ash	*Fraxinus excelsior*	-	Occasional	-	-	-	-
Atlas Cedar	*Cedrus atlantica*	Rare	-	-	-	-	-
Bald Cypress	*Taxodium distichum*	-	Rare	-	-	-	-
Bramble	*Rubus fruticosus* aggregate	-	Occasional	-	-	-	-

Species		Abundance					
Common Name	**Latin Name**	**Amenity Grassland**	**Broad Leaved Woodland**	**Watercourse**	**Hard Standing**	**Introduced Shrub**	**Species Poor Hedge**
Buddleia	*Buddleja davidii*	-	-	-	-	Rare	Rare
Cabbage Palm	*Palmetto sabal*	-	-	-	-	Rare	-
Cherry Laurel	*Prunus laurocerasus*	-	Occasional	-	-	-	-
Chinese Mugwort	*Artemisia verlotiorum*	-	-	-	-	-	Rare
Cleavers	*Galium aparine*	-	-	-	-	-	Occasional
Creeping Cinquefoil	*Potentilla repens*	Frequent	-	-	-	-	-
Daisy	*Bellis perennis*	Occasional	-	-	-	-	-
Dandelion	*Taraxacum officinale*	-	Rare	-	-	-	-
Dogwood	*Cornus sanguinea*	-	Occasional	-	-	-	-
Elder	*Sambucus nigra*	-	-	-	-	-	Occasional
English Ivy	*Hedera helix*	-	Occasional	-	-	Occasional	Dominant
English Oak	*Quercus robur*	-	Frequent	-	-	Rare	Rare
Firethorn	*Pyracantha angustifolium*	-	Occasional	-	-	-	-
Fuchsia	*Fuchsia* species	-	-	-	-	Rare	-
Greater Plantain	*Plantago major*	Occasional	-	-	-	-	-
Green Alkanet	*Pentaglottis sempervirens*	-	Rare	-	-	-	-
Himalayan Balsam	*Impatiens glandulifera*	-	Rare	-	-	-	-
Holly	*Ilex aquifolium*	Rare	Frequent	-	-	Rare	Rare
Japanese Privet	*Ligustrum japonicum*	-	-	-	-	-	Occasional
Japanese Spindle	*Euonymus japonicus*	-	-	-	-	Frequent	-
Korean Mulberry	*Morus australis*	-	-	-	-	-	Frequent
Lime	*Tilia platyphyllos*	-	-	-	-	-	Rare
London Plane	*Platanus x acerfolia*	-	-	-	Rare	-	-
Perennial Rye Grass	*Lolium perenne*	Dominant	-	-	-	-	-
Shining Cranesbill	*Geranium lucidum*	Frequent	-	-	-	-	-
Sneezeweed	*Helenium autmnale*	-	-	-	-	Rare	-
Stinging Nettle	*Urtica dioica*	-	Frequent	-	-	-	Rare
Sycamore	*Acer pseudoplatanus*	-	Frequent	-	-	-	Occasional
Thyme	*Thymus vulgaris*	-	-	-	-	Rare	-
White Bryony	*Byronia alba*	-	Occasional	-	-	-	-
Yellow Flag Iris	*Iris pseudacorus*	-	-	Rare	-	-	-
Yew	*Taxus baccata*	-	Occasional	-	-	Occasional	-

Bees Centre

Species		Abundance	
Common Name	**Latin Name**	**Amenity Grassland**	**Line of Trees**
Creeping Cinquefoil	*Potentilla repens*	Rare	-
Copper Beech	*Fagus sylvatica purpurea*	-	Rare
Daisy	*Bellis perennis*	Rare	-
Dandelion	*Taraxacum officinale*	Occasional	-
Downy Birch	*Betula pubescens*	Occasional	-
English Ivy	*Hedera helix*	-	Occasional
Lime	*Tilia platyphyllos*	-	Dominant
Norway Maple	*Acer platanoides*	-	Rare
Perennial Rye Grass	*Lolium perenne*	Dominant	-
Ribwort Plantain	*Plantago lanceolata*	Occasional	-
Shining Cranesbill	*Geranium lucidum*	Occasional	-
Silver Birch	*Betula pendula*	-	Rare
Thyme	*Thymus vulgaris*	Rare	-
Yarrow	*Achille millefolium*	Rare	-

Alderborne Rehabilitation Centre Building

Species		Abundance		
Common Name	**Latin Name**	**Amenity Grassland**	**Introduced Shrub – Hedge**	**Introduced Shrub - East**
Buddleia	*Buddleja davidii*	Rare	-	-
Cabbage Palm	*Palmetto sabal*	-	-	Rare
Canadian Fleabane	*Conyza canadensis*	-	-	Occasional
Cherry Laurel	*Prunus laurocerasus*	Occasional	-	-
Cleavers	*Galium aparine*	Rare	-	Occasional
Daisy	*Bellis perennis*	Occasional	-	-
English Ivy	*Hedera helix*	Occasional	Occasional	-
European Raspberry	*Rubus idaeus* x *strigosus*	-	-	Occasional
Firethorn	*Pyracantha angustifolium*	-	Dominant	Occasional
Greater Plantain	*Plantago major*	Frequent	-	-
Japanese Mahonia	*Mahonia japonica*	-	-	Frequent
Leyland Cypress	*Cupressus × leylandii*	-	-	Frequent
Lobelia	*Lobelia* species	-	-	Rare
Marguerite Daisy	*Argyranthemum frutescens*	-	-	Rare
Norway Maple	*Acer platanoides*	-	Occasional	-
Perennial Rye Grass	*Lolium perenne*	Dominant	-	-
Privet	*Ligustrum vulgare*	-	Rare	-
Shining Cranesbill	*Galium lucidum*	Occasional	-	-
Sneezeweed	*Helenium autumnale*	-	-	Rare
Spanish Dagger	*Yucca gloriosa*	Rare	-	-

Species		Abundance		
Common Name	Latin Name	Amenity Grassland	Introduced Shrub – Hedge	Introduced Shrub - East
Thyme	*Thymus vulgaris*	-	-	Occasional

Broad-Leaved Woodland and Garden

Common Name	Latin Name	Semi Natural Broadleaved Woodland	Watercourse	Introduced Shrub - Garden	Amenity Grassland - Garden
Ash	*Fraxinus excelsior*	Occasional	-	-	-
Beech	*Fagus sylvatica*	-	-	Occasional	-
Bramble	*Rubus fruticosus* aggregate	Frequent	Occasional	-	-
Broad Leaved Dock	*Rumex obtusifolius*	Rare	-	-	-
Buddleia	*Buddleja davidii*	-	-	Rare	-
Chinese Silver Grass	*Miscanthus sinensis*	-	-	Rare	-
Cleavers	*Galium aparine*	Occasional	-	-	-
Daisy	*Bellis perennis*	-	-	-	Rare
Dwarf Mallow	*Malva neglecta*	-	-	Rare	-
English Ivy	*Hedera helix*	Frequent	-	-	-
English Oak	*Quercus robur*	Dominant	-	-	-
European Spindle	*Euonymus europaeus*	Rare	-	-	-
Field Maple	*Acer campestre*	Occasional	-	-	-
Hawthorn	*Crataegus monogyna*	Occasional	-	-	-
Holly	*Ilex aquifolium*	Rare	-	-	-
Low St John's Wort	*Hypericum perforatum*	Rare	-	-	-
Norway Maple	*Acer platanoides*	Rare	-	-	-
Natal Lilly	*Clivia miniate*	-	-	Rare	-
Pampas Grass	*Cortaderia selloana*	-	-	Occasional	-
Pendulous Sedge	*Carex pendula*	Occasional	Frequent	-	-
Perennial Rye Grass	*Lolium perenne*	-	-	-	Dominant
Red Dead Nettle	*Lamium purpureum*	Rare	-	-	-
Shining Cranesbill	*Geranium lucidum*	-	-	-	Occasional
Spanish Dagger	*Yucca gloriosa*	-	-	Rare	-
Thyme	*Thymus vulgaris*	-	-	Occasional	-
Viburnum tinus	*Viburnum tinus*	Rare	-	-	-
Yellow Flag Iris	*Iris pseudacorus*	-	Rare	-	-
Yew	*Taxus baccata*	Occasional	-	-	-

Tudor Building - South

Species		Abundance			
Common Name	**Latin Name**	**Amenity Grassland**	**Semi-Natural Broad Leaved Woodland**	**Fence**	**Line of Trees - South**
Ash	*Fraxinus excelsior*	Occasional	-	-	Rare
Bramble	*Rubus fruticosus* aggregate	-	Occasional	-	Occasional
Cleavers	*Galium aparine*	-	-	-	Frequent
Daisy	*Bellis perennis*	Rare	-	-	-
Dog Rose	*Rosa canina*	-	-	-	Rare
Downy Birch	*Betula pubescens*	-	-	-	-
Dwarf Mallow	*Malva neglecta*	-	-	-	Rare
English Ivy	*Hedera helix*	-	Occasional	Occasional	Occasional
English Oak	*Quercus robur*	-	Dominant	-	Frequent
European Spindle	*Euonymus europaeus*	-	Frequent	-	-
Field Maple	*Acer campestre*	-	-	-	-
Firethorn	*Pyracantha angustifolium*	-	Occasional	-	-
Greater Plantain	*Plantago major*	Occasional	-	-	-
Hawthorn	*Crataegus monogyna*	-	-	Rare	-
Herb Robert	*Geranium robertianum*	-	Rare	-	-
Holly	*Ilex aquifolium*	-	Frequent	-	-
Japanese Privet	*Ligustrum japonicum*	-	-	-	-
Leyland Cypress	*Cupressus* x *leylandii*	-	-	-	-
Lime	*Tilia platyphyllos*	-	-	-	Occasional
Mugwort	*Artemisia vulgaris*	-	-	-	Rare
Norway Maple	*Acer platanoides*	-	-	Dominant	Occasional
Pendulous Sedge	*Carex pendula*	-	Rare	-	-
Perennial Rye Grass	*Lolium perenne*	Dominant	-	-	-
Red Dead Nettle	*Lamium purpureum*	-	-	-	Rare
Ribwort Plantain	*Plantago lanceolata*	-	-	-	Rare
Shining Cranesbill	*Geranium lucidum*	Rare	-	-	-
Spurge Laurel	*Daphne laureola*	-	Rare	-	-
Yew	*Taxus baccata*	-	-	-	Rare

Tudor Building

Common Name	**Latin Name**	**Tudor – Amenity Grassland**	**Tudor Garden – Amenity Grassland**	**Tudor Centre – Introduced Shrub**	**Old Creche Garden – Amenity Grassland**	**Old Creche Centre – Introduced Shrub**	**Old Creche Centre - Scrub**
Apple	*Malus domestica*	-	Rare	-	-	-	-

Common Name	Latin Name	Tudor – Amenity Grassland	Tudor Garden – Amenity Grassland	Tudor Centre – Introduced Shrub	Old Creche Garden – Amenity Grassland	Old Creche Centre – Introduced Shrub	Old Creche Centre - Scrub
Ash	*Fraxinus excelsior*	-	Occasional	Occasional	-	-	-
Bramble	*Rubus fruticosus* aggregate	-	-	Occasional	-	-	Occasional
Chinese Gooseberry	*Actinidia* species	-	-	-	-	Frequent	-
Climbing Prairie Rose	*Rosa setigera*	-	-	-	Rare	-	-
Cleavers	*Galium aparine*	Rare	-	-	-	-	Occasional
Daisy	*Bellis perennis*	Occasional	Rare	-	Frequent	-	-
Dwarf Mallow	*Malva neglecta*	-	-	-	Rare	Rare	-
English Ivy	*Hedera helix*	-	Occasional	-	-	-	Rare
Firethorn	*Pyracantha angustifolium*	-	Occasional	Dominant	Rare	-	-
Greater Plantain	*Plantago major*	Frequent	Occasional	-	Occasional	-	-
Green Alkanet	*Pentaglottis sempervirens*	-	-	-	-	-	Occasional
Hard Rush	*Juncus inflexes*	Rare	-	-	-	-	-
Holly	*Ilex aquifolium*	-	-	-	Rare	-	Occasional
Leyland Cypress	*Cupressus* x *leylandii*	-	-	-	-	-	Frequent
Moss Rose	*Portulaca grandiflora*	-	-	-	-	Rare	-
Pendulous Sedge	*Carex pendula*	-	-	Occasional	-	-	-
Perennial Rye Grass	*Lolium perenne*	Dominant	Dominant	-	Dominant	-	-
Red Dead Nettle	*Lamium purpureum*	-	-	Rare	-	-	-
Ribwort Plantain	*Plantago lanceolata*	-	-	-	Occasional	-	-
Rosemary	*Salvia rosmarinus*	-	-	-	-	Dominant	-
Shrubby St John's Wort	*Hypericum prolificum*	-	-	-	-	Occasional	-
Siberian Dogwood	*Cornus alba*	-	-	-	Rare	-	-
Staghorn Sumac	*Rhus typhina*	-	-	Occasional	-	-	-
Thyme	*Thymus vulgaris*	-	-	-	-	Occasional	-
True Myrtle	*Myrtus communis*	-	-	Occasional	-	-	-

Appendix D Legislation

7.1.1 The Conservation of Habitats and Species Regulations 2017 (as amended)

The Habitats Regulations consolidate all the various amendments made to the Conservation (Natural Habitats, &c.) Regulations 1994 in respect of England and Wales. The 1994 Regulations transposed Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law. The Regulations came into force on 30th October 1994. In Scotland the Habitats Directive is transposed through a combination of the Habitats Regulations 2017 (in relation to reserved matters) and the 1994 Regulations. The Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) transpose the Habitats Directive in relation to Northern Ireland.

The Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites.

Under the Regulations, competent authorities i.e. any Minister, Government department, public body, or person holding public office, have a general duty, in the exercise of any of their functions, to have regard to the EC Habitats Directive.

The Regulations place a duty on the Secretary of State to propose a list of sites which are important for either habitats or species (listed in Annexes I and II of the Habitats Directive respectively) to the European Commission. Once the Commission and EU Member States have agreed that the sites submitted are worthy of designation, they are identified as Sites of Community Importance (SCIs). The EU Member States must then designate these sites as Special Areas of Conservation (SACs) within six years. The Regulations also require the compilation and maintenance of a register of European sites, to include SACs and Special Protection Areas (SPAs) classified under Council Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive). These sites form a network termed Natura 2000.

The Regulations enable the country agencies to enter into management agreements on land within or adjacent to a European site, in order to secure its conservation. If the agency is unable to conclude such an agreement, or if an agreement is breached, it may acquire the interest in the land compulsorily. The agency may also use its powers to make byelaws to protect European sites. The Regulations also provide for the control of potentially damaging operations, whereby consent from the country agency may only be granted once it has been shown through Appropriate Assessment that the proposed operation will not adversely affect the integrity of the site. When considering potentially damaging operations, the country agencies apply the precautionary principle' i.e. consent cannot be given unless it is ascertained that there will be no adverse effect on the integrity of the site.

In instances where damage could occur, the appropriate Minister may, if necessary, make special nature conservation orders, prohibiting any person from carrying out the operation. However, an operation may proceed where it is or forms part of a plan or project with no alternative solutions, which must be carried out for reasons of overriding public interest. In such instances the Secretary of State must secure compensation to ensure the overall integrity of the Natura 2000 system. The country agencies are required to review consents previously granted under the Wildlife and Countryside Act 1981 for land within a European site and may modify or withdraw those that are incompatible with the conservation objectives of the site.

The Regulations make it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4. However, these actions can be made lawful through the granting of licenses by the appropriate authorities. Licenses may be granted for a number of purposes (such as science and education, conservation, preserving public health and safety), but only after the appropriate authority is satisfied that there are no satisfactory alternatives and that such actions will have no detrimental effect on wild population of the species concerned.

The Regulations make special provisions for the protection of European marine sites, requiring the country agencies to advise other authorities of the conservation objectives for a site, and also of the operations which may affect its integrity. The Regulations also enable the establishment of management schemes and byelaws by the relevant authorities and country agencies respectively, for the management and protection of European marine sites.

7.1.2 Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981 is the major domestic legal instrument for wildlife protection in the UK, and is the primary means by which the following are implemented:

- The Convention on the Conservation of European Wildlife and Natural Habitats ('the Bern Convention'); and
- The Council Directive 79/409/EEC on the Conservation of Wild birds (the 'Bird Directive')

7.1.2.1 Wild Birds

The Act makes it an offence (with exception to species listed in Schedule 2) to intentionally:

- kill, injure, or take any wild bird,
- take, damage or destroy the nest of any wild bird while that nest is in use or being built (also [take, damage or destroy the nest of a wild bird included in Schedule ZA1] under the Natural Environment and Rural Communities Act 2006), or
- take or destroy an egg of any wild bird.

Special penalties are available for offences related to birds listed on Schedule 1, for which there are additional offences of disturbing these birds at their nests, or their dependent young. The Secretary of State may also designate Areas of Special Protection (subject to exceptions) to provide further protection to birds. The Act also prohibits certain methods of killing, injuring, or taking birds, restricts the sale and possession of captive bred birds, and sets standards for keeping birds in captivity.

7.1.2.2 Other Animals

The Act makes it an offence (subject to exceptions) to intentionally kill, injure or take any wild animal listed on Schedule 5, and prohibits interference with places used for shelter or protection, or intentionally disturbing animals occupying such places. The Act also prohibits certain methods of killing, injuring, or taking wild animals.

7.1.2.3 Flora, Fungi and Lichens

The Act makes it an offence (subject to exceptions) to intentionally) pick, uproot or destroy:

- any wild plant listed in Schedule 8, or
- unless an authorised person, to intentionally uproot any wild plant not included in Schedule 8,
- to sell, offer or expose for sale, or possess (for the purposes of trade), any live or dead wild plant included in Schedule 8, or any part of, or anything derived from, such a plant.

7.1.2.4 Invasive Non-Native Species

The Act contains measures for preventing the establishment of non-native species which may be detrimental to native wildlife, prohibiting the release of animals and planting of plants listed in Schedule 9 in England and Wales. It also provides a mechanism making any of the above offences legal through the granting of licences by the appropriate authorities.

7.1.3 Countryside and Rights of Way (CRoW) Act 2000

The Countryside and Rights of Way Act 2000 applies to England and Wales only. Part III of the Act deals specifically with wildlife protection and nature conservation.

The Act places a duty on Government Departments and the National Assembly for Wales to have regard for the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted, in accordance with the Convention on Biological Diversity.

Schedule 9 of the Act amends the SSSI provisions of the Wildlife and Countryside Act 1981, including increased powers for their protection and management of SSSIs. The provisions extend powers for entering into management agreements; place a duty on public bodies to further the conservation and enhancement of SSSIs; increase penalties on conviction where the provisions are breached; and include an offence whereby third parties can be convicted for damaging SSSIs.

Schedule 12 of the Act amends the species provisions of the Wildlife and Countryside Act 1981, strengthening the legal protection for threatened species. The provisions make certain offences 'arrestable', include an offence of reckless disturbance, confer greater powers to police and wildlife inspectors for entering premises and obtaining wildlife tissue samples for DNA analysis, and enable heavier penalties on conviction of wildlife offences.

7.1.4 Natural Environment and Rural Communities (NERC) Act 2006

The Natural Environment and Rural Communities (NERC) Act came into force on 1st October 2006. Section 41 (S41) of the Act required the Secretary of State to publish a list of habitats and species which are of principal

importance for the conservation of biodiversity in England. The list was drawn up in consultation with Natural England, as required by the Act.

The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the Natural Environment and Rural Communities Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions.

Fifty-six habitats of principal importance are included on the S41 list. These are all the habitats in England that were identified as requiring action in the (now withdrawn) UK Biodiversity Action Plan (UK BAP) and continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework. They include terrestrial habitats such as upland hay meadows to lowland mixed deciduous woodland, and freshwater and marine habitats such as ponds and subtidal sands and gravels.

There are 943 species of principal importance included on the S41 list. These are the species found in England which were identified as requiring action under the (now withdrawn) UK BAP and which continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework. In addition, the hen harrier has also been included on the list because without continued conservation action it is unlikely that the hen harrier population will increase from its current very low levels in England.

7.1.5 Protection of Badgers Act 1992

Badgers and their setts (burrows) are protected under the Act. This makes it an offence to kill or take a badger, to cruelly ill-treat a badger, or to interfere with a badger sett, including disturbing a badger while it is occupying a sett.

Licences to permit otherwise prohibited actions can be granted under section 10 of the Act for various purposes. This includes licences to interfere with a badger sett for the purpose of development as defined by section 55(1) of the Town and Country Planning Act 1990.

Licences may be granted in order to close down setts, or parts of setts, prior to development or to permit activities close to a badger sett that might result in disturbance. A licence will be required if a sett is likely to be damaged or destroyed in the course of development or if the badger(s) occupying the sett will be disturbed.

Licences can be applied for at any time, but a licence for development will not normally be issued unless full planning permission has been granted. The closure of setts under licence is normally only permitted during July to November, inclusive.

7.1.6 The Hedgerow Regulations 1997

The intention of the Act is to protect important countryside hedges from destruction or damage. The Act does not apply where planning permission has been granted. There are various other exemptions under the Act, including:

- To make a new opening in substitution for an existing one that gives access to land. For example, a gate. However, the old opening must be filled in within 8 months;

- To obtain access to land where other means are not available or are only available at disproportionate cost;

- For the proper management of the hedgerow. This means real management, such as coppicing. But if the hedgerow is deliberately 'over-managed' this might qualify as removal.

If the proposed works are not exempt or subject to a current planning permission then the landowner must serve a Hedgerow Removal Notice in writing on their local planning authority. The authority then has 42 days (which period can be extended if the applicant agrees) to determine whether or not the hedge is considered 'important' under the regulations, and if so, whether or not to issue a Hedgerow Retention Notice. The local authority does not have to issue a Retention Notice, even if the hedgerow counts as important. If they do not issue a notice for an important hedge this is often on condition that certain things are done, e.g. reinstatement or replanting to a certain standard, or creation of an equivalent boundary elsewhere.

7.1.7 Water Framework Directive (WFD) 2017

The Water Framework Directive (WFD) (2000/60/EC) introduced a comprehensive river basin management planning system to help protect and improve the ecological health of our rivers, lakes, estuaries and coastal and groundwaters. This is underpinned by the use of environmental standards to help assess risks to the ecological

quality of the water environment and to identify the scale of improvements that would be needed to bring waters under pressure back into a good condition.

7.1.8 Invasive Alien Species (Permitting and Enforcement) Order 2019

The Invasive Alien Species (Enforcement and Permitting) Order 2019 came into effect on 1st December 2019. This allows for the enforcement of the EU Invasive Alien Species Regulation 1143/2014 on the prevention and management of invasive alien plant and animal species in England and Wales, including the relevant licenses, permits and rules for keeping invasive alien species.

If it is not a species of EU concern, then the Wildlife & Countryside Act (WAC; Section 14, Schedule 9) still applies.

The IAS Regulation lists species of concern which cannot be imported, kept, bred / grown, transported, sold, used, allowed to reproduce, or released into the environment. There are currently 49 species listed, which can be found in the Annex of Regulation (EU) No. 2016/1141 adopting a list of invasive alien species of Union concern pursuant to Regulation (EU) No 1143/2014. Unless species are being moved for the purpose of eradication, then a licence would be needed from Natural England to carry this action out. The Order also makes it an offence to: import, keep, breed, place on the market, exchange, allow to grow, cultivate or permit to reproduce and, finally, release into the environment a listed species.

This Order applies to England and Wales and the UK's offshore marine area. It also applies to controls on imports and exports from the UK. The civil penalties available via this Order are not relevant to Scotland and Northern Ireland.

Offences and penalties

Criminal offences are introduced for breaches of the main restrictions of The IAS Regulation, as well as offences relating to:

- false statements;
- altering, or not meeting, the conditions of permits and licences;
- attempts to commit offences;
- obstruction; and
- offences for companies and partnerships.

It is also an offence to:

- Allow the escape or release into the wild an animal that is not normally a resident or regular visitor to Great Britain, or an animal listed in Part 1 of Schedule 2, including species of crabs, ducks and squirrel.
- Plant, or allow to grow in the wild, plants listed in Part 2 of Schedule 2.
- Sell, or be involved in the sale of, any plant listed in Part 3 of Schedule 2, including Water Primrose and Floating Pennywort.

Each member state is also required to implement Management Measures to enable the Control, Containment and Eradication of those species identified as being widely spread in England and Wales – Japanese knotweed is not included (not designated as a Species of Concern within the EU IAS Regulation). Plant species included under Management Measures are:

- Nuttall's waterweed (Elodea nuttallii)
- Chilean rhubarb (Gunnera tinctoria)
- Giant hogweed (Heracleum mantegazzianum)
- Floating pennywort (Hydrocotyle ranunculoides)
- Himalayan balsam (Impatiens glandulifera)
- Curly waterweed (Lagarosiphon major)

- American skunk cabbage (Lysichiton americanus)
- Parrot's feather (Myriophyllum aquaticum)

Otherwise, 'Species of Concern' not included above but which are known to be present in the UK (e.g. Tree of heaven, Persian Hogweed), will be dealt with under 'Rapid eradication' permits.

The government considers that the prohibitions set out in the Order should be treated as seriously as those for the Wildlife and Countryside Act 1981: The maximum penalty upon summary conviction is 6 months imprisonment, a fine or both and the maximum penalty for conviction on indictment, is imprisonment for a term not exceeding two years, a fine or both.

7.1.9 National Planning Policy

The latest version of the NPPF came into being in July 2021, relevant sections are as follows:

Section 15 of the NPPF relates specifically to 'Conserving and Enhancing the Natural Environment'. *Paragraph 174 states that 'Planning policies and decision should contribute to and enhance the natural and local environment by:*

- *protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*
- *recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*
- *maintaining the character of the undeveloped coast, while improving public access to it where appropriate;*
- *minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*
- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, considering relevant information such as river basin management plans; and*
- *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'*

Paragraph 175 states that '*Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.* '

Paragraph 179 states that '*To protect and enhance biodiversity and geodiversity, plans should:*

- *Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and*
- *promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity. '*

Paragraph 180 states that '*When determining planning application, local planning authorities should apply the following principles:*

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

normally be permitted. The only exception is where the benefits of the development in the location proposed clearly

- *outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;*
- *development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and*
- *development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.'*

Paragraph 181 states that '*The following should be given the same protection as habitats sites:*

- *potential Special Protection Areas and possible Special Areas of Conservation;*
- *listed or proposed Ramsar sites; and*
- *sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.'*

Paragraph 182 states that '*The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.'*

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Appendix E Bat Survey Report

Hillingdon Hospital

Bat Survey Report

Hillingdon Hospitals NHS Foundation Trust

Project number: 60642181
THHR-ACM-ZZ-XX-RP-Y-000013

March 2022

Delivering a better world

Quality information

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		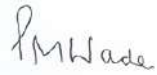	
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Revision History

Revision	Revision date	Details	Authorized	Name	Position
V1	22.10.2021	Draft for comment	22.10.2021	Paul Stannard	Regional Director
V2	11.11.2021	Issue	11.11.2021	Paul Stannard	Regional Director
V3	28.03.2022	Issue after receipt of crib sheet	29.03.2022	Paul Stannard	Regional Director

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Executive Summary

This Bat Survey Report has been prepared by AECOM Ltd (hereafter AECOM) to inform a hybrid planning application being submitted by the Applicant, Hillingdon Hospitals NHS Foundation Trust, to the London Borough of Hillingdon. AECOM was commissioned to carry out bat roost presence/absence surveys of trees and buildings and internal inspections of buildings at Hillingdon Hospital (hereafter referred to as the Site), as per the recommendations of a Preliminary Ecological Appraisal (PEA) [1] for the re-development of Hillingdon Hospital and grounds (hereafter referred to as 'the Proposed Development').

An overall Bat Mitigation Strategy should be prepared, taking into account Scheme detail design and Scheme program and the outcomes of the surveys undertaken of the bats and their roosts.

Dusk emergence and dawn re-entry surveys were carried out to investigate the presence/absence of bat roosts within buildings and trees that have suitability for roosting bats. The surveys were carried out from May - September 2021.

An internal inspection survey was carried out on Building 10 (the Furze) on 18th February 2021, which had high suitability for roosting bats, and Building 9 (Maternity), which had low suitability for roosting bats, to supplement the emergence / re-entry surveys and to record any evidence of bats roosting within the internal areas of the buildings.

Building 19 (Alderbourne Rehabilitation Centre), Tree 12 and Tree 14 were confirmed as having bat roosts:

- B19 is a day roost for a single common pipistrelle;
- T12 is a transitional roost in use during the summer by a number of noctule males/non-breeding females; and
- T14 is a transitional roost in use during the summer by a number of common pipistrelle males/non-breeding females.

Roosts recorded to date within the Site are of small numbers of common species, widespread across the UK, and categorized as non-breeding. Small number of rare species were also recorded foraging and commuting on site, but no roost was recorded for them. Based on survey results and following CIEEM[2] guidance and Wray *et al.* (2010)[3], the assemblage of roosting bats present within the Site is assessed as County Importance.

It is expected that the design for the Proposed Development will include the demolition of Building 19 (Alderbourne Rehabilitation Centre) in which case such works will need to be undertaken in accordance with a European Protected Species Mitigation Licence (EPSML) obtained from Natural England. It is understood that trees T12 and T14 will be retained within the Proposed Development. Were this to change and one or both need to be felled, this would also necessitate obtaining a EPSML.

Roost surveys will require updates for any subsequent EPS licence application beyond the bat season 2022 as data must be from the current or previous season.

For buildings with **High, Moderate** and **Low** suitability without roosts recorded in 2021 (B6, B9, B10, B14, B15, B16, B17, B18, B21-26, B30), it is recommended that contractors are briefed about the risk of discovering bats unexpectedly during works and the need to stop in this scenario.

Six trees were found to have **Moderate** suitability for roosting bats but with no roosts identified (T59, T95, T99, T102, T130 and T176) and 22 trees with **Low** suitability for roosting bats (T4, T5, T8, T9, T10, T11, T24, T49, T68, T70, T97, T107, T110, T114, T117, T128, T129, T143, T178a, T178b, T181 and T182) (see Figure 1). Where it is not possible to retain these within the design, any works to these trees should be section felled under supervision by a Natural England-licenced bat ecologist.

Though bat activity surveys were not carried out, bat calls of non-roosting bats and bats passing through the Site were recorded during the presence/absence surveys. The Site had suitability for foraging and commuting bats, particularly the trees, scrub and a watercourse in the south of the Site, where the majority of passes were recorded. Due to the limited species assemblage of five species recorded across the Site, the assemblage of foraging and commuting bats present within the Site is classified as being of Local Importance.

[1] AECOM (2022) Hillingdon Hospital. Preliminary Ecological Appraisal. THHR-ACM-ZZ-XX-RP-Y-000010
[2] CIEEM (2018) Guidelines for Ecological Impact Assessment in the United Kingdom: Terrestrial, Freshwater, Coastal and Marine
[3] Wray S, Wells D, Long E, and Mitchell-Jones T (2010) Valuing Bats in Ecological Impact Assessment, IEEM In Practice issue 70, p 23-25.

Without mitigation and habitat compensation, there is a low risk that there will be an impact on foraging and commuting bats on the Site through loss of foraging habitat. Measures should be taken such as retaining the woodland, hedgerows and watercourse along with use of low-level (e.g. bollards) or directional lighting to reduce spillage during works or in the operational phase of the Proposed Development, and enhancement of habitat for biodiversity through the planting of native and/or wildlife-friendly species, creation of wetland areas and alternative management of some areas reducing the level of human intervention.

1. Introduction

1.1 Background

This Bat Survey Report has been prepared by AECOM Ltd (hereafter AECOM) to inform a hybrid planning application being submitted by the Applicant, Hillingdon Hospitals NHS Foundation Trust, to the London Borough of Hillingdon. AECOM was commissioned to carry out bat roost presence/absence surveys and internal inspections of buildings at Hillingdon Hospital (hereafter referred to as 'the Site'), as per the recommendations of the Preliminary Ecological Appraisal (PEA)[4] for the re-development of Hillingdon Hospital and grounds.

The proposal (hereafter referred to as the Proposed Development) comprises a hybrid application for:

- full application seeking planning permission for demolition of existing buildings and redevelopment of the site to provide the new Hillingdon Hospital, multi-storey car park and mobility hub, vehicle access, highways works, associated plant, generators, substation, new internal roads, landscaping and public open space, utilities, servicing area, surface car park/ expansion space, and other works incidental to the proposed development.
- outline planning application (all matters reserved, except for access) for the demolition of buildings and structures on the remaining site (excluding the Grade II Furze and Tudor Centre) for a mixed-use development comprising residential (Class C3) and supporting Commercial, Business and Service uses (Class E), new pedestrian and vehicular access; public realm, amenity space, car and cycling parking.

1.2 Site Location and Context

Hillingdon Hospital is located to the south of Pield Heath Road, bound by Royal Lane to the west, and Colham Green Road to the east. The Site is located within the Brunel Ward. The site comprises a ten storey block built in the 1960s and a mix of other hospital buildings scattered across the Site. Many of the acute beds are in single storey wards built in the 1940s, which are in very poor condition.

The remainder of the Site consists mainly of surface level car parking, interspersed with pockets of landscaping.

There are two areas covered by Tree Preservation Orders (TPOs) within the Site: one south of the Furze and the second is west of the Woodlands Centre. A culvert runs west-east crossing both TPOs. The culvert is canalised under the service road and partially under the Woodlands Centre. On the east of the Site is a Grade II Listed Building, the Furze.

There are several points of access to the Site; the main entrance is from Pield Heath Road with a separate access for the Accident and Emergency (A&E) department. There are three separate access points from Royal Lane and a separate access from Colham Green Road. Cycle access is only through the vehicular traffic road path. Heathrow Central and Hayes Town. Uxbridge town centre is approximately 2km to the north west.

To the west of the Site along Royal Lane comprises two-storey detached and semi-detached residential properties, to the north-west corner of the Site there is a three-four storey flatted residential block along Pield Health Road opposite the entrance to the Outpatient Department.

1.3 Purpose of Report

The initial roost assessment on all relevant features carried out in November 2020 during the extended Phase 1 Habitat survey within the Site boundary identified the suitability of trees and buildings for roosting bats. Additional survey work for bats was recommended in order to determine roost presence/absence within the Site. This included the following surveys undertaken in 2021:

- Dusk emergence and dawn re-entry surveys were carried out to investigate the presence/absence of bat roosts within buildings and trees that have suitability for roosting bats. Three dusk and/or dawn surveys were carried out on buildings with **High** suitability for roosting bats, two dusk and/or dawn surveys were carried out on **Moderate** suitability buildings and trees and one dusk or dawn survey was carried out on **Low** suitability buildings. Note that overall building suitability ratings were based upon the presence of Potential Roost Features (PRFs) as described within the PEA[4].

[4] AECOM (2022) Hillingdon Hospital. Preliminary Ecological Appraisal. THHR-ACM-ZZ-XX-RP-Y-000010

- An internal inspection survey was carried out on buildings with accessible roof voids and / or high suitability or confirmed bat roosts. Building 10 (the Furze), which had high suitability for roosting bats, and Building 9 (Maternity), which had low suitability for roosting bats were inspected to supplement the emergence / re-entry surveys and to record any evidence of bats roosting within the internal areas of the buildings.

A discussion of the Site's nature conservation importance for bat species/populations is provided based on guidance from CIEEM[5,6].

The results of this report can be used to inform any future ecological assessment of the Proposed Development and any future mitigation licensing requirements.

[5] CIEEM (2018) Guidelines for Ecological Impact Assessment in the United Kingdom: Terrestrial, Freshwater, Coastal and Marine
[6] Wray S, Wells D, Long E, and Mitchell-Jones T (2010) Valuing Bats in Ecological Impact Assessment, IEEM In-Practice issue 70, p 23-25.

2. Relevant Wildlife Legislation

2.1 Bats

All bat species and their roosts are legally protected in the UK under The Conservation of Habitats & Species Regulations 2017 (as amended) (Habitats Regulations), which implements the EC Directive 92/43/EEC (the Habitats Directive). In addition, barbastelle (*Barbastella barbastellus*), lesser and greater horseshoe bats (*Rhinolophus hipposideros* and *R. ferrumequinum*) and Bechstein's bat (*Myotis bechsteinii*) are listed in Annex II of the Habitats Directive, which requires sites to be designated in member states for their protection. Bats and their roosts are also protected under the Wildlife and Countryside Act 1981 (WCA) (as amended).

Taken together, the Habitats Regulations and the WCA make it illegal to:

- deliberately capture or intentionally take a bat;
- deliberately or intentionally kill or injure a bat;
- be in possession or control of any live or dead bat or any part of, or anything derived from a bat;
- damage or destroy a breeding site or resting place of a bat;
- intentionally or recklessly obstruct access to any place that a bat uses for shelter or protection;
- intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection; and
- deliberately disturb bats, in particular any disturbance which is likely to (i) impair their ability to survive, breed, reproduce or to rear or nurture their young; or in the case of hibernating or migratory species, to hibernate or migrate; or (ii) to affect significantly the local distribution or abundance of the species to which they belong.

A bat roost is defined as any structure a bat uses for breeding, resting, shelter or protection. It is important to note that since bats tend to re-use the same roost sites, current legal opinion is that a bat roost is protected regardless of whether or not the bats are present at a specific point in time.

Section 40 of The NERC Act 2006 places a legal obligation on public bodies in England to have regard to particular living organisms and types of habitat which are of the greatest conservation importance whilst carrying out their functions, whilst also having a general regard for protecting all biodiversity. The NERC Act 2006 Section 41 includes seven bats as species of 'principal importance': barbastelle, Bechstein's bat, noctule (*Nyctalus noctula*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared bat (*Plecotus auritus*), lesser and greater horseshoe bats.

Local Planning Authorities must be satisfied that favourable conservation status of bats (and other European Protected Species) can be maintained before granting planning permission. Demonstrating the maintenance of 'favourable conservation status' is one of three Habitats Directive "derogation tests" relating to European protected species that the Local Planning Authority must be satisfied are met in order to be able to grant planning permission.

The three "derogation tests" as set out in paragraph 53 of Conservation of Habitats and Species Regulations 2017 are that:

- the development must be either for *"public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment";*
- *"that there is no satisfactory alternative";* and
- *"that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range."*

Favourable conservation status is defined in Article 1(i) of the Habitats Directive as when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and

- there is, and will probably continue to be, a sufficiently large habitat to maintain its population on a long term basis.

2.2 European Protected Species Mitigation Licences

Although the law provides strict protection for bats, it also allows this protection to be set aside (derogated) under Regulation 53 of the Conservation of Habitats and Species Regulations through the issuing of European Protected Species Mitigation Licences (EPSML) for the purpose of preserving public health; public safety; other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment. However, in accordance with the requirements of the Conservation of Habitats and Species Regulations a licence can only be issued where the following requirements are satisfied that:

- there is no satisfactory alternative; and
- the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

The process of obtaining an EPSML from Natural England will normally take two months (Natural England's standard determination period is 30 working days). In addition, Natural England would normally expect any bat EPSML application to be accompanied by the data collected from the bat emergence surveys, which are used to determine the status of the structure or tree with regard to bats; specifically, the location of roost sites, the bat species utilising the roost and the type of roost (such as maternity, or transitional).

The application for an EPSML would need to include the production of a detailed method statement for the proposed works. This document would include details of working practices and mitigation measures to ensure that the favourable conservation status of the bats using the structure or tree is not adversely affected.

3. Methods

3.1 Desk Study

A desk study was carried out in November 2020 and reported in the PEA report[7]. A summary of existing bat records of potential relevance to the Proposed Development is provided in this report (for full details please refer to the PEA report). A search for any granted EPSML for bats within 2 km of the Site, using the MAGIC website, was undertaken in September 2021.

3.2 Preliminary Roost Assessment – Trees and Buildings

A ground-level preliminary roost assessment of buildings and trees was carried out on the 26th and 27th of November 2020. Details of the method of the preliminary bat roost assessment can be found in the PEA report[7].

3.3 Internal Inspection

An internal inspection of two accessible buildings was carried out on 18th February 2021 by an AECOM ecologist holding a Natural England Bat Class License WML CL18 (Bat Survey Level 2), assisted by an AECOM ecologist holding a Natural England Bat Class License WML CL17 (Bat Survey Level 1).

Building 10 (the Furze) had high suitability for roosting bats and was partially accessed internally, based upon having potential for internal features (roof voids, suspected tile access points etc suitable for roosting bats that could be internally inspected). One other building was accessed, Building 9 (Maternity with low suitability). The locations of these All walls and surfaces accessible in Buildings 9 and 10 were inspected for any signs of bats, such as fur stains, scratch marks, bat droppings and urine staining. A video endoscope was used to view the interior of accessible cracks and crevices within the interior of the building to search for any roosting bats, or signs.

3.4 Bat Emergence / Re-entry - Trees and Buildings

Between one and five suitably experienced ecologists (depending on the Potential Roost Features (PRFs) present) undertook dusk emergence and dawn re-entry surveys of the 16 buildings and eight trees within the Site assessed to have low, moderate or high suitability to support roosting bats (moderate to high for trees only). Where the presence of a bat roost was confirmed during the surveys, additional surveys were conducted as required such that buildings with confirmed roosts were subject to a total of three survey visits.

Note that while a licence was not required for surveys, all surveys were led by a Natural England Class licence registered surveyor for bats. Licences are used for when disturbance, entrance to roosts or handling is necessary.

The aim of the surveys was to identify bats leaving and/or returning to any roost that may be present. In accordance with the current Bat Surveys Good Practice Guidelines[8], the dusk emergence surveys covered the period from 15 minutes before sunset to 1.5 to 2 hours after sunset. The dawn re-entry surveys commenced 1.5 to 2 hours before sunrise and ended 15 minutes after sunrise.

During these time periods surveyors observed potential access/egress points on the trees and buildings. Surveyors carried bat echolocation detectors (Elekon Batlogger M and EchoMeter Touch) to help determine which species are present.

The time, location, number, species (where possible) and direction of flight was recorded for each bat pass (either echolocation heard or activity seen) encountered during the survey. The echolocation calls detected were recorded onto a digital recorded (i.e. iPhone or Elekon Batlogger M) to allow the use of bat sound analysis software such as BatExplorer, Kaleidoscope and Analook to verify bat calls.

3.4.1 Bat Emergence Survey Timings and Weather Conditions

The dates, times and weather conditions of the bat emergence/re-entry survey visits conducted to date are presented in Table 1 below. All of these were compliant with the conditions necessary to undertake a bat emergence survey. On 8th September, it rained towards the end of the survey and although unsuitable weather

[7] AECOM (2022) Hillingdon Hospital Preliminary Ecological Appraisal. THHR-ACM-ZZ-XX-RP-Y-000010
[8] Collins, J. (ed.) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.). London: Bat Conservation Trust.

for recording bats, it did not affect the outcome of the survey. Buildings and trees subject to survey along with surveyor locations (L1-L37) are shown in Appendix A.

Table 1. Bat presence/absence survey conditions

Building / tree ID	Location ID	Date and type of survey	Sunset / rise	Time (24hr)		Air temp (°C)		Wind (Beaufort 1-7)		Cloud (0-8)		Rain	Number of surveyors
				Start	End	Start	End	Start	End	Start	End		
B10	L11, L10, L12, L13. L14	Dusk 24-05-2021	21:00	20:45	22:30	10	8	1	1	8	8	Recent rain showers	5
T95, T99, T102, T129		Dawn 25-05-2021	05:00	03:50	05:15	7	7	0	1	8	8	Dry	4
B19	L25, L26, L27, L28, L29	Dusk 01-06-2021	21:07	20:50	02:40	21	20	1	1	0	2	Dry	5
B18	L23, L24	Dusk 02-06-2021	20:50	22:40	21:07	21	20	0	1	0	0	Dry	2
B6	L1, L2, L3, L4	Dusk 07-06-2021	21:15	21:00	22:45	19	17	0	0	6	2	Dry	4
B9	L5, L6, L7, L8	Dusk 08-06-2021	21:15	21:00	22:45	21	18	2	1	0	0	Dry	4
B16, B15	L19, L18	Dusk 15-06-2021	21:20	22:50	21:05	23	20	2	2	0	6	Dry	5
B26, B30	L38, L39, L40	Dusk 22-06-2021	21:20	21:05	22:50	14	12	2	1	4	0	Recent rain	3
B14	L14, L15, L16	Dusk 25-06-2021	21:25	21:10	22:55	17	16	0	0	6	6	Dry	3
B24 B25, B26	L33, L34, L35, L36, L37	Dusk 29-06-2021	21:21	21:06	22:51	17	14	3	1	8	8	Dry	5
T176, T59		Dawn 30-06-2021	04:47	03:17	04:47	14	14	1	1	6	8	Dry	2
B10	L9, L10, L11, L12, L13	Dusk 12-07-2021	21:15	21:00	22:45	16	16	0	0	8	8	Drizzle from 22:00	4

Building / tree ID	Location ID	Date and type of survey	Sunset / rise	Time (24hr)		Air temp (°C)		Wind (Beaufort 1-7)		Cloud (0-8)		Rain	Number of surveyors
				Start	End	Start	End	Start	End	Start	End		
B16, T12, T14	L19, L20,	Dawn 13-07-2021	04:58	03:30	05:15	16	16	1	0	4	4	Dry	2
B21, B22	L30, L31, L32	Dusk 26-07-2021	21:00	20:45	22:30	21	20	0	1	0	0	Dry	3
B19	L25, L26, L28, L29	Dawn 27-07-2021	05:17	03:45	05:32	18	18	4	2	8	8	Dry	4
T176, T12, T14		Dusk 04-08-2021	20:45	20:30	22:15	20	17	2	0	1	0	Dry	3
B25, B26	L36, L37, L38	Dawn 05-08-2021	05:30	04:00	05:45	14	13	0	0	4	0	Dry	3
T95, T99, T102, T129	L17	Dusk 10-08-2021	20:32	20:11	22:02	21	21	0	0	2	2	Dry	5
B10	L9, L10, L11, L12, L13	Dawn 11-08-2021	05:39	04:01	05:55	13	12	0	0	0	1	Dry	5
B23, B24, B25	L33, L34, L35	Dawn 19-08-2021	05:53	04:23	06:08	14	14	0	1	8	8	Dry	3
B21, B22	L30, L31, L32	Dawn 24-08-2021	06:01	04:31	06:16	14	15	1	2	6	8	Dry	3
B19	L29, L28, L26. L25	Dusk 08-09-2021	19:30	19:15	20:50	24	22	2	2	8	8	Rain at 20:30	4
B15	L17, L18	Dusk 23/09/2021	18:57	18:40	20:27	18	17	0	0	0	0	Dry	2

3.5 Assessment method

The assessment method broadly followed the guidelines on deciding which ecological features are important and should be subject to detailed assessment[9].

[9] CIEEM (2018) Guidelines for Ecological Impact Assessment in the United Kingdom: Terrestrial, Freshwater, Coastal and Marine.

Bat specie are an important ecological feature on the Site, as some species are listed as species of principal importance under Section 41 of the Natural Environment and Rural Communities Act, 2006 and all bat species are protected under the Wildlife and Countryside Act 1981 (as amended).

The importance of an ecological feature was considered within a defined geographic context. The following frame of reference is appropriate for bat species:

- International and European
- National
- Regional
- Metropolitan, county, vice-county or other local authority-wide area
- Local.

As well as considering the importance of bats in their geographic context, various characteristics contribute to the assessment. This includes population size, range, habitat and changes over time. Recent information for the status of UK bat species can be found on the Bat Conservation Trust website and publications from Natural England.[10]

The importance of bat species on Site is considered with respect to roosting, commuting and foraging behaviours.

3.6 Limitations

Acoustic survey techniques were biased towards some bat species rather than others. For example, noctule bats have a loud call and can be heard using a detector over 50 metres away, while a brown long-eared bat (*Plecotus auritus*), for example, can only be detected within a few metres. This results in a higher likelihood of detecting noctules rather than brown long-eared bats.

The recording bias was further increased by the bats' habits and mobility. Some species of bat move between roosts and/or feeding grounds regularly and open foraging strategies are used. These are limitations common to most bat surveys and do not significantly affect the findings of this report, where the purpose is to identify roost presence/absence and type only.

The surveys only provided a snapshot of information temporally and spatially from which we extrapolate behaviour to make an ecological evaluation. Identification to species level was not always possible, particularly for the Myotis group of bats, which is notoriously hard to split into species due to their similar call types. Where a bat could not be identified to species, it was recorded to genus (e.g. *Myotis* and *Pipistrellus*) or, if this could not be ascertained, it was recorded as 'unidentified'. This is not a significant limitation as further survey techniques would be employed to identify bat species if echolocation data / visual observation were not conclusive.

Within the roof voids in Building 10 (the Furze with high suitability), it was not possible to walk around the voids due to the lack of safe footing. The voids were viewed only from the hatch as a result and the entirety of the voids were not visible. This building is scheduled to be refurbished.

Internal roof access was not gained into Buildings 21-26 (the Pinewood complex with moderate suitability) as access would only be possible by walking across flat roof areas to loft doors with no guard rail which was a cause for safety concern.

Internal roof access was not gained into Building 19 (Alderbourne Rehabilitation Centre with moderate suitability) due to health and safety concerns for acutely ill patients and COVID-19 restrictions.

T59 was unable to be surveyed as it had been removed as part of the Hillingdon operational works within the Site in the summer of 2021. In August 2021, it was confirmed by the Estates Officer of the Hillingdon Hospital and Heritage Tree Services (maintenance contractor) manager that the tree was inspected with an endoscope prior to being felled and no bats were found.

The level of survey effort was sufficient on the Site to overcome the limitations raised in this section. No bats were seen emerging or returning to buildings 10 and 21-26 and mitigation is proposed in Section 6.1 for Building 19, where a roost was recorded.

[10] Kubasiewicz L. M.,Gurnell J.,Harrower C. A.,McDonald R. A. and Shore R. F. (2018) Natural England Joint Publication JP025: A Review of the Population and Conservation Status of British Mammals. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage.

4. Results

4.1 Desk study

The desk study returned records of eight species of bat within 1 km of the Site. These comprised brown long-eared bat (*Plecotus auritus*), common pipistrelle (*Pipistrellus pipistrellus*), Leisler's bat (*Nyctalus leisleri*), *Myotis* species, Nathusius's pipistrelle (*Pipistrellus nathusii*), Noctule bat (*Nyctalus noctula*), serotine (*Eptesicus serotinus*) and soprano pipistrelle, (*Pipistrellus pygmaeus*). These records were sightings only and no roost records were provided from the local records centre due to confidentiality. There were no records of bat roosts or sightings within the Site from the London Bat Atlas[11].

There were no granted EPSMLs within 2 km of the Site[12]. The closest to the Site (EPSML Ref. 2014-3752-EPS-MIT) was located approximately 2.6 km to the north-west for destruction of a non-breeding common and soprano pipistrelle roost in 2014.

4.2 Preliminary Roost Assessment – Trees and Buildings

Details of the results of the preliminary bat roost assessment can be found in the PEA report[13]. Based on the initial inspection from the ground in the PEA, 16 buildings and eight trees were assessed as suitable to support roosting bats and were subject to further presence/absence bat surveys. Buildings and trees subject to survey along with surveyor locations are shown in Appendix A.

There was one building with **High** suitability for roosting bats:

- The Furze building (B10)

There were seven buildings with **Moderate** suitability for roosting bats:

- The Beaconsfield building (B16)
- The Alderbourne Rehabilitation Centre (B19)
- The Pinewood Complex (B21-B26)

There were eight buildings with **Low** suitability for roosting bats:

- main hospital building and Tower Block (B6)
- The Maternity building (B9)
- The Tudor building (B14)
- The Old Creche (B15)
- The Elderly Day Hospital (B17)
- The Nursery (B18)
- The INR (B23)
- The Education Centre (B30)

There were eight trees with **Moderate** suitability for roosting bats (T12, T14, T59, T95, T99, T102, T130 and T176). T59 was unable to be surveyed as it was removed as part of the hospital operational works in the summer of 2021.

(There were 22 trees with **Low** suitability for roosting bats but, following best practice guidelines for Low suitability trees, these were not subject to further surveys[14]).

[11] Law, R. (2015) The London Bat Atlas, London Bat Group.
[12] https://magic.defra.gov.uk/
[13] AECOM (2022) Hillingdon Hospital Preliminary Ecological Appraisal. THHR-ACM-ZZ-XX-RP-Y-000010
[14] Collins, J. (editor) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition.). London: Bat Conservation Trust.

4.3 Internal Inspection

An internal inspection was carried out on **High** suitability Building 10 (the Furze) on 18th February 2021. No sign of any bats was found in the three roof voids inspected (Plate 1). Access was available to the roof space of Building 9 (Maternity) with **Low** suitability for roosting bats and no sign of any bats were found. Details of the inspection are in Table 2.

Plate 1. Location of roof voids in Building 10 (the Furze) from Google aerial image

Table 2. Summary of Building Inspections

Building	Description	Photograph No.
Building 10 (the Furze)	Void 1 was located on the ground floor, in the eastern section. It was a large roof void, 3m in height and at least 6m long. The floor of the roof void was covered in insulation. The wooden ridge beam and rafters were visible. There was minor light ingress as a thin crack at the base of the pitched tile roof. The temperature in the roof void was cool, likely due to its large size and air flow. Rat dropping were recorded near the entrance hatch, but no visible evidence of bats was visible, however note that due to lack of a load bearing floor the void could not be surveyed in detail.	Photo 1
	Void 2 was located on the first floor, in the southern section. It was a large roof void, 2m in height and 10m long. The floor of the roof void was covered in insulation. There was natural detritus on the insulation but no sign of bat droppings or feeding remains. The wooden ridge beam was visible. There was a tear in the felt membrane covering the underside of the pitched roof void. There was also some folds in the felt membrane. There wasn't any light ingress or obvious crevices, though the tear and loose fitting between pitch roof felt provided potential entry points to bats from underneath roof files. There was a water tank and the temperature was humid. Mice droppings were recorded but no visible evidence of bats was present.	Photo 2
	Void 3 was located on the first floor, in the western section. It was a narrow roof void 1.5m high and 12m long. There was no insulation and the ridge beam, rafters and roof void floor were visible. There was old nesting material (grass and sticks) on the roof void floor, likely from previous pigeon use. There were two/three old fireplaces consisted of brick, lath and plaster. There was no light ingress to the void. The temperature was warm.	Photo 3
Building 9 (Maternity)	The building was flat roof with a roof space accessible via a vertical ladder. The roof area was not sealed, and the windows had no glass, so there was a breeze in the roof area.	Photo 4
Buildings 21-26 (the Pinewood complex)	Internal roof access was not gained as it would only be possible by walking across flat roof areas to loft doors with no guard rail which was a cause for safety concern.	Photo 5

4.4 Overall Summary of Emergence / Re-entry Surveys

Three bat roosts within a building and two trees were found on the Site.

A common pipistrelle re-entered the wooden cladding of Building 19, a noctule was seen exiting a woodpecker hole from Tree 12 and it is suspected that a common pipistrelle entered the canopy of Tree 14. A summary of bat roosts found is shown in Table 3.

Table 3. Summary of Bat Roosts found on Site from June – September 2021

Building / Tree	Survey date	Species	Description	Photograph
Building 19	Dawn 27-07-2021	Common pipistrelle	A single bat re-entered a gap in the buildings external wooden cladding, approximately 3m in height at 04:07am.	
ree 14	Dawn 13-07-2021	Common pipistrelle	A single bat was seen circling the tree canopy. It is suspected that the bat entered the tree at 04:01am.	
Tree 12	Dusk 04-08-2021	Noctule	A bat was seen exiting the tree via a woodpecker hole at 20:50pm.	

There were no other bat roosts recorded on the other buildings and trees on site.

Bat activity was recorded during the emergence / re-entry surveys and a summary of the activity results is available in Appendix C. Detailed raw data of the emergence / re-entry results per building and trees is available in Appendix D.

5. Discussion

5.1 Roosting Bats

On the 27th July 2021, a common pipistrelle re-entered the wooden cladding of Building 19 (Alderbourne Rehabilitation Centre) at 04:07am. It is likely that this is a day roost for a single individual as during two subsequent surveys, no further emergences were recorded at the same feature.

On the 4th of August 2021, a noctule was seen exiting a woodpecker hole from tree T12. Several other noctule calls were recorded around dusk and it is suspected that multiple noctules may roost in this tree. It is likely that this is a transitional roost in use during the summer by a number of males and, or non-breeding females.

On the 13th of July, it was suspected that a common pipistrelle entered the canopy of tree T14. Several other common pipistrelles calls were recorded around dawn and it is suspected that common pipistrelles may roost in this tree. It is likely that this is a transitional roost in use during the summer by a number of males/non-breeding females.

No bat roost was recorded on site during the presence/absence surveys apart from the three mentioned above, including Building 10 (the Furze) that had high suitability for roosting bats. No evidence of roosts was recorded during the internal inspections on Building 9 and 10.

5.2 Bat Activity (Commuting and Foraging)

Though bat activity surveys were not carried out, bat calls of non-roosting bats and bats passing through the Site were recorded during the emergence / re-entry surveys. It was found that the Site supported an assemblage of five bat species, namely common pipistrelle, soprano pipistrelle, noctule, serotine, and brown long eared. In addition, there were records for *Pipistrellus* species and *Nyctalus* species that could not be identified to species level.

The majority of bat passes consisted of three species: common pipistrelle, soprano pipistrelle and noctule during the survey season from May to September. There were infrequent passes of serotine and brown long eared on single nights in July and August 2021.

The Site had suitability for foraging and commuting bats, particularly the trees, scrub and watercourse in the south of the Site, where the majority of passes were recorded. Most of the pipistrelle, noctule and *Nyctalus* species passes were recorded in these habitats in the south of the Site, which had a higher concentration of mature trees, had lower lighter levels resulting in large dark areas and was less subjected to human activity as it contained a quiet road and was bordered by residential gardens. In contrast the north of the Site was along a busy road (Pield Heath Road), had higher concentration of street lighting and had higher levels of human activity due to the busy A&E and maternity areas of the hospital. Due to the number of passes recorded near B10, B19, T12, and T14, it is assumed that bats are commuting along the stream and mature trees in the south-east and south of the Site.

5.3 Nature Conservation Importance for Bat Species of the Site

All bat species in the UK have been assessed and assigned a conservation status. Common pipistrelle, soprano pipistrelle, noctule and brown long eared are of “Least Concern” on the IUCN red list and described as common and widespread across England within Bat Conservation Trust reports[15]. Serotine is listed as ‘Vulnerable’ on the IUCN red list[16] and is relatively uncommon with a restricted distribution mainly in southern England and south Wales and this species was only recorded on a single night. Wray (2010)[17] assesses both pipistrelle species and brown long-eared as common species and noctule and serotine as a ‘rarer’ species.

Roosts recorded to date within the Site are of small numbers of common and widespread species across the UK, as well as a small number of a rarer species, assessed as non-breeding. Based on survey results, the

[15] Bat Conservation Trust (undated). State of the UKs Bats. National Bat monitoring Programme Population Trends.
[16] https://www.mammal.org.uk/science-research/red-list/
[17] Wray S, Wells D, Long E, & Mitchell-Jones T (2010) Valuing Bats in Ecological Impact Assessment, IEEM In-Practice issue 70, p 23-25.

assemblage of roosting bats present within the Site is assessed as County Importance based on CIEEM guidance [18] and Wray[19].

The commuting and foraging bat species assemblage recorded on Site is less than the bat species assemblage records returned in the desk study within 1 km of the Site in the last 10 years and contains low activity of species assessed as Least Concern in the UK and two rarer species, being serotine (vulnerable on the IUCN red list) recorded only on a single night. Due to the limited species assemblage of five species recorded across the Site, the assemblage of foraging and commuting bats present within the Site is of Local Importance based on CIEEM guidance and Wray.

[18] CIEEM (2018) Guidelines for Ecological Impact Assessment in the United Kingdom: Terrestrial, Freshwater, Coastal and Marine.
[19] Wray S, Wells D, Long E, & Mitchell-Jones T (2010) Valuing Bats in Ecological Impact Assessment, IEEM In-Practice issue 70, p 23-25.

6. Recommendations

6.1 Demolition and tree felling

It is expected that the design for the Proposed Development will include the demolition of Building 19 (Alderbourne Rehabilitation Centre) in which case such works will need to be undertaken in accordance with a EPSML obtained from Natural England. It is understood that trees T12 and T14 will be retained within the Proposed Development. Were this to change and one or both needs to be felled, this would also necessitate obtaining a EPSML.

For buildings with **High, Moderate** and **Low** suitability without roosts recorded in 2021 (B6, B9, B10, B14, B15, B16, B17, B18, B21-26, B30), it is recommended that contractors are briefed about the risk of discovering bats unexpectedly during works and the need to stop and seek advice from an ecologist in this scenario. Six trees were found to have **Moderate** suitability for roosting bats (T59, T95, T99, T102, T130 and T176) and 22 trees with **Low** suitability for roosting bats (T4, T5, T8, T9, T10, T11, T24, T49, T68, T70, T97, T107, T110, T114, T117, T128, T129, T143, T178a, T178b, T181 and T182) (see Figure 1). Where it is not possible to retain these, any works to these trees should be done by section felling under supervision by a Natural England-licenced bat ecologist.

Soft felling is a precautionary tree removal method often applied to the felling and removal of trees with bat roost potential. Soft felling involves the careful removal of individual limbs followed by the trunk (which may also be cut sectionally depending on the size of the tree) and lowering them to the ground. Any potential roost features identified should be cut around (rather than through) and once carefully lowered, any potential roost feature should be left facing upwards on the ground for approximately 48 hours to allow any bats that may still be in the feature time to vacate. Utilising this methodology will minimise any potential impacts to bats. Any works to the tree should be conducted under the supervision of a licensed bat ecologist at an appropriate time of year during the bat active season (April to October, weather-dependent).

An overall Bat Mitigation Strategy should be prepared in taking into account Scheme detail design and Scheme program and the outcomes of the surveys of bats and their roosts.

6.2 Commuting and Foraging Habitat

Without mitigation and habitat compensation, there is a low risk that there will be an impact on foraging and commuting bats on the Site through loss of foraging habitat, for example. There is currently a level of lighting on the Site.

The use of low level (e.g. bollards) or directional lighting during works and within final design to avoid disturbance to commuting and foraging bats (particular of retained habitats) is recommended. Keeping appropriate light levels in key bat habitats across Site for bats and producing a Lighting Strategy with the input of an ecologist and a lighting engineer at a detailed design stage will ensure that lighting causes minimal disturbance for bats. Lighting guidance for bats[20] is being considered for the lighting strategy of the Proposed Development while working in maintaining minimum levels required for security.

As recommended within the PEA[21], the woodland, hedgerow and stream in the south of the Site will be retained within the Proposed Development's landscape design. The retained habitats, the new habitats (three wetland areas and green spaces in the centre of the Site) and the new tree planting proposed (approximately 395 new trees within Phase 1 of the Proposed development) will mitigate for the loss of some trees and planting beds and enhance the biodiversity within the Site.

Suitable boxes for bats would be appropriate within the retained woodland and retained/new trees for species such as brown long eared, common pipistrelle, soprano pipistrelle or noctule:

- Schwegler 1FF large Bat Box (note all boxes can be interchanged with a non-Schwegler equivalent)
- 2F Schwegler Bat Box with Double Front Panel

Suitable bat boxes appropriate for the external walls of new buildings for common and widespread crevice-dwelling bat species such as common pipistrelle or soprano pipistrelle:

[20] Bat Conservation Trust (2018) Guidance Note 08/18 Bats and Artificial Lighting in the UK.
[21] AECOM (2022) Hillingdon Hospital. Preliminary Ecological Appraisal. THHR-ACM-ZZ-XX-RP-Y-000010

- 1FQ Schwegler Bat Roost
- 2FE Schwegler Wall-Mounted Bat Shelter

Such measures should be co-ordinated into an overall ‘Bat Mitigation Strategy’ which will incorporate the measures above into the detailed masterplan and landscape strategy.

7. Conclusion

The habitats at the Site are used regularly by commuting and foraging bats including common pipistrelle, soprano pipistrelle, noctule, serotine, and brown long eared bat. The activity was concentrated in the south of the Site at the woodland, scrub and watercourse.

Building 19 (Alderbourne Rehabilitation Centre), trees T12 and T14 were confirmed as bat roosts. No bat roosts were recorded on the other trees and buildings on site.

If bat roosts are directly impacted by the Proposed Development (i.e. building demolition or tree removal), these works will need to be undertaken in accordance with a EPSML from Natural England. Therefore, Building 19 will require a EPSML as is scheduled to be demolished. Trees 12 and 14 are scheduled to be retained, as such, they will not require a EPSML.

Roost surveys will require updates in 2022 (or later for potential license applications beyond 2022) for any subsequent EPS mitigation licence application beyond the 2022 bat season as data for informing a EPSML must be from the current or previous season.

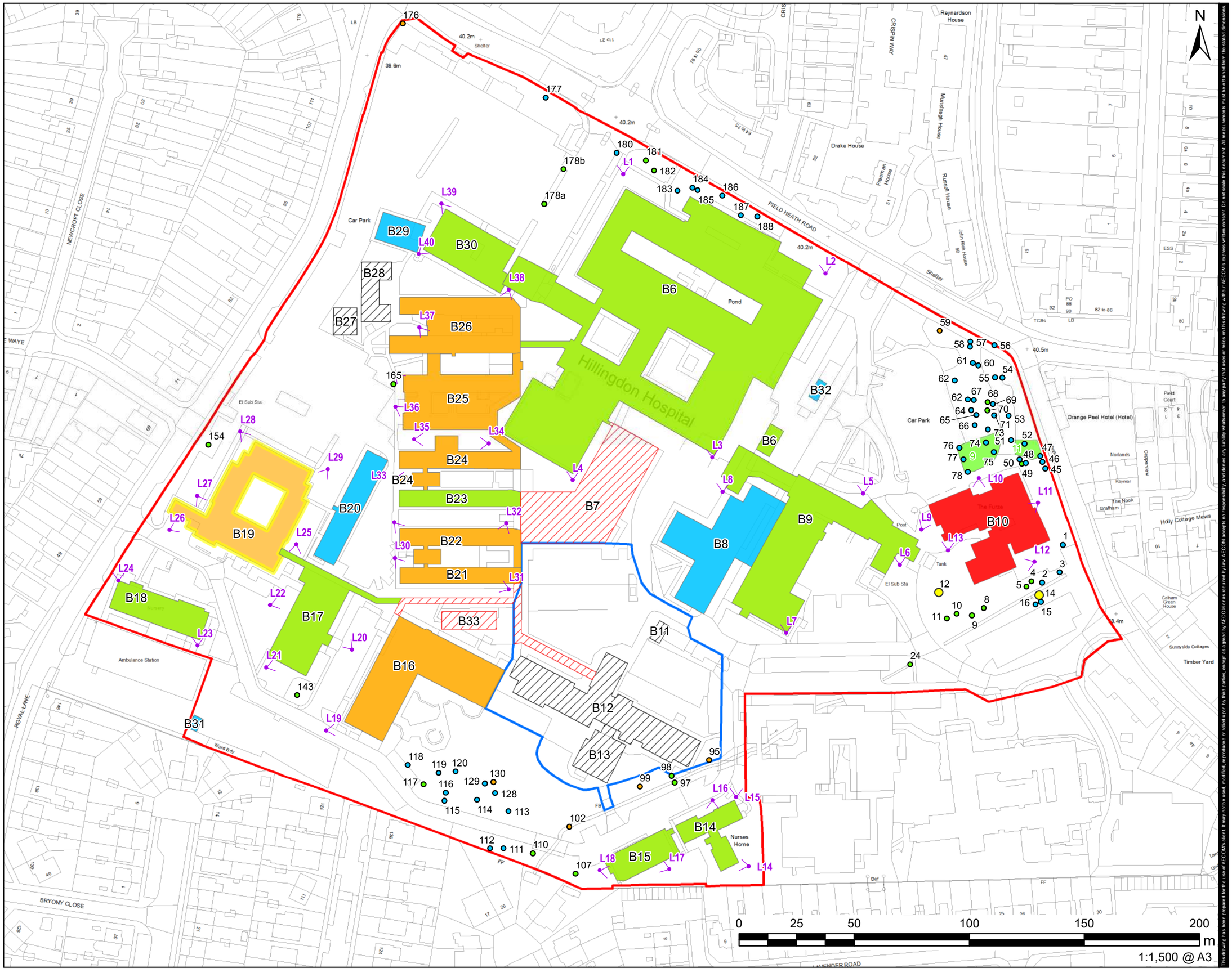
An overall Bat Mitigation Strategy should be prepared in taking into account Scheme detail design and Scheme program.

The data in this report will remain valid if the nature of the Site or the surrounding area is unlikely to change since the original surveys, and the original surveys were carried out in good conditions and at appropriate time of the year. It is recommended to review the validity of the data if it is required to inform a material decision such as a planning consent after the following (2022) bat survey season e.g. from September 2022 onwards.

Appendix A Figures

Figure 1. Location of Roosts and Buildings and Trees with Suitability for Roosting Bats

Filename: \\na.aecomnet.com\lfs\EMEA\Croydon-UKCRD1\Legacy\UKCRD1FP001\UKCRD1FP001-V1\E\projects\general\GISProjects\Hillingdon Hospital\02_Maps\AEC_ENV_ECO_Figure01_LocationOfBatRoosts.mxd Date: 21/03/2022
Revision: 01 Drawn: NK Checked: TG Approved: CF



AECOM

PROJECT
Hillingdon Hospital

CLIENT
Hillingdon Hospitals NHS Foundation Trust

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LEGEND
- Red Line Boundary
- Existing Construction Boundary
- Proposed Surveyor Locations

Suitability for Bat Roost
- Confirmed
- Low
- Moderate
- Negligible

Bat Roost Potential
- Confirmed Roosts
- High
- Low
- Moderate
- Negligible
- Demolished
- Inaccessible

NOTES

ISSUE PURPOSE
FOR INFORMATION

PROJECT NUMBER
60642181

SHEET TITLE
Location of Bat Roosts

SHEET NUMBER
Figure 01

Appendix B Photos

Photo 1. Roof Void 1 in Building 10

Photo 2 Roof Void 2 in Building 10

Photo 3. Roof Void 3 in Building 10

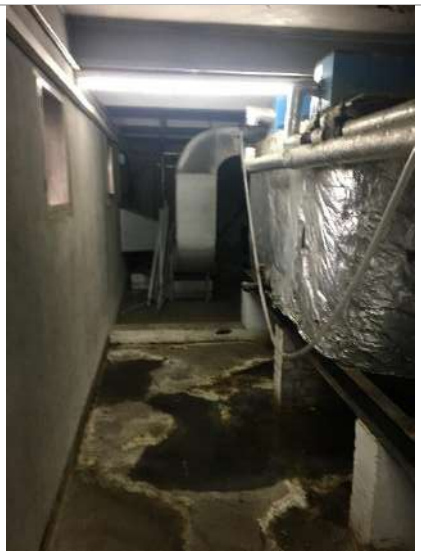


Photo 4. Roof Building 9

Photo 5. Buildings 21-26

Appendix C Summary of Bat Activity Results

Building	Survey Date	Location ID	Species & Approximate Passes								Closest Pass to Sunset / Sunrise	Notes
			Common Pipistrelle	Soprano Pipistrelle	*Pipistrellus* species	*Nyctalus* species	Noctule	Serotine	Brown long-eared			
Building 6	Dusk 07-06-2021	L1, L2, L3, L4										No bats seen or heard
Building 9	Dusk 08-06-2021	L5					10				+13 mins	
		L6					11				+15 mins	
		L7					10				+13 mins	
		L8					5				+87 mins	
Building 10	Dusk 24-05-2021	L9, L10, L11, L13										No bats seen or heard
		L12	5								+78 mins	
	Dusk 12-07-2021	L9, L13				1					+87 mins	
		L10					2				+86 mins	
		L11					3				+76 mins	
		L12	10-50				6				+29 mins (common pipistrelle)	
	Dawn 11-08-2021	L9				1	50+	5			-20mins (*Nyctalus* species)	
		L10	31	17		5	11				-20mins (*Nyctalus* species)	
		L11	2				2				-21mins (noctule)	
		L12	3	50+			20+				-21mins (noctule)	
		L13		6		16	24	5			-18mins (noctule)	
Building 14	Dusk 25-06-2021	L14	1	17			19				+27mins (noctule)	
		L15	1				2				+7mins (common pipistrelle)	
		L16	40+	10			11				+27mins (noctule)	
Building 15	Dusk 15-06-2021	L18	40+	21							+27mins (noctule)	
	Dusk 10-08-2021	L17										Invalid survey
	Dusk 23-09-2021	L17, L18	9				1				+35mins (common pipistrelle)	
Building 16	Dusk 15-06-2021	L19, L20	3				3				+28mins (noctule)	
	Dawn	L19, L20					5				-42mins	

Building	Survey Date	Location ID	Species & Approximate Passes							Closest Pass to Sunset / Sunrise	Notes
			Common Pipistrelle	Soprano Pipistrelle	*Pipistrellus* species	*Nyctalus* species	Noctule	Serotine	Brown long-eared		
	13-07-2021										
Building 17	Dusk 15-06-2021	L20, L21, L22					11			+79mins	
Building 18	Dusk 02-06-2021	L23, L24					4			+72mins	
Building 19	Dusk 01-06-21	L25, L26, L27, L28, L29	1	1						+52mins	
	Dawn 27-07-2021	L25	2							-35mins	
		L26									No bats seen or heard
		L27, L28	20	12						-36mins (common pipistrelle)	Bat roost recorded at 04:07am
		L29					4			-45mins	
	Dusk 08-09-2021	L25				1				+64mins	
		L26					15			+26mins	
		L27, L28				23	9			+27mins	
		L29				1				+64mins	
Building 21, 22	Dusk 26-07-2021	L30, L31, L32	2				7			+35mins (noctule)	
	Dawn 24-08-2021	L30, L31, L32									No bats seen or heard
Building 23, 24, 25	Dawn 19-08-2021	L33, L34, L35									No bats seen or heard
Building 23, 24, 25, 26	Dusk 29-06-2021	L33, L34, L35, L36, L37	1							+67mins	
Building 25, 26	Dawn 05-08-2021	L36, L37, L38									No bats seen or heard
Building 26, 30	Dusk 22-06-2021	L38									No bats seen or heard
		L39, L40					2			+84mins	
Tree 1, 6	Dawn 30-06-2021	T1		1						-21mins	
		T6									No bats seen or heard
Tree 176, 12, 14	Dusk 04-08-2021	T176				1	3			+25mins	
		T12	5+				10+		3	-3mins (noctule)	Bat roost recorded at 20:50pm (noctule)

Building	Survey Date	Location ID	Species & Approximate Passes							Closest Pass to Sunset / Sunrise	Notes
			Common Pipistrelle	Soprano Pipistrelle	*Pipistrellus* species	*Nyctalus* species	Noctule	Serotine	Brown long-eared		
		T14	2	1			2			+5mins (noctule)	
Tree 12, 14	Dawn 13-07-2021	T12	3	1						-31mins (common pipistrelle)	
		T14	9							-31mins	Suspected roost recorded at 04:01am
Tree T95, T99, T102, T129	Dawn 25-05-2021	T95, 99, 102									No bats seen or heard
		T129					2			-55mins	
Tree T95, T99, T102, T129	Dusk 10-08-2021	T95	1				3			+5mins (noctule)	
		T99	5	2			4			+5mins (noctule)	
		T102	11	2			3				
		T129	10	2			4			+4mins (noctule)	

Appendix D Full Bat Emergence Survey Results

Building 6

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
07-06-2021	1	L1	CF	Echometer Touch	21:00	22:45	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
07-06-2021	1	L2	JC	Batlogger M	21:00	22:45	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
07-06-2021	1	L3	CWF	Batlogger M	21:00	22:45	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
07-06-2021	1	L4	SR	Batlogger M	21:00	22:45	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Building 9

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
08-06-2021	1	L5	CF	Echometer Touch	21:00	22:45	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:28-22:40	Noctule	10 approx	N	Heard not seen, likely flying overhead			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
08-06-2021	1	L6	CWF	Batlogger M	21:00	22:45	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:30	Noctule	11	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
08-06-2021	1	L7	SR	Batlogger M	21:00	22:45	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:27-22:44	Noctule	10	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
08-06-2021	1	L8	JC	Batlogger M	21:00	22:45	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:38	Noctule	2	N	Heard not seen			
22:49	Noctule	1	N	Heard not seen			
22:51	Noctule	2	N	Heard not seen			

Building 10

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
24-05-2021	1	L9	RW	Batlogger M	20:45	22:30	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
24-05-2021	1	L10	SR	Batlogger M	20:45	22:30	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
24-05-2021	1	L11	CWF	Batlogger M	20:45	22:30	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
24-05-2021	1	L12	MW	Batlogger M	20:45	22:30	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:18	Common pipistrelle	3	N	Forgaging overhead			
22:23	Common pipistrelle	2	N	Forgaging overhead			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
24-05-2021	1	L13	CF	Echometer Touch	20:45	22:30	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
12-07-2021	2	L9+L13	CWF	Batlogger M	21:00	22:45	21:15
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:43	Nyctalus sp.	1	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
12-07-2021	2	L10	RW	Batlogger M	21:00	22:45	21:15
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:42-22:43	Noctule	2	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
12-07-2021	2	L11	CF	Echometer Touch	21:00	22:45	21:15
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:31	Noctule	1	N	Heard not seen			
22:32	Noctule	1	N	Heard not seen			
22:43	Noctule	1	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
12-07-2021	2	L12	MC	Batlogger M	21:00	22:45	21:15
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
21:44	Common pipistrelle	1	N	Heard not seen			
21:46	Common pipistrelle	1	N	Heard not seen			
22:26	Common pipistrelle	2	N	Heard not seen			
22:26	Common pipistrelle	1	N	flying on top of the trees			
22:27	Common pipistrelle	Several	N	foraging			
22:32	Noctule	5	N	Heard not seen			
22:42	Soprano pipistrelle	Several	N	Heard not seen			
22:42	Common pipistrelle	Several	N	Heard not seen			
22:43	Common pipistrelle	1	N	Heard not seen			
22:44	Noctule	1	N	Heard not seen			
22:44-22:48	Common pipistrelle	Several	N	foraging, flying on top of the trees			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
12-07-2021	2	L9+L13	CWF	Batlogger M	21:00	22:45	21:15
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:43	Nyctalus sp.	1	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
12-07-2021	2	L11	CF	EchometerTouch	21:00	22:45	21:15
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
22:31	Noctule	1	N	Heard not seen			
22:32	Noctule	1	N	Heard not seen			
22:43	Noctule	1	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
11-08-2021	3	L12	CWF	Batlogger M	04:10	05:55	05:39
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
04:10-04:38	Soprano pipistrelle	Several	N	Heard not seen, passing every few minutes			
04:32-05:20	Noctule	Several	N	Heard not seen, potential juvenile noctule from a perch in the woodland			
04:54	Common pipistrelle	3	N	Heard not seen			
05:09	Soprano pipistrelle	4	N	Heard not seen			
05:14	Soprano pipistrelle	1	N	Foraging around oak tree in woodland area south of the building			
05:19	Noctule	11	N	Flew over B10 heading south			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
11-08-2021	3	L9	MC	Batlogger M	04:10	05:55	05:39
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
04:28	Nyctalus species	1	N	Heard and seen, commuting on top of the building			
04:53	Noctule	18	N	Heard not seen			
04:53	Serotine	5	N	Heard not seen, brief pass			
04:54	Noctule	19	N	Heard not seen			
05:19	Noctule	13	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
11-08-2021	3	L11	SR	Batlogger M	03:54	05:55	05:39
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
04:55	Common pipistrelle	1	N	Heard not seen			
04:56	Noctule	1	N	Heard not seen			
04:56	Common pipistrelle	1	N	Heard not seen			
05:18	Noctule	1	N	Flying overhead			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
11-08-2021	3	L13	JC	Batlogger M	04:10	05:55	05:39
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
04:22	Noctule	2	N	Heard not seen			
04:30	Serotine	5	N	Heard not seen			
04:55	Noctule	17	N	Heard not seen			
04:56	Serotine	5	N	Heard not seen			
04:56	Nyctalus species	16	N	Heard not seen			
05:11	Soprano pipistrelle	1	N	Heard not seen			
05:15	Soprano pipistrelle	5	N	Heard not seen			
05:21	Noctule	5	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
11-08-2021	3	L10	JC	Batlogger M	04:10	05:55	05:39
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
04:40	Soprano pipistrelle	17	N	Heard not seen			
04:55	Noctule	11	N	Heard not seen			
04:56	Common pipistrelle	31	N	Seen foraging over trees north of building			
05:19	Nyctalus species	5	N	Heard not seen			

Building 14

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
25-06-2021	1	L15	MC	EchometerTouch	21:07	22:55	21:22
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
21:29	Common pipistrelle	1	N	Heard not seen			
21:49	Noctule	1	N	Heard not seen			
22:48	Noctule	1	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
25-06-2021	1	L14	RW	Batlogger M	21:05	22:55	21:22
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
21:49	Noctule	14	N	Unseen, likely foraging			
22:27	Soprano pipistrelle	17	N	Unseen, likely foraging			
22:29	Common pipistrelle	1	N	Unseen			
22:48	Noctule	5	N	Unseen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
25-06-2021	1	L16	CF	Batlogger M	21:05	22:55	21:22

Time	Species	No. of passes	Emerge (Y/N)	Description
21:49	Noctule	7	N	Heard not seen
22:04	Soprano pipistrelle	9	N	Heard not seen
22:27	Soprano pipistrelle	1	N	Heard not seen
22:28	Common pipistrelle	11	N	Heard not seen, likely foraging
22:36	Common pipistrelle	14	N	Heard not seen, likely foraging
22:44	Common pipistrelle	15	N	Heard not seen, likely foraging
22:47	Common pipistrelle	2	N	Heard not seen
22:47	Noctule	2	N	Heard not seen
22:52	Common pipistrelle	19	N	Heard not seen, likely foraging

Building 15

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
15-06-2021	1	L18	MC	Batlogger M	21:06	22:51	21:21

Time	Species	No. of passes	Emerge (Y/N)	Description
21:48	Common pipistrelle	1	N	Brief pass, Heard not seen
22:01	Soprano pipistrelle	20	N	Heard not seen, likely foraging
22:08	Common pipistrelle	19	N	Heard not seen, likely foraging
22:13	Soprano pipistrelle	1	N	Brief pass, Heard not seen
22:29	Common pipistrelle	1	N	Brief pass, Heard not seen
22:38	Common pipistrelle	7	N	Multiple faint passes, likely foraging
22:51	Common pipistrelle	17	N	Multiple faint passes, likely foraging

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
23-09-2021	2	L17	CF	EchometerTouch	18:40	20:29	18:57

Time	Species	No. of passes	Emerge (Y/N)	Description
19:40	Common pipistrelle	1	N	Heard not seen

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
23-09-2021	2	L18	RW	Batlogger M	18:40	20:29	18:57
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
19:32	Common pipstrelle	1	N	~3m up			
19:34	Common pipstrelle	1	N	Unseen			
19:40	Common pipstrelle	1	N	~3m up			
19:53	Common pipstrelle	1	N	Unseen			
19:54	Common pipstrelle	1	N	Unseen			
20:03	Noctule	2	N	Unseen			
20:21	Common pipstrelle	1	N	Unseen			
20:23	Common pipstrelle	1	N	Unseen			
20:28	Common pipstrelle	1	N	Unseen			

Building 16

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
15-06-2021	1	L19	CF	Echometer Touch	21:05	22:50	21:20
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
21:48	Noctule	2	N	Heard not seen			
22:04	Common pipstrelle	1	N	Heard not seen			
22:17	Common pipistrelle	1	N	Seen flying at a low height (2m) from north to south towards the hedge			
22:27	Common pipistrelle	1	N	Heard not seen			
22:41	Noctule	1	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
15-06-2021	1	L20	RW	Batlogger M	21:05	22:50	21:20
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:39	Noctule	1	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
13-07-2021	2	L19+L20	CF	EchometerTouch	03:30	05:15	04:58
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
03:31	Noctule	2	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
03:47	Noctule	1	N	Heard not seen			
03:52	Noctule	1	N	Heard not seen			
04:16	Noctule	1	N	Heard not seen			

Building 17

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
15-06-2021	1	L22	SR	Batlogger M	21:05	22:50	21:20
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:39	Noctule	8	N	Heard not seen, likely foraging overhead			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
15-06-2021	1	L21	CWF	Batlogger M	21:05	22:50	21:20
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:41	Noctule	1	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
15-06-2021	1	L20	RW	Batlogger M	21:05	22:50	21:20
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:39	Noctule	1	N	Heard not seen			

Building 18

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
02-06-2021	1	L24	MC	Batlogger M	20:56	20:45	21:11
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:23 - 22:31	Noctule	3	N	Heard not seen			
22:36	Soprano	1	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
02-06-2021	1	L23	SR	Batlogger M	20:50	22:40	21:07
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Building 19

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
01-06-2021	1	L25	MS	Batlogger M	20:40	22:40	21:07
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
01-06-2021	1	L27	SR	Batlogger M	20:50	22:40	21:07
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
01-06-2021	1	L29	MS	Batlogger M	20:50	22:40	21:07
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
21:59	Common pipistrelle	1	N	Commuting			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
01-06-2021	1	L26	CWF	Batlogger M	20:50	22:40	21:07
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
01-06-2021	1	L28	RW	Batlogger M	20:30	22:40	21:07
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:00	Common pipistrelle	1	N	Unseen, commuting			
22:35	Soprano pipistrelle	1	N	Unseen, commuting			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
27-07-2021	2	L26	CF	Batlogger M	03:45	05:32	05:17
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
27-07-2021	2	L25	CWF	Batlogger M	03:45	05:32	05:17
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
27-07-2021	2	L26	CF	Batlogger M	03:45	05:32	05:17
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
04:20	Common pipistrelle	1	N	Heard not seen			
04:42	Common pipistrelle	1	N	Commuting, heading North over B19			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
27-07-2021	2	L29	MC	Batlogger M	03:45	05:32	05:17
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
03:42	Noctule	1	N	Heard not seen, brief pass			
03:46	Noctule	1	N	Heard not seen, brief pass			
04:32	Noctule	2	N	Heard not seen, brief pass			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
27-07-2021	2	L27, L28	RW	Batlogger M	03:45	05:32	05:17
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
03:56	Pipistrellus species	12	N	Heard not seen			
04:07	Common pipistrelle	1	Y	Seen landing on building			
04:14	Common pipistrelle	2	N	Heard not seen			
04:41	Common pipistrelle	17	N	Seen flying at roof height			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
09-09-2021	3	L29	CF	Batlogger M	19:15	20:50 (rain)	19:30
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
20:38	Nyctalus species	1	N	Heard not seen			

Building 21, 22

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
26-07-2021	1	L31	MC	EchometerTouch	20:45	22:30	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
21:35	Noctule	1	N	Heard not seen, brief pass			
21:35	Noctule	1	N	Heard not seen, brief pass			
21:48	Noctule	1	N	Heard not seen, brief pass			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
22:12	Noctule	1	N	Heard not seen, brief pass			
22:16	Noctule	1	N	Heard not seen, brief pass			
22:19	Noctule	1	N	Heard not seen, brief pass			
22:30	Noctule	1	N	Heard not seen, brief pass			
22:28-22:29	Common pipistrelle	2	N	Heard not seen, brief pass			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
26-07-2021	1	L32	CWF	BatloggerM	20:45	22:30	21:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
21:34	Noctule	1	N	Heard not seen			
21:35	Noctule	12	N	Heard not seen			
21:35	Noctule	1	N	Heard not seen			
21:35	Noctule	1	N	Heard not seen			
21:48	Noctule	1	N	Heard not seen			
21:48	Noctule	1	N	Heard not seen			
21:48	Noctule	2	N	Heard not seen			
21:48	Noctule	1	N	Heard not seen			
22:12	Noctule	1	N	Heard not seen			
22:12	Noctule	1	N	Heard not seen			
22:12	Noctule	1	N	Heard not seen			
22:14	Noctule	1	N	Heard not seen			
22:16	Noctule	1	N	Heard not seen			
22:16	Noctule	5	N	Heard not seen			
22:16	Noctule	2	N	Heard not seen			
22:19	Noctule	1	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
24-08-2021	2	L31	CWF	Batlogger M	04:31	06:16	06:01
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
24-08-2021	2	L30	CWF	Batlogger M	04:31	06:16	06:01
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Building 23

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
19-08-2021	1	L33	JC	Batlogger M	04:23	06:08	05:53
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
24-08-2021	2	L31	CWF	Batlogger M	04:31	06:16	06:01
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
20:38	*Nyctalus* species	1	N	Heard not seen			

Building 24

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
29-06-2021	1	L35	CWF	Batlogger M	21:05	22:50	21:21
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
29-06-2021	1	L34	MC	EchometerTouch	21:06	22:56	21:21
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
29-06-2021	1	L33	JC	EchometerTouch	21:06	22:56	21:21
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:27	Common pipistrelle	1	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
19-08-2021	2	L34	RW	Batlogger M	04:23	06:08	05:53
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
19-08-2021	2	L35	CF	Batlogger M	04:23	06:08	05:53
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
19-08-2021	2	L35	JC	Batlogger M	04:23	06:08	05:53
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Building 25

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
29-06-2021	1	L36	RW	Batlogger M	21:06	23:21	21:24
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
05-08-2021	2	L36	JC	Batlogger M	04:00	05:45	05:30
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
05-08-2021	1	L37	MC	EchometerTouch	04:00	05:45	05:30
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
05-08-2021	1	L38	CWF	Batlogger M	04:00	05:45	05:30
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Building 26

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
22-06-2021	1	L38	CF	Batlogger M	21:05	22:50	21:20
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
29-06-2021	1	L37	MS	Batlogger M	21:05	22:50	21:20
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
05-08-2021	2	L37	MC	EchometerTouch	04:00	05:45	05:30
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
05-08-2021	2	L38	CWF	Batlogger M	04:00	05:45	05:30
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Building 30

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
22-06-2021	1	L40	MC	Batlogger M	21:05	22:50	21:20
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
22-06-2021	1	L39	RW	Batlogger M	21:05	22:50	21:20
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
22:44	Noctule	1	N	unseen			
22:44	Noctule	1	N	unseen, Likely Foraging			

Tree 176

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
30-06-2021	1	T176	MC	Batlogger M	03:17	04:47	04:47
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
04:06	Soprano pipistrelle	1	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
04-08-2021	2	T176	JC	Batlogger M	03:17	04:47	04:47

Time	Species	No. of passes	Emerge (Y/N)	Description
21:11	Noctule	4	N	Heard not seen
21:33	Noctule	14	N	Heard not seen, likely foraging
21:38	Noctule	16	N	Heard not seen, likely foraging
22:15	Leisler's	2	N	Heard not seen

Tree 59

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
30-06-2021	1	T59	RW	Batlogger M	03:00	04:46	04:51

Time	Species	No. of passes	Emerge (Y/N)	Description
				No bats seen or heard

Tree 12

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
13-07-2021	1	T12	CWF	Batlogger M	03:30	05:15	05:00

Time	Species	No. of passes	Emerge (Y/N)	Description
03:39	Common pipistrelle	1	N	Heard not seen
03:49	Common pipistrelle	1	N	Heard not seen
04:22	Soprano pipistrelle	1	N	Heard not seen
04:29	Common pipistrelle	3	N	1 bat foraging east of the tree along ditch

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
04-08-2021	2	T12	CF	Batlogger M	20:30	22:15	20:45

Time	Species	No. of passes	Emerge (Y/N)	Description
20:33	Noctule	1	?	Social calls
20:40	*Nyctalus* species	2	?	Social calls
20:42	Noctule	1	?	Social calls
20:48	Noctule	6	?	Social calls
20:50	Noctule	1	Y	Seen emerging from woodpecker hole, 10m high, north-facing
20:50	Brown long eared	3	N	Heard not seen

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
21:06-21:08	Common pipistrelle	Continuous	N	Foraging along tree-lined watercourse			
21:50	Noctule	1	N	Heard not seen			
21:56	*Nyctalus* species	1	N	Heard not seen			
22:05-22:15	Noctule	Continuous	N	Heard not seen, social calls			

Tree 14

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
13-07-2021	1	T14	MC	Batlogger M	03:30	05:15	05:00

Time	Species	No. of passes	Emerge (Y/N)	Description
03:24	Common pipistrelle	1	N	Heard not seen
03:26	Common pipistrelle	1	N	Heard not seen
03:33	Common pipistrelle	1	N	Heard not seen
03:48	Common pipistrelle	1	N	Heard not seen
03:49	Common pipistrelle	1	N	Commuting
03:59	Common pipistrelle	1	N	Heard not seen
04:00	Common pipistrelle	1	N	Heard not seen
04:01	Common pipistrelle	Several	?	Flying on top of the tree, suspected roost
04:29	Common pipistrelle	1	N	Heard not seen

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
04-08-2021	2	T14	CWF	Batlogger M	20:30	22:15	20:45

Time	Species	No. of passes	Emerge (Y/N)	Description
20:50	Noctule	1	N	Heard not seen
21:07	Common pipistrelle	1	N	Heard not seen
21:39	Common pipistrelle	1	N	Heard not seen
21:49	Noctule	2	N	Heard not seen
22:00	Soprano pipistrelle	1	N	Heard not seen

Tree 95

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
25-05-2021	1	T95	RW	Batlogger M	03:50	05:15	04:59
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
10-08-2021	2	T95	CWF	Batlogger M	20:15	22:01	20:32
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
20:37	Noctule	1	N	Heard not seen			
21:07	Noctule	1	N	Commuting high above the canopy east to west			
21:21	Common pipistrelle	3	N	Heard not seen			
21:49	Noctule	1	N	Heard not seen			

Tree 99

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
25-05-2021	1	T99	SR	Batlogger M	03:48	05:15	04:59
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
10-08-2021	2	T99	SR	Batlogger M	20:15	22:05	20:32
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
20:37	Noctule	1	N	Flying over trees			
21:00	Common pipistrelle	1	N	Heard not seen			
21:07	Noctule	1	N	Heard not seen			
21:11	Soprano pipistrelle	1	N	Heard not seen			
21:20	Common pipistrelle	1	N	Heard not seen			
21:23	Noctule	1	N	Heard not seen			
21:31	Soprano pipistrelle	1	N	Heard not seen			
21:48	Noctule	2	N	Heard not seen			
21:56	Common pipistrelle	1	N	Heard not seen			
21:58	Common pipistrelle	1	N	Heard not seen			
21:59	Common pipistrelle	1	N	Heard not seen			

Tree 102

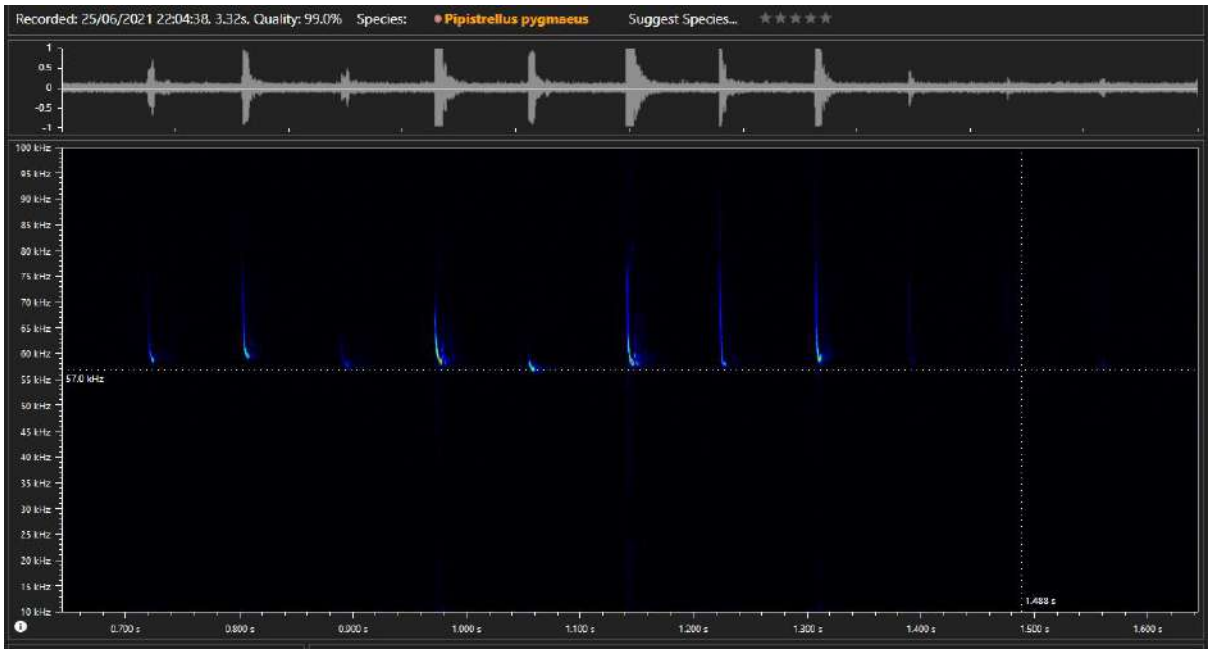
Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
25-05-2021	1	T102	CWF	Batlogger M	03:50	05:15	04:55
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
				No bats seen or heard			

Tree 129

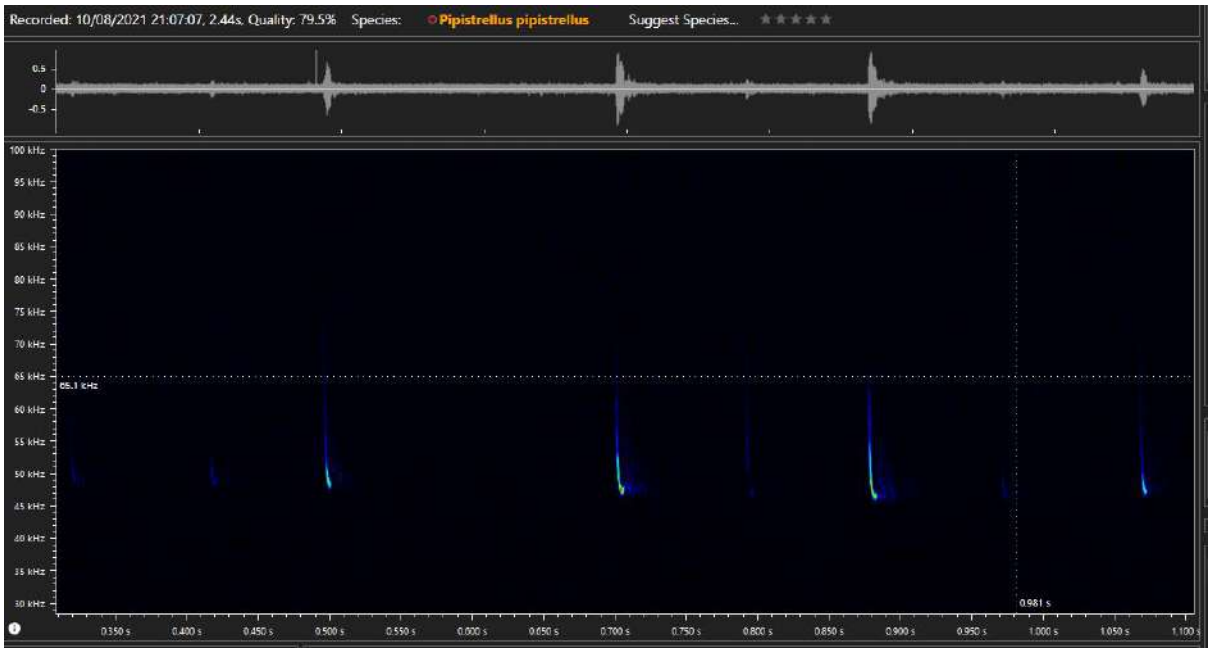
Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
25-05-2021	1	T129	CF	Batlogger M, EchometerTouch	03:50	05:15	05:00
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
04:00	Noctule	2	N	Heard not seen			
04:05	Noctule	3	N	Heard not seen			

Date	Survey number	Location Number	Surveyor	Equipment	Start time	End time	Sunset/rise
10-08-2021	2	T129	MC	Batlogger M	20:15	22:02	20:32
Time	**Species**	**No. of passes**	**Emerge (Y/N)**	**Description**			
20:36	Noctule	1	N	Heard not seen, possible roost in tree close to this			
20:56	Common pipistrelle	1	N	Commuting			
20:57	Soprano pipistrelle	1	N	Heard not seen, brief pass			
21:00	Common pipistrelle	1	N	Bat flying on top of the trees			
21:02	Common pipistrelle	Several	N	Foraging			
21:06	Noctule	1	N	Heard not seen			
21:08	Soprano pipistrelle	1	N	Heard not seen, brief pass			
21:21	Common pipistrelle	1	N	Heard not seen, brief pass			
21:22	Common pipistrelle	1	N	Flying on top of the trees			
21:28	Common pipistrelle	1	N	Heard not seen, brief pass			
21:44	Noctule	1	N	Heard not seen			
21:48	Noctule	1	N	Heard not seen			
21:54	Common pipistrelle	1	N	Heard not seen			
21:56	Common pipistrelle	1	N	Heard not seen, brief pass, commuting			
21:58	Common pipistrelle	1	N	Heard not seen			
21:59	Common pipistrelle	1	N	Heard not seen, commuting			

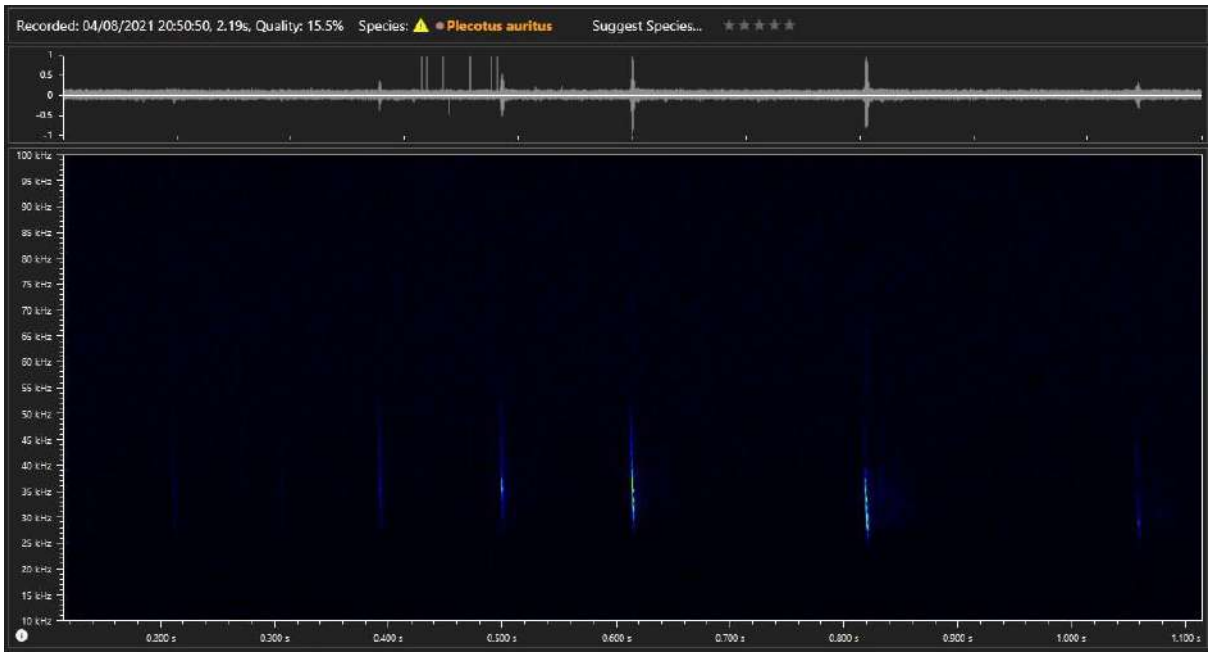
Appendix E Example Bat Echolocation Sonograms



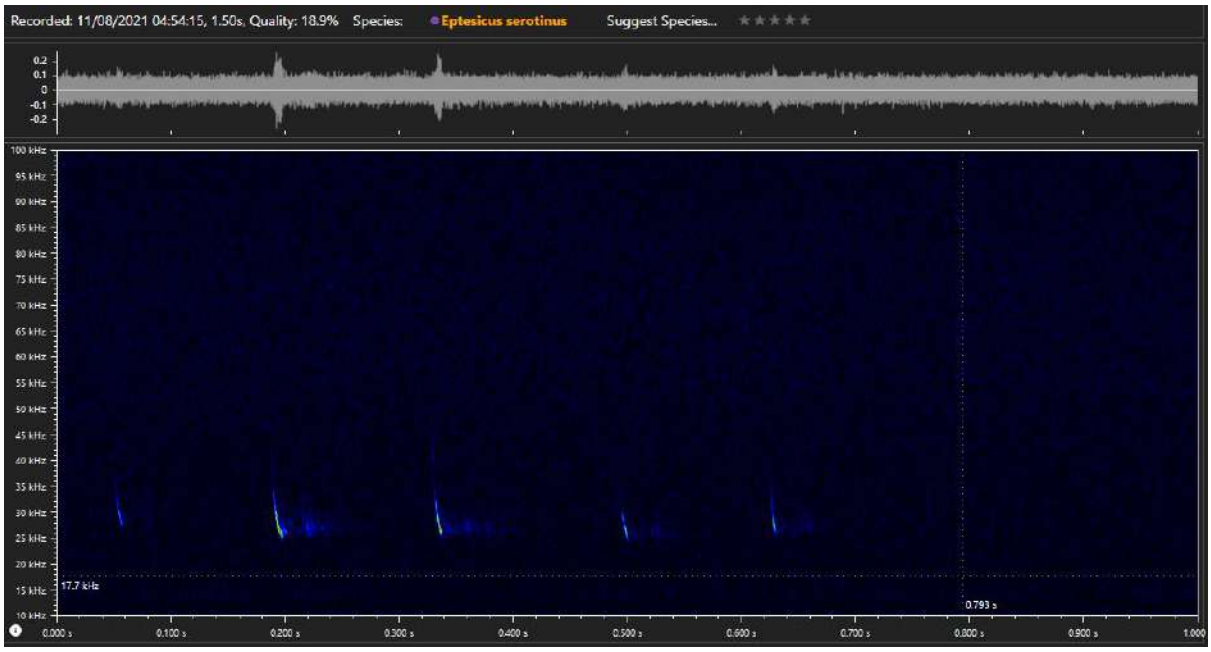
Soprano pipistrelle recorded at 22:04pm on 25th June 2021



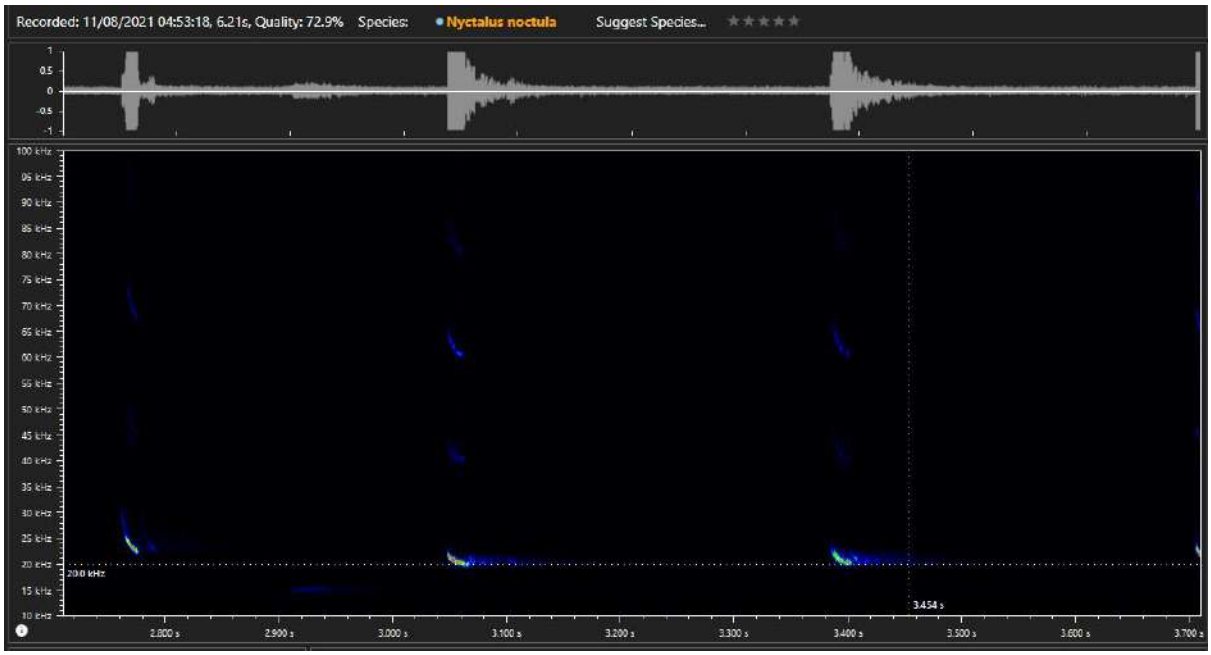
Common pipistrelle recorded at 21:07 on 10th August 2021



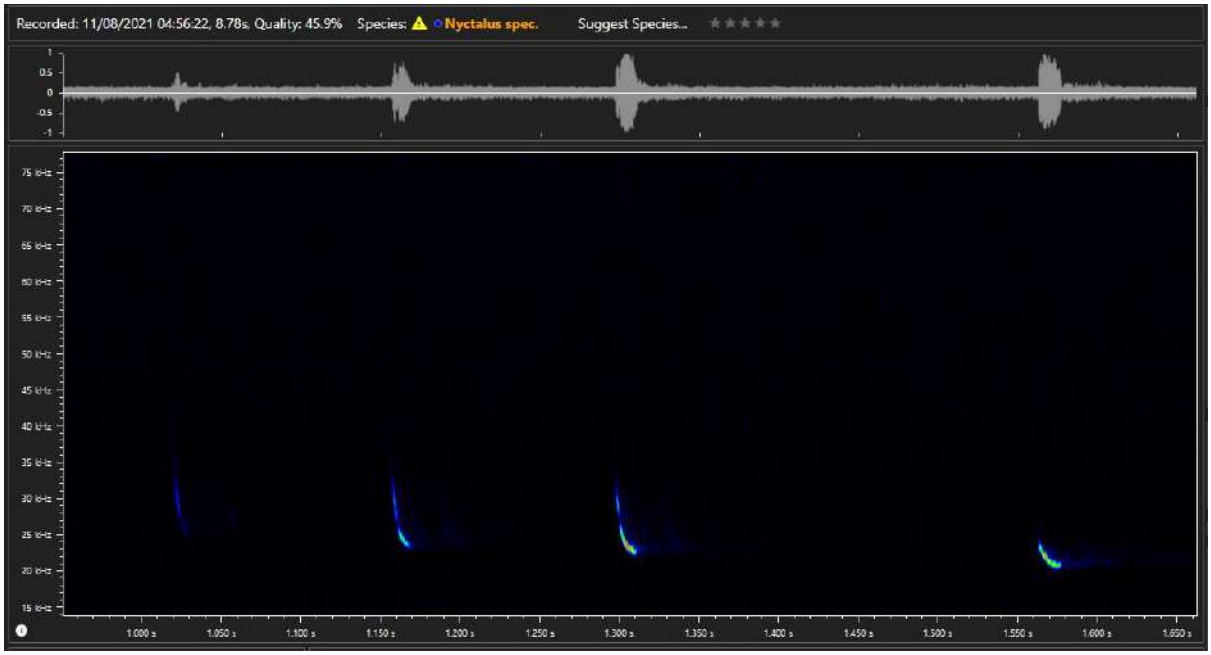
Brown long eared bat call recorded at 20:50pm on 4th August 2021



Serotine call recorded at 04:54am on 11th August 2021 at B10



Noctule call recorded at 04:53am on 11th August 2021



Nyctalus species recorded at 04:56am on 11th August 2021

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Appendix F Peregrine Falcon and Breeding Bird Report - CONFIDENTIAL report

Report provided separately due to its confidentiality

Appendix G Non-Native Invasive Plant Species Assessment. Biosecurity and Management Plan

Hillingdon Hospital

Invasive Non-native Plant Species Assessment: Biosecurity and Management Plan

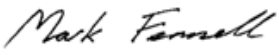
Hillingdon Hospitals NHS Foundation Trust

Project number: 60642181
THHR-ACM-ZZ-XX-RP-Y-000011

March 2022

Delivering a better world

Quality information

Prepared by	Checked by	Verified by	Approved by
			
John Cheese BSc ACIEEM Ecologist	Mark Fennell BSc (Hons) PhD Associate Director	Max Wade FCIEEM Technical Director	Paul Stannard Regional Director

Revision History

Revision	Revision date	Details	Authorized	Name	Position
V1	06.08.2021		06.08.2021	Paul Stannard	Regional Director
V2	07.04.2022		08.04.2022	Paul Stannard	Regional Director

Prepared for:

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Table of Contents

Figures

Tables

1. Executive Summary

This Invasive Non-native Plant Species Assessment report has been prepared by AECOM Ltd to accompany a hybrid planning application being submitted by the Applicant, Hillingdon Hospitals NHS Foundation Trust, to the London Borough of Hillingdon.

Fifteen invasive non-native plant species (INNS) were identified during an invasive species assessment (walkover survey) carried out by AECOM at Hillingdon Hospital in June 2021. The distributions of INNS on and adjacent to the Site are shown in Figure 1.

Six of these species; Japanese knotweed, three cornered garlic, Himalayan balsam, Himalayan cotoneaster, small leaved cotoneaster and rhododendron are listed on Schedule 9 of the Wildlife and Countryside Act, with the remaining species listed on the London Invasive Species Initiative. Himalayan balsam is also listed on the Invasive Alien Species (Permitting and Enforcement) Order, 2019.

It is an offence to plant, or otherwise cause to grow (including allowing to spread), species listed on the Wildlife and Countryside Act and the Alien Invasive species Order in the wild. Also, if transported off site, there is a duty of care with regards to the disposal of any part of the plant that may facilitate establishment in the wild and cause environmental harm. The presence of these INNS has the potential to cause delays to the development and, if improperly managed, result in breaches in legislation and/or substantial control and/or waste disposal costs.

This report constitutes an invasive species management plan for these species and has three main objectives:

- eliminate the risks associated with INNS presence on and near the Proposed Development;
- reduce the probability of re-infestation following development; and
- demonstrate an appropriate management plan is in place to achieve mitigation, and how management should be implemented.

The optimal approach to managing the listed species recorded on the Site involves a combination of avoidance, chemical control and physical removal.

The management approach can be undertaken as part of the outline or detailed application enabling works but is best incorporated into the ongoing management of the Hillingdon Hospital Campus to minimise the potential future spread of the species as well as control costs.

Note that due to the lengthy potential time period between the original Preliminary Ecological appraisal (PEA) survey and future enabling works, a pre-commencement INNS survey is recommended prior to enabling works to determine any change to the status and distribution of these species as well as any corresponding changes to control recommendations.

A summary of management recommendations is presented in Sections 6 and 7.

Commencing control action as far in advance of development works as is possible can greatly reduce the cost of management and reduce constraints.

2. Introduction

2.1 Background and Scope

This Invasive Non-native Plant Species Assessment report has been prepared by AECOM Ltd to inform a hybrid planning application being submitted by the Client, Hillingdon Hospitals NHS Foundation Trust, to the London Borough of Hillingdon.

The proposal comprises a hybrid planning application for:

- a full application seeking planning permission for demolition of existing buildings and redevelopment of the site to provide the new Hillingdon Hospital, multi-storey car park and mobility hub, vehicle access, highways works, associated plant, generators, substation, new internal roads, landscaping and public open space, utilities, servicing area, surface car park/ expansion space, and other works incidental to the proposed development; and
- an outline planning application (all matters reserved, except for access) for the demolition of buildings and structures on the remaining site (excluding the Grade II Furze and Tudor Centre) for a mixed-use development comprising residential (Class C3) and supporting Commercial, Business and Service uses (Class E), new pedestrian and vehicular access; public realm, amenity space, car and cycling parking.

AECOM was instructed in November 2020 by Hillingdon Hospitals NHS Foundation (hereafter referred to as 'the Client') to carry out a Preliminary Ecological Appraisal (PEA) [1] of the hospital campus (hereafter referred to as 'the Site').

Several invasive non-native plant species listed on relevant legislation were identified on the Site during the PEA carried out by AECOM in November 2020. It was recommended within the PEA report that an invasive species assessment (ISA) be carried out and a Biosecurity and Management Plan (BMP) be produced to avoid the spread of these plants during construction and to provide recommendations for their management.

2.2 Site Description

Hillingdon Hospital is located to the south of Pield Heath Road, bound by Royal Lane to the west, and Colham Green Road to the east. The Site is located within the Brunel Ward. The site comprises a ten storey block built in the 1960s and a mix of other hospital buildings scattered across the Site. Many of the acute beds are in single storey wards built in the 1940s, which are in very poor condition (Figure 1).

The remainder of the Site consists mainly of surface level car parking, interspersed with pockets of landscaping.

There are two parcels of woodland within the Site that are covered by Tree Preservation Orders (TPOs): one south of the Furze and the second is west of the Woodlands Centre. A culvert runs west-east crossing both TPO's. The culvert is canalised under the service road and partially under the Woodlands Centre. On the east of the Site is a Grade II Listed Building, The Furze.

To the west of the Site along Royal Lane, there is a two storey detached and semi-detached residential properties, and to the north west corner of the Site lies a three-four storey flatted residential block along Pield Health Road opposite the entrance to the Outpatient Department.

The approximate central grid reference of the Site is TQ 06826 81850.

The surrounding area consists of commercial and residential properties, with green areas a little further afield. The River Pinn is located to the west of the Site and is approximately 470 m away from the western edge of the Site. A tributary stream of the River Pinn flows through the south of the Site (Figure 1)

2.3 Purpose

The INNS Assessment presents the results of a detailed survey of the Site together with recommendations and appropriate management to mitigate risk associated with relevant invasive non-native plants on site.

Thirteen invasive non-native plant species listed on relevant legislation and guidance (see Appendix B) were identified within or adjacent to the Site as part of the PEA (Section 3.2). During the survey walkover carried out on

[1] AECOM (2022) Hillingdon Hospital. Preliminary Ecological Appraisal. THHR-ACM-ZZ-XX-RP-Y-000010.

the 8th of June, an additional two invasive species were recorded on or in the area surrounding the Site (Section 3.2).

2.4 Legislation

There are several legislative instruments relating to invasive non-native species (INNS). The purpose of this legislation is to prevent and reduce the negative economic and environmental impacts of these species. Key legislation identified species for white mitigation is required, specifically:

- Species listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) – WCA; and
- Species of special concern and Schedule 2 species as per the Invasive Alien Species (Enforcement and Permitting) Order 2019 (as amended) - IASO.

It is an offence to cause any of the species listed on either Schedule 9 or species of special concern on Schedule 2 to spread into the wild. If transported off site, there is a duty of care with regards to the disposal of any part of the plant that may facilitate establishment in the wild and cause environmental harm (as per the Environmental Protection Act 1990).

While it is not illegal to have any of the identified INNS on a property, even when growing on managed land, the spread of Schedule 9 species should be kept under control such that the species is not having an appreciable adverse impact on habitats and their native biodiversity[2]. Species of special concern (as per IASO) should be safely removed if containment cannot be guaranteed[3], with exemptions being in place for widespread species[4].

If charged with committing an offence, it is a defence against prosecution to prove that all reasonable steps were taken and all due diligence exercised in attempting to avoid committing the offence. Therefore, in order to reduce the potential of breaching legislation and fines/prosecution, a management plan should be in place for INNS on a property and property owners should be able to demonstrate that they are following it.

The London Invasive Species Initiative (LISI) also provides guidance on INNS occurring in London, rating these species according to four categories.

A full summary of the legislation relevant to INNS in England is presented in Appendix B.

[2] Defra (2010). Guidance on Section 14 of the Wildlife and Countryside Act, 1981
[3] Defra (2016). The EU Invasive Alien Species Regulation – Frequently Asked Questions
[4] Defra (2019). Management measures for widely spread Invasive Alien Species (IAS) in England and Wales

3. Site Assessment

3.1 Method

A PEA walkover survey was carried out in November 2020 by a suitably qualified ecologist, with a follow up invasive non-native plant species walkover carried out in June 2021 during the time when most plants are growing. As part of the PEA, an invasive non-native plant species survey was carried out of any species on or in close proximity to the Site with particular focus on:

- invasive non-native plant species listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (WCA);
- species of special concern and Schedule 2 species, as per the Invasive Alien Species (Enforcement and Permitting) Order 2019; and
- invasive species listed and classified by LISI.

The survey comprised:

- a walkover of the Site;
- an inspection of the immediate surroundings of the Site;
- an assessment of features that might affect biosecurity; and
- an assessment of all apparent features that may affect control action.

The location of any invasive species observed was recorded along with:

- the location of all stands/plants;
- the level of establishment; and
- the health of plants.

Geo-referenced time-stamped photographs were taken as a record of the inspection (see Appendix D). Locations of INNS were recorded using a hand-held GPS device.

The invasive species assessment (ISA) was undertaken in accordance with current good practice published by the Environment Agency (Environment Agency, 2013[5]), Royal Institute of Chartered Surveyors (RICS, 2012[6]) and the Property Care Association (PCA, 2018[7]).

3.2 Results

The PEA survey in 2020 recorded 13 invasive species with an additional two species recorded on the follow up survey in 2021. Seven of these species are listed on Schedule 9 of the Wildlife and Countryside Act and by LISI, one of which, Himalayan balsam is also listed on Schedule 2 of the Alien Invasive species Order (Table 1). The remaining eight species are listed by LISI (Table 2).

Descriptions of these species are provided in Table 1 and Table 2.

Table 1. Species recorded on the Site listed on Schedule 9 of the Wildlife and Countryside Act

Species	Legislation/Policy Status	Relevant Traits
Entire Leaved Cotoneaster (*Cotoneaster integrifolius*)	Listed on Schedule 9 of the Wildlife and Countryside Act and the London Invasive Species Initiative London Invasive Species Initiative: Category 2. Species of high impact or concern present at specific sites that	A low growing shrub that spreads via animal consumption of the red fruit the plant produces. The seeds only germinate after a period of cold stratification in the spring, with the exact length of seed viability unknown at present. All cotoneaster species can regrow from suckers emerging from the roots, as well as emerge from cut stumps. Once established, the removal of cotoneasters can be quite difficult and expensive.

[5] Environment Agency (2013) Managing Japanese Knotweed on Development Sites: The Knotweed Code of Practice. Environment Agency, Bristol.

[6] RICS (2012) Japanese Knotweed and Residential Property Information Paper.

[7] PCA (2018) Code of practice for the management of Japanese knotweed. PCA, Huntingdon.

Species	Legislation/Policy Status	Relevant Traits
	require attention (control, management, eradication etc	
Himalayan Balsam (*Impatiens glandulifera*) (Photograph 7)	Listed on Schedule 9 of the Wildlife and Countryside Act, the Invasive Alien Species (Enforcement and Permitting) Order, and the London Invasive Species Initiative London Invasive Species Initiative: Category 3. Species of high impact or concern in London and required concentrated, coordinated and extensive action to control/eradicate)	Himalayan balsam is an annual plant which grows on the banks of ditches and rivers, growing to a height of 2m. Himalayan balsam produces spikes of pink flowers that explosively release seeds in mid-summer that are carried downstream, as well as adhering to the footwear and tyres of humans and machinery. Himalayan balsam promotes river bank erosion when it dies back in autumn as it leaves banks exposed and unprotected from flooding. The flowers of Himalayan balsam have a high nectar yield and as such are attractive to pollinating insects which can lead to them outcompeting native species.
Himalayan Cotoneaster (*Cotoneaster simonsii*)	Listed on Schedule 9 of the Wildlife and Countryside Act and the London Invasive Species Initiative London Invasive Species Initiative: Category 2. Species of high impact or concern present at specific sites that require attention (control, management, eradication etc	A low growing shrub that spreads via animal consumption of the red fruit the plant produces. The seeds only germinate after a period of cold stratification in the spring, with the exact length of seed viability unknown at present. All cotoneaster species can regrow from suckers emerging from the roots, as well as emerge from cut stumps. Once established, the removal of cotoneasters can be quite difficult and expensive. In addition, any berries that have been produced will need to be removed to prevent the plant from recolonizing an area.
Hollyberry Cotoneaster (*Cotoneaster bullatus*) (Photograph 6)	Listed on Schedule 9 of the Wildlife and Countryside Act and the London Invasive Species Initiative London Invasive Species Initiative: Category 2. Species of high impact or concern present at specific sites that require attention (control, management, eradication etc	A low growing shrub that spreads via animal consumption of the red fruit the plant produces. The seeds only germinate after a period of cold stratification in the spring, with the exact length of seed viability unknown at present. All cotoneaster species can regrow from suckers emerging from the roots, as well as emerge from cut stumps. Once established, the removal of cotoneasters can be quite difficult and expensive.
Japanese Knotweed (*Reynoutria japonica* previously *Fallopia jaopnica*)) (Photograph 1)	Listed on Schedule 9 of the Wildlife and Countryside Act London Invasive Species Initiative: Category 3. Species of high impact or concern in London and require concentrated, coordinated and extensive action to control/eradicate)	A tall perennial plant with bamboo like canes and large green leaves that often grows in dense thickets. While Japanese knotweed does create flowers, it mostly spreads along its rhizomes to colonise new areas. Where the plant colonises, it often regrows from the roots and rhizomes when the above ground plant dies back in the winter. Japanese knotweed readily takes advantages of cracks in hard standing and masonry and magnifies damage done to these structures when allowed to persist in these areas.
Rhododendron (*Rhododendron ponticum*) (Photograph 4)	Listed on Schedule 9 of the Wildlife and Countryside Act and the London Invasive Species Initiative Category 3: Species of high impact or concern in London and required concentrated, coordinated and extensive action to control/eradicate)	A long-lived, evergreen, woody shrub which spreads via seeds and stem layering. The seeds spread by wind and occasionally in contaminated soil. Regrowth will occur from cut stumps. Rhododendron plants produce seeds at age 10 years or more, usually 12 to 20 years (regrowth from mature cut stumps can produce seeds after 2 years). The seed bank can persist for up to 3 years; however, seeds rarely remain viable for more than 1 year (particularly in wetter soil). Rhododendron can spread rapidly through woodlands forming impenetrable thickets, reducing access and amenity. Once populations become well established and mature, control can become extremely difficult and expensive.
Three Cornered Garlic (*Allium triquetrum*) (Photograph 9)	Listed on Schedule 9 of the Wildlife and Countryside Act and the London Invasive Species Initiative London Invasive Species Initiative Category 4: Species which are widespread for which eradication is not feasible but where avoiding spread to other sites may be required.	A small annual plant that produces stems up to 60cm tall topped with dropping white flowers. When established three cornered garlic forms extensive swathes of vegetation that outcompeted native species. Once flowered the plant dies back, often leaving large areas of barren soil that remain uncolonized by other plants. Three cornered garlic produces two types of seeds; large white bulbs and smaller corrnels which can be spread by both wind and water, with the corrnels also able to adhere to animals and machinery.

Table 2. Species recorded on the Site listed on the London Invasive Species Initiative and Relevant Traits

Species	Legislation/Policy Status	Relevant Traits
Bearberry Cotoneaster (*Cotoneaster dammeri*)	Listed on the London Invasive Species Initiative London Invasive Species Initiative: Category 2. Species of high impact or concern present at specific sites that require attention (control, management, eradication etc	A low growing shrub that spreads via animal consumption of the red fruit the plant produces. The seeds only germinate after a period of cold stratification in the spring, with the exact length of seed viability unknown at present. All cotoneaster species can regrow from suckers emerging from the roots, as well as emerge from cut stumps. Once established, the removal of cotoneasters can be quite difficult and expensive.
Buddleia (*Buddleja davidii*) (Photograph 8)	Listed on the London Invasive Species Initiative London Invasive Species Initiative: Category 3. Species of high impact or concern in London and required concentrated, coordinated and extensive action to control/eradicate)	A deciduous scrub that is attractive towards insect pollinators and has seeds spread on the wind, as well as on the feet of animals and on vehicles. These seeds germinate after a period of cold stratification in the spring and can remain viable in the seed bank for up to five years. Buddleia is a montane plant and can grow on masonry eventually cracking it open if allowed to persist. While buddleia spreads quickly it is relatively easy to control, especially if the plant is still young
Cherry Laurel (*Prunus laurocerasus*) (Photograph 2)	Listed on the London Invasive Species Initiative London Invasive Species Initiative: Category 3. Species of high impact or concern in London and required concentrated, coordinated and extensive action to control/eradicate)	An evergreen scrub that spreads via animal consumption of the red fruit the plant produces. These seeds germinate after a period of cold stratification in the spring, with the exact length of seed viability unknown at present. Chery Laurel can also regrow from suckers emerging from the roots, as well as emerge from cut stumps. The species quickly creates large areas of laurel dominated vegetation that chemically alters the soil, creating unsuitable growing conditions for other species. Once established, the removal of cherry laurel can be quite difficult and expensive.
False Acacia *Robinia pseudoacacia*) (Photograph 3)	Listed on the London Invasive Species Initiative London Invasive Species Initiative: Category 4. Species which are widespread for which eradication is not feasible but where avoiding spread to other sites may be required)	A fast-growing tree that can reach a height of 20m when fully grown. False acacia is pollinated by insects and produces fruit that may persist on the tree through winter to the following year. The seeds contained in these fruits require a period of warm weather before they germinate, but those that are successful can grow up to 60cm in the first year. False acacia rapidly shades out native plants and the leaves and fruit are poisonous to humans and livestock. Large false acacia can also damage masonry and hard standing with their network of roots.
Green Alkanet (*Pentaglottis sempervirens*)	Listed on the London Invasive Species Initiative London Invasive Species Initiative: Category 6. Species that were not currently considered to pose a threat or have the potential to cause problems in London.	A perennial plant with blue flowers that grows in wet woodlands and marshland. Green alkanet rapidly regenerates and is difficult to completely eradicate, allowing it to outcompete native plants leading to monocrop of the species. While usually localised around the parent plant, the adhesive seeds of the species can spread via animal movement to areas outside the immediate vicinity.
Holm Oak (*Quercus ilex*)	Listed on the London Invasive Species Initiative London Invasive Species Initiative: Category 5. Species for which insufficient data or evidence was available from those present to be able to priorities	A large evergreen tree with long lanceolate leaves that turn silver in autumn. The acorns are long and bullet shaped and are spread by acorn eating birds. Holm oak is able to hybridise with the English oak (*Quercus robur*) and can out shade native plants when it grows on heathland and grassland. Holm oak can grow on exposed rock and can grow on masonry eventually cracking it open if allowed to persist.
Snowberry (*Symphoricarpos albus*) (Photograph 5)	Listed on the London Invasive Species Initiative London Invasive Species Initiative: Category 2. Species of high impact or concern present at specific sites that require attention (control, management, eradication etc	A deciduous shrub that spreads via animal consumption of the white fruit that the plant produces. These seeds germinate after a period of warm stratification, followed by a period of cold stratification in the spring, with seeds viable for up to 10 years. Snowberry can also regrow from suckers emerging from the roots, as well as emerge from cut stumps. The species quickly creates large areas of laurel dominated vegetation that chemically alters the soil, creating unsuitable growing conditions for other species. Once established, the removal of snowberry can be quite difficult and expensive.
Turkey Oak (*Quercus cerris*) (Photograph 5)	Listed on the London Invasive Species Initiative London Invasive Species Initiative: Category 5. Species for which insufficient data or evidence was available from those present to be able to priorities	A large deciduous oak tree distinguishable from native species by the bristle tipped lead lobes and acorn cups. These acorns mature a year and a half after pollination and are spread by both birds and squirrels. Turkey oak can hybridise with native species of oak, reaching maturity faster than either UK native species, and can shade out plants growing around it particularly in heathland and grassland. Turkey oak is also a required component for the gall wasp *Andricus quercuscalicis*, which can cause damage to the acorns of native oak trees.

Table 3 and Table 4 shows the locations and extent of stands and provides a description of each stand or group of stands.

Table 3. Stand/Group Descriptions of Species listed on Schedule 9 of the Wildlife and Countryside Act

Stand ID	Area	Description and Observations
Entire-Leaved Cotoneaster (CIf) (Photograph 7)	Within Main Car Park	Multiple specimens growing in a block of introduced shrubs and a line of trees in main car park.
Himalayan Balsam (HBA) (Photograph 10)	Within the Furze Building Footprint and Carpark	Three individuals seen in November in a block of woodland along the stream south of the Furze Building. A large block was present in the 2021 surveys along the stream on the south of the Site.
Himalayan Cotoneaster (CSi)	Within Main Car Park	Single specimen growing in block of introduced shrub in main car park.
Hollyberry Cotoneaster (CBu) (Photograph 6)	To the area south of the Elderly Day Hospital	Single specimen growing in a hedge south of the Elderly Day Hospital
Japanese Knotweed (JKW) (Photograph 1)	Within the area north of the Tudor Centre	Multiple specimens growing in stream running along the south of the Site
Rhododendron (Rho) (Photograph 4)	Within Maternity Ward Building Footprint and Carpark	Single specimen within woodland edge on the northern edge of the car park
Three Cornered Garlic (TCG) (Photograph 9)	Within Education Centre Courtyard	Single potted specimen in Education Centre courtyard

Table 4. Stand/Group Descriptions of Species listed on the London Invasive Species Initiative

Column heading		
Bearberry Cotoneaster (CDa)	Within Maternity Ward Building Footprint and Carpark	Single specimen growing in hedge outside the Maternity Ward
Buddleia (BUD) (Photograph 8)	Within the Furze Building Footprint and Carpark	Potted and wild specimens at the Furze building.
Cherry Laurel (CLu) (Photograph 2)	Within Maternity Ward Building Footprint and Carpark and the Area south of the Furze	Introduced hedge south of the Maternity Building and along the banks of the stream south of the Furze Building
False Acacia (FAc) (Photograph 3)	Within Maternity Ward Building Footprint and Carpark	Single specimen growing in hedge outside the Maternity Ward and multiple immature specimens within woodland edge on the northern edge of the car park
Green Alkanet (PSv)	Within Maternity Ward Building Footprint and Carpark	Growing within Maternity Ward Overflow Carpark
Holm Oak (QIl)	Within Maternity Ward Building Footprint and Carpark	Single mature tree within Maternity Ward Overflow Carpark
Snowberry (SnB) (Photograph 5)	Within Maternity Ward Building Footprint and Carpark and south of the Elderly Day Hospital.	Multiple mature specimens within Maternity Ward Overflow Carpark
Turkey Oak (QCr) (Photograph 5)	Within Maternity Ward Building Footprint and Carpark.	Multiple mature specimens within Maternity Ward Overflow Carpark with a single immature specimen

3.3 Other Species

Specimens of both western snowberry (*Symphoricarpos occidentalis*) and coralberry (*Symphoricarpos orbiculatus*) were recorded on the Site. Both species are akin to the snowberry species listed on LISI in morphology behaviour and control methods. Unless stated elsewhere in the report, any information relating to snowberry applies to both western snowberry and coralberry as well.

3.4 Limitations

An ecological survey represents a 'snapshot' in time of the ecological condition of a site. The ecological character of a site can change substantially throughout both the course of a year, and from year to year impacting on the extent and quality of habitats potential to support protected species.

Where habitat boundaries coincided with physical boundaries recorded on OS maps the resolution is as determined by the scale of mapping. Elsewhere, habitat mapping is as estimated in the field. Where areas of habitat are given, they are approximate and should be verified by measurement on site where required for design or construction.

Given the optimal time of year for undertaking a plant survey, these limitations did not affect the results and conclusions.

3.5 Quality Assurance

AECOM ecologists are appropriately qualified and trained and conduct their work with all reasonable skill and care. The fieldwork and reporting presented here was undertaken by AECOM ecologists who follow the Chartered Institute of Ecology and Environment Management (CIEEM) code of professional conduct when undertaking ecological work. Many senior AECOM ecologists are also Chartered Ecologists or Environmentalists.

The invasive species assessment (ISA) was undertaken in accordance with good practice published by the Environment Agency, RICS and the PCA[8].

To provide assurance that our Quality and other Management Systems have been consistently implemented and applied, we work closely with external auditors who certify the system and its operation to the standards required by the UK Accreditation Service. All work is subject to verification, and technical review by a qualified person before submission to the client. Part of the technical review includes a review of the work against the proposed scope of works.

[8] Environment Agency, 2013), Royal Institute of Chartered Surveyors (RICS, 2012) and the Property Care Association (PCA, 2014)

4. Risk Assessment

4.1 General Risks

The primary impacts associated with listed invasive species, relating to the development of residential, infrastructure and community facilities are listed below:

a. Breaches of legislation (failure to observe duty of care), with exposure to prosecution (civil and/or criminal) and fines (unlimited);

b. Delays (with associated financial implications), particularly if listed invasive plant species are encountered unexpectedly.

c. Control costs, which can increase rapidly in the absence of appropriate mitigation;

d. Damage to built structures, with associated costs and liabilities;

e. Reductions in property value and/or difficulty attaining mortgages;

f. Reputational risk;

g. Significant waste disposal issues regarding infested soils; and

h. Ecological risks to native plant species.

4.2 Specific Site Risks

All listed species present on site have the potential to cause programme delays if not managed appropriately. It is therefore extremely important to respond to the infestations as quickly as possible. The risks posed by the listed species can be divided into three categories shown in Table 5.

Table 5. Descriptions of risk ratings

Rating	Description
1	**High Risk of Impact:** Concerted and dedicated action is required to prevent spread and reduce control costs. Control action should commence as far in advance of development works as is practical.
2	**Medium Risk of Impact:** Concerted and dedicated action is required to prevent spread and reduce control costs, however with forward planning these should be no impact on development works.
3	**Low Risk of Impact:** Control action can be integrated into other site activities before or at onsite of development works.

The types of associated impacts and risk ratings for the invasive non-native plant species found on the Site are shown in Table 6.

Table 6. Species associated risks and risk rating

Species	Associated Impacts	Rating
Entire-Leaved Cotoneaster	a, b, c	2
Himalayan Balsam	a, b, c, d, f, g, h	1
Himalayan Cotoneaster	a, b, c	2
Hollyberry Cotoneaster	a, b, c	2
Japanese Knotweed	a, b, c, d, e, f, g, h	1
Rhododendron	a, b, c, h	2
Three-cornered Garlic	a, b, c, g, h	2
Bearberry Cotoneaster	b, c	3
Buddleia	c, d	3
Cherry Laurel	b, c, h	2
False Acacia	b, c, h	2

Species	Associated Impacts	Rating
Green Alkanet	h	0
Holm Oak	c, d	3
Snowberry	b, c, g, h	2
Turkey Oak	c, h	3

The potential risks of species with a rating of 3 or higher are listed below.

4.2.1 Japanese Knotweed

Japanese knotweed possesses the greatest risk due to the hazard posed to the flow of water in the stream, especially at times of high flow and the perceived hazard and the issues associated with its presence and spread, and the growing trend of large land asset holders being prosecuted for not taking appropriate action to prevent the species from impacting neighbouring properties. Additionally, without proper management in place, this species can quickly spread on and off site, with associated liabilities and constraints to development/waste-management, which can lead to delays in project programmes.

Japanese knotweed is often costly to remove, and dispose of, requiring a suitably qualified contractor to undertake the works. Japanese knotweed grows rapidly and can quickly spread into new areas if left unchecked and can be connected to plants a significant distance outside of the boundary of site by its underground rhizomes.

Additionally, Japanese knotweed can damage hard standing if it can exploit an existing weakness such as a crack or loose kerb stone if allowed to grow to maturity. Studies have also shown that properties with Japanese knotweed on their property are less attractive to buyers and may be refused insurance due to the perceived destructive nature of the plant and its potential to easily spread onto neighbouring properties.

It is an offence under the Wildlife and Countryside Act 1981 (as amended) to cause this species to bespread into the wild.

Soil/substrate containing Japanese knotweed rhizome is considered a non-hazardous controlled waste, necessitating a specific duty of care when disposing of such materials off-site. As such, management costs will increase if the plant is allowed to continue to spread.

4.2.2 Himalayan Balsam

Himalayan balsam is an annual plant that grows up to 2 m in height, and produces large pink flowers, and is often found growing on the banks of rivers, streams and irrigation ditches. The flowers of Himalayan balsam are incredibly attractive to pollinating insects and outcompetes native plants leading to large stands of the species. After the seeds are produced, they are explosively ejected by the plant into the waterbody to be carried downstream where they colonise exposed banks. Because Himalayan balsam is an annual it dies back in autumn and can leave banks vulnerable to bank erosion due to the plants short roots inability to bind the bank together, as well as colonisation by other invasive species such as Japanese knotweed (*Reynoutria japonica*). While it can be costly to remove, dispersal can be prevented by ‘balsam bashing’ extensive damage either by breaking the stem or removing the plant entirely prior to seed production to prevent propagation.

It is an offence under the Wildlife and Countryside Act 1981 (as amended) and the Alien Invasive Species (Enforcement and Permitting) Order 2019 to cause this species to bespread into the wild.

Soil/substrate containing Himalayan balsam seeds is considered a non-hazardous controlled waste, necessitating a specific duty of care when disposing of such materials off-site. As such, management costs will increase if the plant is allowed to continue to spread.

4.2.3 Three-cornered Garlic

Three-cornered garlic is an annual plant that flowers in spring and grows up to 60cm tall. Where three-cornered garlic is dominant is outcompetes, native plants leaving barren areas of soil when the plant isn’t growing. Three cornered garlic spreads long distances by adhesive cornels that are also able to be transported by wind and water. The larger bulbs that three-cornered garlic can aid in short range distribution when soil containing them is

disturbed by earthworks or soil slippage or by dispersal by ants[9]. Once established in an area three-cornered garlic is hard to eradicate due to a combination of the amount of seeds produced and the small size of the cornels.

It is an offence under the Wildlife and Countryside Act 1981 (as amended) to cause this species to bespread into the wild.

Soil/substrate containing three-cornered garlic seeds and, or bulbs is considered a non-hazardous controlled waste, necessitating a specific duty of care when disposing of such materials off-site. As such, management costs will increase if the plant is allowed to continue to spread.

4.2.4 Entire-leaved Cotoneaster

Entire-leaved cotoneaster is a low growing prostate evergreen shrub that grows in montane habitats. When left untreated and unmanaged entire=leaved cotoneaster quickly out-competes native vegetation and can form dense matts of monoculture vegetation. The seeds of all cotoneaster species are attractive to birds and the flowers are attractive to bees, providing an important resource for biodiversity in urban areas. Cotoneasters are deep rooted and if they are damaged but not destroyed, they may rapidly regrow. Cotoneasters will also regrow from small suckers and any berries left in the seed bank and recolonise bare ground if left unmaintained.

It is an offence under the Wildlife and Countryside Act 1981 (as amended) to cause this species to bespread into the wild.

Soil/substrate containing entire-leaved cotoneaster seeds is considered a non-hazardous controlled waste, necessitating a specific duty of care when disposing of such materials off-site. As such, management costs will increase if the plant is allowed to continue to spread.

4.2.5 Himalayan and Hollyberry Cotoneasters

Himalayan and Hollyberry cotoneasters are small upright shrubs that reaches a height of up to 4 m tall. Both these cotoneasters out shade native species, and once they become established spread rapidly to form large aggregations of understory vegetation. The seeds of all cotoneaster species are attractive to birds and the flowers are attractive to bees, providing an important resource for biodiversity in urban areas. These cotoneasters are deep rooted and if they are damaged but not destroyed, they may rapidly regrow. Cotoneasters will also regrow from small suckers and any berries left in the seed bank and recolonise bare ground if left unmaintained.

It is an offence under the Wildlife and Countryside Act 1981 (as amended) to cause these species to bespread into the wild.

Soil/substrate containing seeds of these species is considered a non-hazardous controlled waste, necessitating a specific duty of care when disposing of such materials off-site. As such, management costs will increase if the plant is allowed to continue to spread.

4.2.6 Rhododendron

Rhododendron is a slow growing evergreen shrub that can form large dense thickets that take over the understory of woodland. Rhododendron spreads its seeds by wind and water in open conditions, but the distance the seeds can travel in dense understory is limited. Where control is limited or non-existent, rhododendron can quickly form large blocks of monocultural vegetation, particularly in the understory of woodlands, by producing allelopathic chemicals that kill surrounding vegetation. When well established this species is incredibly difficult (and expensive) to completely eradicate.

It is an offence under the Wildlife and Countryside Act 1981 (as amended) to cause this species to bespread into the wild.

Soil/substrate containing rhododendron seeds is considered a non-hazardous controlled waste, necessitating a specific duty of care when disposing of such materials off-site. As such, management costs will increase if the plant is allowed to continue to spread.

[9] BSBI (2011) *Allium triquetrum* [Online]. Non-native species secretariat: GB non-native organism risk assessment scheme. Available: http://www.nonnativespecies.org/index.cfm?pageid=143

4.2.7 Bearberry Cotoneaster

Bearberry cotoneaster is a low growing prostate evergreen shrub that grows in montane habitats. When left untreated and unmanaged bearberry cotoneaster quickly out-competes native vegetation and can form dense matts of monoculture vegetation. The seeds of all cotoneaster species are attractive to birds and the flowers are attractive to bees, providing an important resource for biodiversity in urban areas. Cotoneaster are deep rooted and if they are damaged but not destroyed they will rapidly regrow. Cotoneaster will also regrow from small suckers and any berries left in the seed bank and recolonise bare ground if left unmaintained.

4.2.8 Buddleia

Buddleia is a common fast-growing shrub that can reach maturity within five years. While buddleia has some benefits for biodiversity, namely its attractive nature to pollinating insects, it also often outcompetes native flowering plants and can rapidly form dense buddleia scrub. In its native habitat buddleia grows on exposed rock and will grow on hard standing and buildings if a seed lands on one of these surfaces and can successfully germinate, leading to mature specimens cracking masonry and causing structural damage. While seeds are normally wind dispersed, they can adhere to vehicles and the feet of people and animals, allowing them to spread far from their original source.

4.2.9 Cherry Laurel

Cherry laurel is an evergreen shrub that grows rapidly, reaching maturity in five years, reaching a height of 5 to 15m in height. The fruit of cherry laurel are similar to other Prunus species and are primarily dispersed by birds and can travel significant distances from the parent plant. If damaged, cherry laurel readily suckers and small fragments left in the soil have the potential to regrow into adult plants. Where control is limited or non-existent, cherry laurel can quickly form large blocks of monocultural vegetation, particularly in the understory of woodlands, by producing allelopathic chemicals that kill surrounding vegetation. When well established this species is incredibly difficult (and expensive) to completely eradicate.

4.2.10 False Acacia

False acacia is a common street tree grown within London, that grows rapidly and can reach a height of 20 m. False acacia often outcompetes native plants that grow in close proximity to it by oversharing them or by monopolising resources. Seeds are spread by birds and animals and can travel significant distances from the parent plant. When the roots of false acacia are damaged, or they hit an obstacle that the roots cannot bypass, the tree sends suckers that can be difficult to control. While false acacia struggles to grow on bare ground, a mature tree's roots can damage hard standing and masonry if it becomes established close to pavements or buildings. False acacia has a tendency to lose limbs, e.g. in windy weather, more so than other trees, with associated risk to property and injury to people. The blossoms provide a source of nectar for bees and other insects

4.2.11 Holm Oak

Holm oak is a large evergreen tree that can reach maturity within 30 to 35 years. Holm oak has limited benefits for biodiversity as roosting habitat for bats and birds but has negative connotations when growing in grassland and heathland where it out shades native plants. Holm oak is capable of hybridising with English oak (*Quercus robur*) to produce Turner's oak (*Quercus* x *turneri*), which reduces genetic diversity in the native species[10]. Holm oak is capable of growing on exposed rock and will grow on hard standing and buildings if a seed lands on one of these surfaces and can successfully germinate, leading to mature specimens cracking masonry and causing structural damage. The acorns of holm oak are dispersed primarily by birds allowing them to spread far from the parent tree.

4.2.12 Snowberry

Snowberry is a low growing deciduous shrub that grows in woodland and scrub, producing soft bodied white fruit. These fruits are poisonous to humans but can be spread by birds and animals far from the parent plant. If damaged, snowberry readily suckers and small fragments left in the soil have the potential to regrow into adult plants. Where control is limited or non-existent, snowberry can quickly form large blocks of monocultural

[10] Coombes A.J and Wiltshire E (2001) *Quercus* x *turneri* Willd. - a rare London hybrid oak, The London Naturalist, No.80 pp21-27

vegetation, particularly in the understory of woodlands. Snowberry primarily spreads by suckers and underground rhizomes in the UK

4.2.13 Turkey Oak

Turkey oak is a large deciduous tree that can reach maturity within 30 to 35 years. Turkey oak provides shelter for roosting bats and birds but has negative connotations when growing in grassland and heathland where it out shades native plants. Turkey oak is one of the required organisms for the development of the gall wasp (*Andricus quercuscalicis*). While the wasp doesn't reduce the fertility of native oak species as initially believed, it does cause damage to acorns and may reduce their dispersal by bird species. The acorns of turkey oak are dispersed primarily by birds allowing them to spread far from the parent tree.

4.2.14 Buddleia

Multiple stands of buddleia were located on Site during the November visit to site in 2020,

For isolated stands of buddleia, and those growing on the roofs of buildings, it is recommended that the plant is manually removed prior to works commencing.

If controlled chemically a single applicated of herbicide should be injected into the trunk in mid-summer (late June-early August). A follow up visit in the following year should be made to determine if the buddleia is still growing, with follow-up applications of herbicide or manual removal carried out if necessary.

4.2.15 Cherry Laurel

Multiple examples of cherry laurel were recorded on Site during the November 2020 visit.

All stands of cherry laurel should be treated by cutting the plant down to the stumps followed by stump herbicide treatment.

Any areas where cherry laurel control takes place should be monitored until two full growth seasons has passed without re-growth. Any re-growth should be treated with foliar application of herbicide. Management is considered complete once two full growth seasons have passed without regrowth from the base of the tree. Additional areas outside the treated area may also need monitoring due to birds spreading cherry laurel seeds from consumed fruit.

4.2.16 False Acacia

Multiple immature false acacia trees were recorded during the visit to Site in July 2021.

If false acacia is over the size where simple mechanical control can remove it and will require a stem injection of herbicide after the tree has been cut down to 50cm in height. Once the tree has been killed, it should then be removed via mechanical excavation.

The surrounding area around the false acacia should be monitored for up to two years has passed with no growth of new trees. Any new growth in the immediate area should be treated by foliar herbicide application and then carefully dug up or hand pulled. Management is considered complete after two years have passed without any sign of new growth

4.2.17 Holm Oak

A single holm oak was recorded in the north eastern corner of the Site during the November visit to Site in 2020.

If removal is proposed, the holm oak is over the size where simple mechanical control can remove it and will require a stem injection of herbicide after the tree has been cut down to 50cm in height. Once the tree has been killed, it should then be removed via mechanical excavation.

The acorns of holm oak take 18 months to mature before they are ready for dispersal and then drop to the ground. Only acorns that land in suitable germination habitat such as partial shaded leaf litter will germinate, with any acorns left on the ground in unsuitable areas prone to be predation from animals and birds or likely to decompose before growth can start. Because animal dispersal is a concern, dropped acorns should be removed with mechanical means to prevent them being spread off site as part of grounds maintenance.

Any new growth in the immediate area should be treated by foliar herbicide application and then carefully dug up or hand pulled. Management will likely be ongoing for the acorn producing lifespan of the mature trees present on Site.

4.2.18 Snowberry

Multiple blocks of snowberry and single blocks of western snowberry and coralberry, located in the north east and north west corners of the Site, were recorded in the November visit in 2020.

Blocks of snowberry and coralberry should be treated by manual removal or by cutting the plant down to stump followed by stump herbicide treatment.

Any areas where chemical control of snowberry and corral berry takes place should be monitored until two full growth seasons has passed without re-growth. Any re-growth should be treated with foliar application of herbicide. Management is considered complete once two full growth seasons have passed without regrowth from the base of the plant. Additional areas outside the treated area may also need monitoring due to birds spreading snowberry seeds from consumed fruit.

4.2.19 Turkey Oak

Multiple mature and semi-mature Turkey oaks were recorded in the north eastern corner of the Site during the November visit to Site in 2020.

If removal is proposed, the Turkey oaks present are over the size where simple mechanical control can remove it and will require a stem injection of herbicide after the tree has been cut down to 50cm in height. Once the tree has been killed, it should then be removed via mechanical excavation.

The acorns of Turkey oak take 18 months to mature before they are ready for dispersal and then drop to the ground. Only acorns that land in suitable germination habitat such as partial shaded leaf litter will germinate, with any acorns left on the ground in unsuitable areas prone to be predation from animals and birds or likely to decompose before growth can start. Because animal dispersal is a concern, dropped acorns should be removed with mechanical means to prevent them being spread off site as part of grounds maintenance.

Any new growth in the immediate area should be treated by foliar herbicide application and then carefully dug up or hand pulled. Management will likely be ongoing for the acorn producing lifespan of the mature trees present on Site.

4.3 Pathway Analysis

The majority of the species on site were likely planted as ornamental shrubs and have then colonised areas of beyond their initial planting points. The three cotoneaster species have possibly been transplanted on site by birds. The Himalayan balsam growing on the Site has likely been introduced by seeds carried into the Site from upstream on the River Pinn which is connected to the Site by underground culverts.

The primary pathways by which invasive plants can be spread on/around/off of Site are summarised below in Table 7.

Table 7. Primary Pathways of spread for invasive non-native species identified on site.

Species	Propagules attached to footwear, equipment etc.	Propagules attached to vehicles	Natural spread across Site (assuming on-site plant control)
Entire-Leaved Cotoneaster	Low risk due to the size of the fruit	Low Risk due to the size of the fruit	High risk of dispersal via birds depositing seeds on Site
Himalayan Balsam	High risk of dispersal, particularly after control efforts.	High risk of dispersal, particularly after control efforts if vehicles involved.	High risk of dispersal via water courses on and off Site.
Himalayan Cotoneaster	Low Risk due to the size of the fruit	Low Risk due to the size of the fruit	High risk of dispersal via birds depositing seeds on Site
Hollyberry Cotoneaster	Low Risk due to the size of the fruit	Low Risk due to the size of the fruit	High risk of dispersal via birds depositing seeds on Site

Species	Propagules attached to footwear, equipment etc.	Propagules attached to vehicles	Natural spread across Site (assuming on-site plant control)
Japanese Knotweed	High risk due to development of ground contaminated by rhizomes and cuttings	High risk due to development of ground contaminated by rhizomes and cuttings	Medium risk due to Japanese knotweed being able to spread underground by rhizomes onto and out of Site.
Rhododendron	Moderate Risk due to the small size of the seeds	Moderate Risk due to the small size of the seeds	High risk of dispersal via seeds being deposited by wind movement
Three-cornered Garlic	High risk due to the small size of the cornels Low risk due to the size of the garlic bulbs	High risk due to the small size of the cornels Low risk due to the size of the garlic bulbs	High risk via water and wind dispersal of seeds on Site. Significant risk of ant dispersal of seeds within Site red line boundary.
Bearberry Cotoneaster	Low Risk due to the size of the fruit	Low Risk due to the size of the fruit	High risk of infiltration via birds depositing seeds on Site
Buddleia	Moderate Risk due to seeds adhering to footwear and equipment	Moderate Risk due to seeds adhering to vehicle tyres and tracks	High risk of infiltration via seeds being deposited by wind movement
Cherry Laurel	Low Risk due to the size of the fruit	Low Risk due to the size of the fruit	High risk of infiltration via birds depositing seeds on Site
False Acacia	Low risk due to the large size of seeds.	Low risk due to the large size of seeds.	Moderate risk of infiltration via bird and animal movement on Site
Holm Oak	Low Risk due to the size of the acorns	Low Risk due to the size of the acorns	Moderate risk of infiltration via birds depositing acorns on Site
Snowberry	Low Risk due to the size of the fruit	Low Risk due to the size of the fruit	High risk of infiltration via birds depositing seeds on Site
Turkey Oak	Low Risk due to the size of the acorns	Low Risk due to the size of the acorns	Moderate risk of infiltration via birds depositing acorns on Site

5. Management Plan

The management plan has three main objectives;

1. eliminate the risks associated with the INNS present on and near the proposed development;
2. reduce the probability of re-infestation following development; and
3. demonstrate an appropriate management plan is in place, that mitigation is feasible and to describe how management should be applied.

A wide range of options is available for the management of invasive species (see 0 for a review of control options and their relative merits and limitations). All of the management measures summarised in 0 have been considered in identifying the most appropriate management regime relevant in the context of the invasive plants on this particular site.

It is likely that a combination of herbicide control and physical removal will be required. Herbicide control is expected to be applied to minimise the number of INNS contaminated material (e.g. soil and hardcore) requiring removal and to reduce spread. Mechanical removal is expected to take part during Site clearance.

The management approach can be undertaken as part of the outline or detailed application enabling works but is best incorporated into the ongoing management of the Hillingdon Hospital Campus to minimise the potential future spread of the species as well as control costs. Note that due to the lengthy potential time period between the November 2020 PEA survey and future enabling works, a pre-commencement INNS survey is recommended prior to enabling works to determine any change to the status and distribution of these species as well as any corresponding changes to control recommendations.

Table 8 provides a summary of potential control and removal options based on the locations of INNS within the Site. The control options are based on the expected proximity of INNS to the Proposed Development and enabling works as follows:

- disturbed' in this context refers to INNS within 4m of the construction boundary or any ground-breaking works, including works access and materials storage areas, i.e. any location within 4m of construction works and associated activities.
- undisturbed' in this context refers to INNS which are located within the Site, but which are located further than 4m from construction works and associated activities; and
- 'adjacent to Site' refers to INNS within 4m of the Site which could be impacted by construction works and associated activities.

Table 8. Overview of Expected INNS Management Options

Species	Location within the Site	Recommended treatment
Cotoneaster species (Entire-Leaved, Himalayan, Hollyberry and Bearberry)	Within soft landscaping adjacent to the buildings	Herbicide treatment (cut stump for plants >30cm in height; foliar application for plants <30cm in height), in advance of development
Himalayan Balsam	Within natural watercourse running through campus	Removal of plants by hand prior to the production of seeds. For larger infestations or as a last resort herbicide application should be applied, with care
Japanese Knotweed	Within natural watercourse running through campus	Fence off the Japanese knotweed plants plus a zone of 4 m, erect notice and restrict access to prevent spread. Assuming that the Japanese knotweed plants plus a zone of 4 m do not fall within area of construction, herbicide treatment in September, with follow up treatment in subsequent years, till two consecutive years without any regrowth. An Aqherb approval to use herbicide near a watercourse will be needed from the Environment Agency. If plants/4 m zone fall within the area of construction, excavation may be necessary. A plan would be submitted to the Environment Agency to remove the Japanese knotweed including disposal to a registered landfill site.

Species	Location within the Site	Recommended treatment
Rhododendron, buddleia and cherry laurel	Within soft landscaping adjacent to the buildings	Herbicide treatment (cut stump for plants >1.5 m in height; foliar application for plants <1.5 m in height), in advance of development. Alternatively, manual removal of the plant using hand tools and, or excavator. Chip remains and dispose of in green waste stream.
Three-cornered Garlic	Within soft landscaping adjacent to the buildings	Manual removal of plant and contaminated soil using hand tools. Dispose of in green waste stream.
False-acacia, Holm oak and Turkey oak	Within soft landscaping adjacent to the buildings	Removal of plants.

5.1 Control Programme

All works involving the management of listed invasive non-native species should be overseen by an appropriately experienced Environmental or Ecological Clerk of Works (ECoW) who is a trained in the management of invasive non-native species.

Method Statements, which account for any invasive non-native species present and include appropriate biosecurity protocols, should be produced prior to any works in areas where invasive non-native species have been identified. Contractors involved in such works should liaise with an invasive non-native species specialist, who should validate that all Method Statements follow current best practice.

5.1.1 Japanese Knotweed

A stand of Japanese knotweed is located on the northern banks of the ditch at the south of the Site during the 2021 survey walkover.

A control programme should be initiated as far in advance of development works as possible. The primary aims are to kill the underground rhizome network. Due to the potential for this plant to grow from small fragments, the only recommended options involve herbicide treatment or mechanical removal. Control is considered complete once two consecutive full growth seasons have passed without any re-growth.

Once identified as present, all areas containing or potentially containing Japanese knotweed must be fenced off with appropriate signage installed before any works commence on Site. Fencing must create a 4 m buffer zone around visible plants due to the potential presence of rhizomes. However, depending on soil type and condition and if agreed by a suitably qualified Environmental or Ecological Clerk of Works, then the fence can be reduced to no closer than 2.5 m from visible plants.

If knotweed is located in areas not likely to be disturbed by the proposed works, herbicide treatment alone is sufficient for control. Treatment should be carried out once per year in September following the methods detailed in Section 6 below. The likely duration of herbicide treatment (including monitoring) is three to five years. An Aqherb approval to use herbicide near a watercourse will be needed from the Environment Agency for those plants within 10 m of the Japanese knotweed

If knotweed is located within the construction area for the Proposed Works, it should be treated with herbicide as far in advance of the Site works as is practicable. This will prevent further spread, reduce the vigour of the plant, and minimise the risks associated with subsequent mitigation works. Once site works commence in the area where works are proposed, impacted material must be mechanically excavated (as described in Section 8 below) and (in order of decreasing priority):

- stockpiled and treated with herbicide;
- buried; or
- disposed of to an appropriately licenced landfill.

Partial excavation to formation level and geotextile installation can help reduce excavation volumes.

For those plants within 10 m of a watercourse, the plan for dealing with the Japanese knotweed should be shown to the Environment Agency for approval.

If knotweed is identified in close proximity (within 7 m) to the Site boundary, then control must be carefully considered as the species may spread by natural processes onto the Site over time. In this case, such plants should be monitored and ideally treated with herbicide at least once per year until control is achieved. If an on-going control programme is not possible, a single well-timed herbicide application will greatly reduce the risk of spread onto the Site. Approval for such treatment must be granted by the owner of the land containing Japanese knotweed outside of the Site boundary.

Areas where Japanese knotweed control has taken place, or where knotweed treated soil has been used in landscaping, must be monitored until two consecutive full growth seasons have passed without re-growth, regardless of what control method was used. Any regrowth must be treated with herbicide. To establish whether Japanese knotweed has not regrown should involve a monitoring survey carried out twice per year in May and August.

5.1.2 Himalayan Balsam

A single specimen of Himalayan balsam was recorded on the northern bank of the ditch south of the Furze building section of the Site during the visit in November 2020, it was found in the July 2021 site visit to have spread onto the southern bank of the watercourse on the Site.

Management can be carried outby pulling up the plants by hand due to the shallow roots. Removal of balsam should be undertaken between May to July when the plant is easy to identify due to its distinctive flowers, but before it sets seed. Up to two additional treatment visits should be made in the following two years to deal with any growth from seeds remaining in the soil (seeds an survive in soil up to two years). Plants should be either bagged off and put into the green waste stream or placed on geotextile sheeting until they have rotted down completely.

If access is not possible for hand pulling, the plants should be treated with herbicide. If herbicide control is used to remove Himalayan balsam, then an AqHerb01 permit will need to be applied for from the Environment Agency.

The species should be treated as far in advance of development works as is possible, as doing so has the potential to remove constraints relating to the species.

5.1.3 Three-cornered Garlic

A single specimen of three-cornered garlic was recorded in a raised planter south of the Education Centre building during the visit in November 2020.

While it is a perennial species the above ground presence of three-cornered garlic is only visible from February-March through to May-June. The bulb and roots of this species are very shallow and can easily be removed using hand tools, although care should be taken to prevent bulbs and cornels being dislodged. Maintenance can occur over multiple years to exhaust the seed bank or be carried out over the course of a single year, with the removal and proper disposal of contaminated soils.

The species should be treated as far in advance of development works as is possible, as doing so has the potential to remove constraints relating to the species. The area should be monitored until 2 years have passed without re-growth, at which point no further action is required.

5.1.4 Cotoneaster plants (Entire-leaved, Himalayan, Hollyberry and Bearberry)

Multiple instances of entire-leaved, Himalayan and Hollyberry cotoneaster respectively were recorded on Site during the November 2020 visit. Due to its ornamental status these species can be retained if they are in areas where disturbance is unlikely to take place.

Stands of cotoneaster should be treated with cutting to stump followed by stump herbicide treatment.

Any areas where cotoneaster control takes place should be monitored until three full growth seasons have passed without re-growth. Any re-growth should be treated with foliar application of herbicide. Management is considered complete once three full growth seasons have passed without new suckers emerging from the trunk, and new seedlings sprouting from bird distributed berries and seeds.

If removed from site, any soil containing cotoneaster berries and suckers should be disposed of at an appropriately licenced landfill site.

These species should be treated as far in advance of development works as is possible, as doing so has the potential to remove constraints relating to the species. The area should be monitored until 2 years have passed without re-growth, at which point no further action is required.

5.1.5 Rhododendron, Buddleia and Cherry Laurel

Rhododendron, buddleia and cherry laurel stands within the hospital campus should be treated with manual cutting down to a stump followed by an application of herbicide to the stump. If regrowth from the stump occurs additional applications of herbicide may be required to control the species and prevent reestablishment.

Any areas where rhododendron, buddleia and cherry laurel control take place should be monitored until two full growth seasons have passed without re-growth. Any re-growth of the blocks should be either manually pulled up or treated with foliar application of herbicide, while any re-growth near water should be manually pulled and disposed of. Management is considered complete once two full growth seasons have passed without new seedlings sprouting.

5.1.6 Snowberry

Stands of snowberry within the hospital campus should be treated by manually digging up the plants and the roots and suckers. This is a demanding task and using an excavator mat be necessary. It is essential to dig up and remove all of the roots and suckers.

Any areas where snowberry control takes place should be monitored until two full growth seasons have passed without re-growth. Any re-growth of the blocks should be either manually pulled up or treated with foliar application of herbicide, while any re-growth near water should be manually pulled up. Management is considered complete once two full growth seasons have passed without new seedlings sprouting.

5.1.7 Turkey Oak, Holm Oak and False Acacia

If removal is proposed, and Turkey oak, holm oak and false acacia are over the size where simple mechanical control can remove them, they will require a stem injection of herbicide after the trees have been cut down to 50cm in height. Once the trees have been killed, it should then be removed via mechanical excavation. Removal of Turkey oak, holm oak and false acacia should include taking measures to avoid spreading seeds/fruits (acorns for Turkey and holm oaks and false-acacia pods) within and beyond the Site.

Post-construction, a check should be made for any emerging seedlings where seeds had been missed. These should be pulled up by hand and disposed of in the green waste stream.

5.2 General Biosecurity Recommendations

Strict biosecurity protocols should be implemented when working in areas where invasive species are present. All works involving the excavation of listed invasive non-native species should be overseen by an appropriately experienced Environmental or Ecological Clerk of Works who is responsible for advising on all biosecurity measures with respect to the invasive species on the Site.

The following biosecurity measures should be implemented when working within INNS buffer zones:

- All appropriate site personnel should be made aware of the locations of listed invasive species and informed of the necessary precautions required to prevent spread;
- A toolbox talk should be provided by a suitably qualified Ecological Clerk of Works at the onset of works, providing details on identification and the required biosecurity precautions.
- Cleaning stations should be set up at designated entry/exit points to invasive non-native species demarcated areas. A jet wash should be available for vehicles and brushes and buckets of water should be available for clothing and equipment.
- Any vehicles, equipment and footwear that may have come into contact with potentially contaminated soils should be inspected and thoroughly cleaned prior to leaving an infested area.
- Where ground disruptive works take place near visible above ground invasive non-native species (particularly larger stands), works in these locations should ideally be carried out towards the end of the work program.

- Any soil in buffer zone areas should be considered to potentially contain INNS material (rhizome, seeds, etc.) and be managed and used accordingly.
- Buffers should be put in place around aquatic plants to prevent dispersal of seeds and fragmentary material into the wider waterbody when removed.
- Personnel should be reminded of biosecurity requirements at the start of each working day and should be updated on any changes to management plans, e.g. information on the locations of any newly identified stands.
- Soil brought on site should only be sourced from a reputable source with a good track record relating to not providing soil contaminated with invasive species' propagules.
- Vehicles brought onto the Site, in particular plant used for excavation, should be clean and free from soil and mud including tyres and tracks.
- Vehicles when leaving the Site, in particular plant used for excavation, should be clean and free from soil and mud including tyres and tracks.

6. Additional Information – Herbicide Treatment

6.1 General Information

Only an approved herbicide may be used and must be applied in accordance with all directions on the product label. The user is responsible for the risks that arise from use of herbicide products. Any person involved in the professional application of herbicides should possess the appropriate pesticides certificate of competence for the safe use of herbicide and hand-held herbicide applicators, e.g. National Proficiency Tests Council (NPTC) Level 2 award in the safe use of pesticides PA1 and PA6. Herbicide application should be carried out when plants are dry and when there is a high likelihood of no rain in the next six hours (preferably 24 hours) post application. Soft water should be used for the herbicide/adjuvant mix if available. It is recommended that herbicide use on and around plants growing in water is avoided to prevent the chemical contaminating the wider network of ponds and ditches. Further details with regards to the agreement of using herbicides near water can be found in Section 6.4

All appropriate information (i.e. name of operative, qualification of operative, site address, date of application, target species, reason for treatment, method of application, product used, application rate, quantity applied, total product used, any environmental risks identified, start time, finish time, weather conditions, and PPE worn) should be recorded following each herbicide application and these records retained in an approved manner within the recording system for the Site.

Plants should not be disturbed for at least three weeks post herbicide application. It is only after such a time that the plants will show the full effect of the herbicide, i.e. the effect is not immediate. Prior to, and for the duration of, herbicide treatments a disturbance buffer zone should be maintained around plants. Such a no disturbance zone will:

- allow any below ground material to be treated or show itself;
- decrease the probability of inadvertently facilitating spread; and
- reduce the chance of missing material during control action.

There should be no digging or other disturbance to the ground/ soil within this buffer zone and ideally Site personnel and equipment should not enter this zone.

6.2 Foliar Application

An approved systematic glyphosate-based herbicide can be used, specifically Roundup ProVantage 480. The application must be prepared as directed on the product label to a 50:1 dilution, (which by way of example would be 20ml chemical in 1 L water).

An adjuvant should be added to the mix, specifically Companion Gold. This should be prepared to a 200:1 dilution (which by way of example would be 5 ml adjuvant in 1 L water). This will enhance the amount of herbicide absorbed. All directions on the product label for appropriately mixing this viscous adjuvant must be followed.

Herbicide should be applied generously to both upper and lower surface of leaves and to the stems. Herbicide should only be applied on windless / low wind days to reduce the extent of impact on non-target vegetation. The recommended treatment schedule is outlined in Table 9.

Table 9. Herbicide Application Schedule

Species	Treatment per Year	Timing	Likely Duration
Himalayan Balsam	3	May to September	1 to 3 years
Bearberry Cotoneaster	1	September to October	1 to 3 years
Entire-leaved Cotoneaster	1	September to October	1 to 3 years
Himalayan Cotoneaster	1	September to October	1 to 3 years
Hollyberry Cotoneaster	1	September to October	1 to 3 years
Japanese Knotweed	1	September	2 to 5 years

Species	Treatment per Year	Timing	Likely Duration
Rhododendron	1	June to September[11]	2 to 3 years
Buddleia	1	May to July	1 to 3 years
Cherry Laurel	1	April/May	1 to 3 years
Snowberry	1	June	1 to 3 years

6.3 Cut Stump Application

An approved systemic glyphosate-based herbicide can be used, specifically Roundup ProVantage 480. The application must be prepared as directed on the product label, i.e. to a 7.5% dilution.

A water-soluble dye should be added to identify treated stumps.

Stumps should be treated immediately after cutting.

This method may be used between November and March or April, depending on the season and location. Do not use this method during the period of active sap flow during the spring and summer.

Apply at the time of cutting with a suitably adapted clearance saw such as the Enso attachment to rotary saws, or apply as soon as possible after cutting using a knapsack sprayer, spot gun or paint brush.

6.4 Use of Herbicide near Water

While it is recommended that herbicide spraying or foliar application is not used on the plants growing in or near water if such treatment is required, then approval should be obtained from the Environment Agency as per their guidelines for using herbicide in or near water[12].

Prior to any agreement being made information on likely affected environments, nature and people, including the contractor applying the herbicide, must be made. In addition, a summary of control measures to prevent herbicide leaching into ground water supplies and contaminating the water body and any water bodies connected downstream by above or below ground flow should be presented.

As with herbicides used to control plants away from water, use should only be conducted on days with no rainfall or high wind, particularly those blowing in the direction of water bodies. Ground conditions should also be considered, and spraying should not occur on days where the ground is saturated, lessening the likelihood that chemicals with percolate into the water table and spread across and off of site.

[11] Woodland Management – control of rhododendron and cherry laurel (Kent Wildlife Trust) – http://www.kentwildlifetrust.org,uk/sites/default/files/2018
[12] Environment Agency (2017) Agreement to use herbicides near water: Guidance Notes

7. Additional Information – Mechanical Removal

7.1 General Information

Following excavation, if possible, impacted soils should be retained onsite, e.g. stockpiled or buried. As per Environmental Agency and Defra guidance[13], the amount of waste generated that contains invasive plants, or their seeds and rhizomes, should be minimised.

7.2 During Excavation

Mechanical excavation on site should be to a depth of 2m and should hold a volume of 1000 tons of vegetation or less[14], the amount of waste generated that contains invasive plants, or their seeds and rhizomes, should be minimised. Table 10 for area/depth requirement relating to identified INNS.

Table 10. Excavation area/depth requirements

Species	Depth	Distance for above ground plants
Himalayan Balsam	The seeds of Himalayan balsam are typically in the top 20 cm of the seedbank	Himalayan balsam can fire its seeds up to 7m from the seed pods
Entire-leaved Cotoneaster	Excavation can likely be scoped out if herbicide treatment commences asap. Where excavation is required. Roots only go down 40-50cm, but often form large root balls that can be difficult to remove. These should be grubbed out and the top layer soil scraped to remove seeds.	The size of the root ball depends on the size of the plant. Generally, the roots spread out the same distance as the plants above ground height.
Japanese Knotweed	Extremely variable. Rhizome can spread down to 3 m; however, 1 m downwards is more typical.	Extremely variable. Rhizome can spread outward to 7 m; however, no more than 2.5 m outwards is more typical. The presence of built structures can facilitate spread due to the presence of gaps between walls and soil etc
Himalayan Cotoneaster	Excavation can likely be scoped out if herbicide treatment commences asap. Where excavation is required. Roots only go down 40-50cm, but often form large root balls that can be difficult to remove. These should be grubbed out and the top layer soil scraped to remove seeds.	The size of the root ball depends on the size of the plant. Generally, the roots spread out the same distance as the plants above ground height.
Hollyberry Cotoneaster	Excavation can likely be scoped out if herbicide treatment commences asap. Where excavation is required. Roots only go down 40-50cm, but often form large root balls that can be difficult to remove. These should be grubbed out and the top layer soil scraped to remove seeds.	The size of the root ball depends on the size of the plant. Generally, the roots spread out the same distance as the plants above ground height.
Rhododendron	Excavation can likely be scoped out if herbicide treatment commences asap. Where excavation is required. Most roots are confined within the first 30-60 cm of soil. Plants may produce a taproot that goes deeper but is generally easy to free once excavation of root ball has commenced. These should be grubbed out and the top layer soil scraped to remove seeds.	Root ball can spread out to a 60 cm radius in mature specimens.
Three-cornered Garlic	Three cornered garlic has very short roots, growing to a length of 10 to 15cm.	Garlic roots generally tend to grow directly the main stem of the aboveground plant.

7.3 Post Excavation

Following remediation works, all plant material and potentially contaminated soil should be removed from all equipment/ clothing/ vehicles involved in the control action before leaving the infested area. If contaminated material is being transported elsewhere on the Site or off-site, a haulage route should be set out in advance and precautions should be taken to prevent the spillage of contaminated soil and the spread of invasive plant material.

[13] Natural England, Department for Environment, Food and Rural Affairs, and Environmental Agency (2014) How to identify, control and dispose of invasive non-native plants that can harm the environment.
[14] Environment Agency (2016) The treatment and disposal of invasive non-native plants

8. Additional Information - Stockpiling and Burial

Following excavation, if possible, impacted soils should be retained onsite, e.g. stockpiled or buried. As per Environment Agency and Defra guidance, the amount of waste generated that contains invasive plants, or their seeds and rhizomes, should be minimised.

8.1 Stockpiling

Low bunds created with soils containing Schedule 9 invasive species must be no more than 50 cm, ideally no more than 20 cm, in height, though bunds can be placed in a depression such that the top of the bund is flush to the ground.

Planning permission may be required to create a bund; advice on this should be sought form the local planning authority.

Good bund design is critical. Rhizome/ seed infested soil should be concentrated into the upper surface of the bund, where it will grow and can subsequently be controlled. If rhizome or seeds are buried deeper in the bund, they may become dormant and regrow only if the bund is subsequently disturbed.

Any regrowth from the bund must be treated with herbicide (as detailed in Section 6).

The bund should be fenced off to prevent access and bunded soils can form the basis of landscaped areas once control is achieved.

8.2 Burial

The Environment Agency must be consulted before burying Schedule 9 invasive species waste in order to determine if this is allowed in the particular location. Subsequently, the Environment Agency may need to be contacted a week before burial is to take place to confirm any specified burial requirements will be met.

A non-persistent herbicide should be applied to the material at least once before burial, ideally three weeks before burial. Burial should be carried out is such a way that it prevents the regrowth of the species.

The location of any buried Schedule 9 invasive species must be recorded as part of the Site management system and these records must be retained in an approved manner. If large pieces of plant material are being buried, a structural engineer should be consulted to determine if there is a risk of subsidence following burial. Ideally larger pieces of plant material should be removed prior to burial for off-site disposal by a registered waste carrier in accordance with a waste disposal licence.

The only species on site that requires burial is Japanese knotweed. Healthy, living rhizomes (Japanese knotweed) should be completely encapsulated inside a root barrier membrane at a depth of at least 7m, with a further 5m of uncontaminated soil on top.

Vegetation that has been subjected to an extensive herbicide treatment programme (as validated by a suitably qualified ecologist) can be safely buried beneath 1 m of soil beneath well-constructed hard standing. The Environment Agency must be consulted however, and approval must be granted for reduced depth burial; otherwise, the depths above should be used.

9. Additional Information – Off Site Disposal

Following excavation, if possible, impacted soils should be retained onsite, e.g. stockpiled or buried. As per Environment Agency[15] and Defra guidance, the amount of waste generated that contains invasive plants, or their seeds or rhizomes, should be minimised.

9.1 Off Site Disposal

All Schedule 9 invasive species plant material and impacted soils due to be disposed off-site which might contain propagules of the plant, e.g. berries, seeds and/or rhizomes/runner fragments, must be taken to a waste disposal facility that is licensed to receive controlled waste (e.g. non-hazardous waste or green waste). The waste facility should supply evidence of its licence.

Before any soil waste is moved off-site, soil samples from the affected area may have to be tested by a suitable laboratory, and the results sent to the receiving landfill site for their approval before they accept the waste. There is a standard turnaround time of two weeks for laboratories to assess soil samples. The range of contaminants for which testing is required will depend on the existing and previous use of the Site and surrounding area. If the Site contains hazardous waste, then a Waste Acceptance Criteria (WAC) analysis will be required.

All waste material should be removed from the Site by a suitably licenced carrier.

All waste removed from the Site should be accompanied by a Waste Transfer Note, or, if hazardous, a Consignment Note, which clearly states the presence of the species in the waste's destination.

All tickets should be checked by the Environmental or Ecological Clerk of Works before signing and copies of all Transfer and Consignment documentation should be filed and kept for the legally required time.

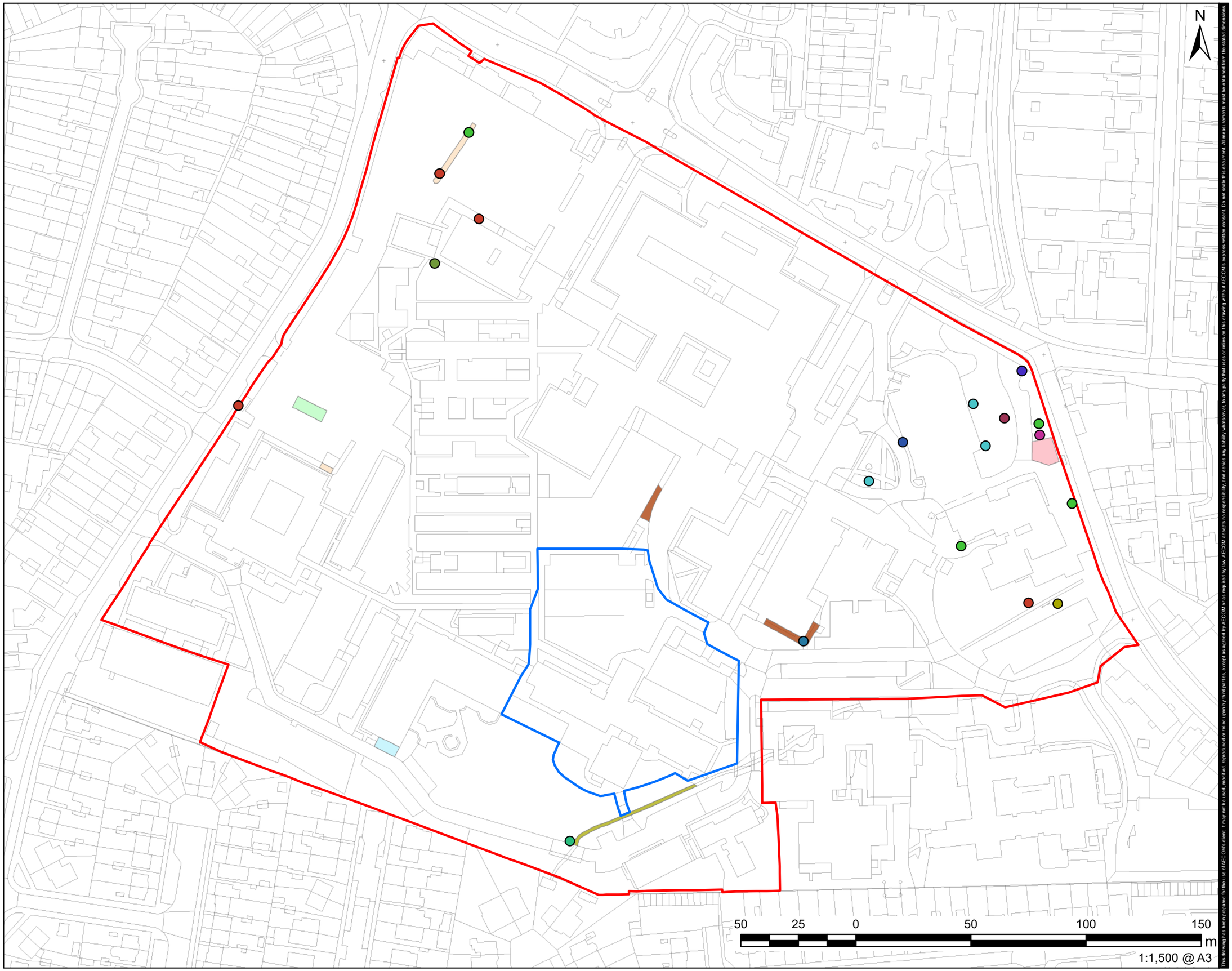
All producers, carriers and waste facilities have a duty of care to ensure that the waste is handled and treated properly.

[15] Environment Agency (2019) Treatment and disposal of invasive non-native plants: RPS 178

Appendix A - Figures

Figure 1: Map of Invasive Species on Site

Filename: \\na.aecomnet.com\lfs\EMEA\Croydon-UKCRD1\Legacy\UKCRD1FP001\UKCRD1FP001-V1\E\projects\general\GIS\Projects\Hillingdon Hospital\02_Maps\AEC_ENV_ECO_Figure01_INNS.mxd
Revision: 01 Drawn: VC Checked: EG Approved: MW Date: 21/03/2022



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LEGEND
- Red Line Boundary
- Existing Construction Boundary

Invasive Species
- Bearberry Cotoneaster
- Buddleia
- Cherry Laurel
- False
- Green Alkanet
- Himalayan Balsam
- Holm Oak
- Japanese Knotweed
- Rhododendron
- Three Cornered Garlic
- Turkey Oak

- Balsam Addendum
- Cherry Laurel Scrub
- Coralberry Scrub
- Entire-Leaved and Himalayan Cotoneaster Scrub
- Snowberry and Hollyberry Cotoneaster Scrub
- Turkey Oak Woodland with Snowberry and Cherry Laurel

NOTES

ISSUE PURPOSE
FOR INFORMATION

PROJECT NUMBER
60642181

SHEET TITLE
Phase 1 Invasive Species Map

SHEET NUMBER
Figure 01

Appendix B – Summary of Relevant Invasive Species Legislation

Table 11. Summary of Relevant Invasive Non-Native Species

Legislation	Summary of Key Aspects
Wildlife and Countryside Act 1981 (as amended) Schedule 9, Section 14 (WCA Schedule 9)	It is an offence to plant or otherwise cause to grow in the wild any listed plant species. It is an offense to release, or allow to escape, listed animal species (or species not ordinarily resident in and is not a regular visitor to Great Britain in a wild state) into the wild.
The Invasive Alien Species (Enforcement and Permitting) Order 2019 (as amended)	This legislation imposes restrictions on species of animals and plants listed in Schedule 2 of the Act or listed as 'Species of Special Concern'. These are species which pose a risk of adverse impacts across the UK and EU, such that targeted action across the UK and EU is required. Restrictions applying to these species mean they cannot not be imported, kept, bred, transported, sold, used or exchanged, allowed to reproduce, grown or cultivated, or released into the environment. Under certain circumstances a Species Control Order can be served on a landowner to require the removal of a given species (see Infrastructure Act 2015). The UK has produced an FAQ document for UK stakeholders outlining the key aspects of the legislation and the obligations of stakeholders in relation to the species on the list of species of special concern. This document states that if the containment of plant species of Union concern cannot be guaranteed, their safe removal should be considered. There are exemptions to these requirements where species of special concern have been identified as widespread in England. However, in such cases, steps must be taken to minimise their impact on native habitats, where management is feasible. Additionally, steps should be taken to reduce further spread of these species, with localised eradication being carried out in high priority areas where possible, e.g. Sites of Special Scientific Interest (SSSIs), where rare native flora are at threat, and areas at risk of flooding and/or erosion. Management of such species should be based on a cost benefit analysis, which includes an assessment of likely effectiveness and long-term sustainability.
Infrastructure Act 2015	Environmental authorities may issue control agreements under which landowners can be obligated to carry out species control operations for invasive non-native animal and plant species.
Anti-social Behaviour, Crime and Policing Act 2014 and Community Protection Notices	Local councils and the police have the power to issue Community Protection Notices against "individuals who are acting unreasonably and who persistently or continually act in a way that has a detrimental effect on the quality of life of those in the locality" including for invasive non-native species. Breach of any requirement of a Community Protection Notice, without reasonable excuse, would constitute an offence. Guidance released by the Home Office provides information on the reformed Anti-social Behaviour, Crime and Policing Act 2014. The guidance note, primarily aimed at Japanese knotweed, giant hogweed and Himalayan balsam, provides information on how best to proceed if a neighbour is unwilling to control INNS on their property, i.e. they will not treat it with herbicide or remove it. The updated legislation means that if a neighbour 'fails to act' regarding controlling, or preventing the growth of INNS, then a Community Protection Notice can be issued requiring action to be taken. Breach of any requirement of a Community Protection Notice, without reasonable excuse, would be a criminal offence, subject to a fixed penalty notice (which attracts a penalty of £100) or prosecution. On summary conviction, an individual would be liable to a level 4 fine (£2,500). An organisation, such as a company, is liable to a fine not exceeding £20,000.
Environmental Protection Act 1990, Sections 33 and 34	If taken away from the site of origin, certain Schedule 9 species and associated material, e.g. soil, may be classified as Controlled Waste and must be disposed following a duty of care. Such waste that is disposed of at a landfill site must be accompanied by appropriate waste transfer documentation.
Town and Country Planning Act 1990	Although this Act does not make specific reference to specific weeds, it provides local authorities with power to serve notices on owners or occupiers of land to control weeds that may be harming the amenity of the surrounding area. If the owners and occupiers fail to remedy the situation, they may be liable to a fine or have to repay the costs of action taken by the local authority to control the weeds.
Common Law	There is provision within Common Law to take civil action against neighbouring landowners where the spread of invasive species is considered to be a private or public nuisance.

The GB Invasive Non-native Species Strategy (Defra 2015) and The Invasive Alien Species (Enforcement and Permitting) Order 2019, direct landowners and managers to adopt a proactive biosecurity driven approach to INNS management. The Environment Agency, Natural England and the Forestry Commission advocate this proactive approach.

This approach is underpinned by several legislative instruments within England which relate to invasive non-native species (INNS). The purpose of this legislation is to prevent and reduce the negative economic and environmental impacts of these species. Invasive non-native species (INNS) of particular concern are referenced in relevant legislation, specifically:

- Species listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) – WCA; and
- Species of special concern and Schedule 2 species, as per The Invasive Alien Species (Enforcement and Permitting) Order 2019.

Taken together, the relevant legislation makes it an offence to plant, or otherwise cause to grow (including allowing to spread), listed plant species in the wild and if transported off site, there is a duty of care with regards to the disposal of any part of the plant that may facilitate establishment in the wild and cause environmental harm (as per the Environmental Protection Act 1990). The legislation also makes in an offense to release, or allow to escape, listed species (or species not ordinarily resident in and is not a regular visitor to Great Britain in a wild state) into the wild.

While it is not illegal to have listed INNS within a property, even when present on managed land (e.g. forming part of landscaping), the spread of listed species should be kept under control such that the species is not having an appreciable adverse impact on habitats and their native biodiversity.

If INNS animals (e.g. adult signal crayfish) become fully under the control of site teams, i.e. they are accidently captured, they must not be returned to the wild, as it is an offence to do so. Rather they must be humanely killed.

Species of Special Concern should not be kept, bread, transported (unless as part of control action), grown, cultivated, permitted to reproduce, or released into the environment. However, there are exemptions to these requirements where species of special concern have been identified as widespread in England (e.g. giant hogweed). In such cases, steps should be taken to reduce further spread of these species, with localised eradication being carried out in high priority areas where possible, e.g. Sites of Special Scientific Interest (SSSIs), where rare native flora are at threat, and areas at risk of flooding and/or erosion. Management of such species should be based on a cost benefit analysis, which includes an assessment of likely effectiveness and long-term sustainability.

If charged with committing an offence, it is a defence against prosecution to prove that all reasonable steps were taken, and all due diligence exercised in attempting to avoid committing the offence. Therefore, in order to reduce the potential of breaching legislation and fines/prosecution, a management plan should be in place for INNS on a property and property owners should be able to demonstrate that they are following it.

Appendix C Management Options

As per Environment Agency Guidance[16] in relation to controlling invasive non-native species, the available control options should be evaluated prior to implementing control. A range of remediation options are available for the management of invasive plants, as outlined below and detailed in guidance produced by the Environment Agency, the Property Care Association, and various management guidance documents produced by local, regional, and national agencies in a range countries. The various options can be used in isolation or in combination. The recommended control options are detailed in Section 6 and 7.

Many remediation options are available for the management of Schedule 9 invasive species, as outlined below and detailed in guidance by the Environment Agency (2013[17], 2016[18], 2019[19]) and the Property Care Association (2014) and Defra. The various options can be used in isolation or in combination.

The various control options, that can be used in isolation or in combination, are listed below:

1. Exclusion and biosecurity implementation: the use of fencing, soil protection and biosecurity washdown to control species and prevent spread.
2. Herbicide treatment: Spraying the affected area with chemicals, achieving control over a period of around 1 to 5 years (depending on species, maturity and area covered).
3. Crown removal and herbicide treatment (Japanese knotweed only): When treating Japanese knotweed with herbicide a large amount of the active chemical is absorbed by this dense crown material (if present), which can reduce the amount of herbicide that reaches buried rhizome and can greatly increase the time required for control. These crowns can be removed prior to herbicide treatment.
4. Physical removal using hand pulling: Removal of plant material by gently pulling plants by hand (not suitable for Japanese knotweed).
5. Physical removal using hand tools: Removal of plant material using spades and soil forks (generally not suitable for Japanese knotweed).
6. Physical removal using machinery: Large scale removal of plant material and associated soils using heavy machinery.
7. Light exclusion: Plant material can be covered using a light impermeable barrier (e.g. polythene) or a semi-impermeable physical barrier (e.g. jute matting) resulting in destruction of the plant material or prevention of germination (not suitable for Japanese knotweed).
8. Draw-down: Water bodies are drained and plant material is left to dry out and die. Can be combined with herbicide application. Water bodies are subsequently re-filled. Only suitable for aquatic plants.
9. Biological control: A biological control agent (e.g. fungus or insect) is introduced to a habitat and eats of kills/damages the target species (non-target species are not affected).
10. Root barrier membrane (Japanese knotweed only): Prevents the horizontal growth of Japanese knotweed by installing a vertical membrane barrier. This is usually used on site boundaries to prevent underground rhizomatous spread from neighbouring sites. A thin trench is dug and the barrier is installed to a depth of around 3 m. The membrane can be reinforced with plywood before backfilling takes place.

The various options for management INNS arisings, that can be used in isolation or in combination, are listed below:

11. Re-use under a Materials Management Plan.
12. Stockpiling: Moving excavated material to an area of the Site where it can be treated with chemicals over a period of approximately 1 to 3 years. After this, soil can be left in situ and landscaped or re-used on site.

[16] Environment Agency (2014) (as amended) Stop invasive non-native plants from spreading
[17] Environment Agency (2013) Stop invasive non-native plants from spreading
[18] Environment Agency (2016) Stop invasive non-native plants from spreading
[19] Environment Agency (2019) Stop invasive non-native plants from spreading

13. Screening (Japanese knotweed only): Excavating the Japanese knotweed stands and screening or sieving the material (e.g. through a 25 mm mesh) to remove the larger rhizome fragments, which are then handled (e.g. incinerated) in an approved manner. The material containing the smaller rhizome fragments, which passed through screening, is then further managed (e.g. treated with herbicide) in a controlled area on the Site. As the Japanese knotweed is re-growing from small rhizome fragments, the time taken to achieve eradication is reduced.

14. Burial: excavating impacted soils and burying the material on site. Some restrictions may apply both where material can be buried and what can happen above the buried area.

15. Disposal as green waste: Some plant material (species dependant) can be taken off site and disposed of as green waste for composting or incineration.

16. Removal to landfill: Excavating impacted soils stands and removing the material to a landfill registered to receive such waste using covered haulage vehicles.

4. A summary of the advantages and disadvantages of each of these control options is presented.

A summary of the advantages and disadvantages of each of these control options is presented in Table 12.

Table 12: Evaluation of the pros and cons of potential mitigation options

Treatment	Option Summary	Advantages	Disadvantages
Fencing to create biosecurity zones - different potential arrangements of fencing are detailed below	Installation of exclusion fencing to demarcate the location of INNS, with works within biosecurity zones requiring biosecurity implementation	• Reduces the probability of accidental disturbance and spread. • Allows the location of INNS to be easily identified. • Can be combined with soil protection to reduce washdown requirements (see below).	• No significant disadvantage. However, there are costs involved and maintenance is required.
Soil protection	Use of geotextiles on soil, coupled with protection and/or a suitable working surface, to prevent disturbance of infested soils	• Protect soils from disturbance. • Allows movement through biosecurity zones without the implementation of washdown.	• Geotextiles will need to be protected to prevent damage and a suitable working surface installed. • Can be impractical or expensive at larger scales. • Ground may need to be levelled in advance.
Washdown (terrestrial)	Use of washdown stations at exit points from biosecurity zones	• Prevents soil from being spread away from biosecurity zones. • Works within biosecurity zones can be carried out with minimal disruption.	• Depending on the soil conditions within a biosecurity zone, the frequency of movement across biosecurity zone boundaries, and the type of vehicles/equipment being used, washdown can be very labour intensive.
Washdown (aquatic) – check, clean, dry	Use of washdown stations on exit from infested waterbodies	• Allows works to be carried out in infested waterbodies, environments where the removal of INNS in advance is typically not viable. • Cost effective. • Heat treatment (also see below) can be used to increase effectiveness.	• Depending on the frequency of movement away from waterbodies, and the type of vehicles/equipment being used, washdown can be very labour intensive. • Removing all viable propagules can be extremely difficult, especially the larval/juvenile stage of invertebrates which can be microscopic. This is less of an issue for plant fragments, which are typically easier to see and remove. • Allowing equipment to become fully dry on site, especially in wetter/colder month, may not be possible. • Many INNS are tolerant to drying out and can survive drying conditions for extended periods (days / weeks).
Washdown (aquatic) – heat treatment	Incorporation of heated water into washdown protocols	• Experiments have shown that water heated above 40 degrees centigrade is an effective method for killing various INNS	• Heating sufficient quantities of water on site may not be practical. • Carbon intensive. • Cost intensive.

Treatment	Option Summary	Advantages	Disadvantages
		animals, e.g. zebra mussel.	• In the lower temperature range, longer periods of contact are required. • Water cools quickly on exit from applicators.
Silt curtains	Installation of silt curtains around aquatic working areas	• Can help capture INNS plant fragments, if created within works areas. • Potentially will be being used regardless of INNS presence.	• Silt curtains will need to be thoroughly cleaned or disposed of. • No long-term benefit to INNS control in the waterbody will be realised.
Herbicide treatment	Application of herbicide to terrestrial INNS	• Cost effective • Treatment can be carried out in situ without risk of spreading plants further • Reduces the risk of accidental spread if stands are treated prior to excavation based remediation	• Stands typically need to be treated over 1-5 years depending on the species • The area, may need to be left undisturbed. • Restrictions can remain on site. • Restricted use near valuable vegetation and waterways.
Screening	Screening or sieving soil to remove rhizome material	• Reduced the organic content of arisings • Regrowth from small fragments is typically easier to treat with herbicide, potentially reducing the time required for eradication.	• Only reduces the level of infestation; smaller fragments will remain in the soil • Arisings must still be managed as infested • Specialist equipment required to sieve soil, which can only be used in certain soil types • Not specialist equipment can be used to remove the majority of rhizome in clay soils (in a similar fashion to tree roots), but this will be less effective that sieving
Crown removal	Removal of crown and shallow rhizome material	• Removes the vast majority of underground biomass • Increases the effectiveness of herbicide treatment • Reduces the time required for herbicide treatment	• Can be expensive or time consuming, particularly for large infestations • An area to store the removed crown may be required • The treatment area has the same restrictions as those for herbicide treatment
Biosecurity Zone Option 1 (multiple small zones)	Fencing is installed, including an appropriate buffer zone, to minimise total area excluded	• Reduces the quantity of INNS infested soils (Table 12). • Reduces the area required for bunding of INNS arisings.	• Does not mitigate the risk associated with unknown greater historic distribution masked by previous unknown herbicide treatment, with associated increased risk of accidental spread • Increases the number of washdowns required, with associated potential issues relating to delays and run-off or escape of other pollutants
Biosecurity Zone Option 2 (combined zones)	Fencing is installed around multiple stands, even when buffer zones don't overlap, to create larger exclusion zone	• Better mitigates the risk associated with unknown greater historic distribution masked by previous unknown herbicide treatment. • Reduces the number of washdowns required, with associated potential issues relating to delays and run-off or escape of other pollutants	• Increases the quantity of INNS infested soils • Increases the area required for bunding of INNS arising
Biosecurity Zone Option 3 (dynamic)	Start with Biosecurity Zone Option 1 and expand as required.	• Minimises the quantity of infested soils • Minimises the area required for bunding of INNS arisings	• Does not mitigate the risk associated with unknown greater historic distribution masked by previous unknown herbicide treatment, with associated increased risk of accidental spread • Increases the number of washdowns required, with associated potential issues

Treatment	Option Summary	Advantages	Disadvantages
			relating to delays and run-off or escape of other pollutants
Bunding (local)	Move excavated material to an area of the Site in close proximity to the excavated area, where it can be treated with chemicals over a period of years, followed by re-used on site.	• Very Cost effective • No import of backfill required to reinstate the area after deconstruction • Infested arisings do not need to be transported over distance	• Proximity to water may necessitate special permission from the Environment Agency • Requires undisturbed area and further monitoring and treatment • Soil from stockpile must remain on site • Restrictions remain in stockpile area
Bunding (elsewhere)	Move excavated material to an area of the away from the excavated area, where it can be treated with chemicals over a period of years, followed by re-used on site.	• Cost effective • Infested arisings need to be transported over distance, with associated risk of accidental spread	• Requires undisturbed area and further monitoring and treatment • Soil from stockpile must remain on site. • Restrictions relating to transporting such material via highways are in place (necessitating an exemption from the EA) • Restrictions remain in stockpile area • Soil import required to backfill void
Geotextile installation	Geotextiles can be used to create vertical and horizontal rhizome barriers	• Prevents regrowth from buried rhizome or encroachment from plants adjacent to site. • Cost effective when compared to full excavation, especially for larger stands.	• Restrictions remain on site. • Geotextiles can be damaged. • Installation can be time-consuming.
Soil stabilisation	Stabilisation of soils containing herbicide treated Knotweed as a form of reuse	• Reduces waste creation. • Reduces the quantity of infested soil that needs to be transported. • The stabilisation process desiccates and heats the soil. Experiments have shown that knotweed rhizome becomes unviable following desiccation or when heated above 50 C for 4 hours.	• Removal of sufficient crown and rhizome material will be required to bring the organic content of soil down to required thresholds and/or other geotechnical limitations may apply (dependant on the characteristics of the soil). • Removed crown and rhizome must be handled appropriately. • The equipment used to auger/mix the soil will need to be thoroughly cleaned prior to use outside biosecurity zones.
Burial	Excavation of impacted soils and burying the material on site. Knotweed at 2m (encapsulated) or 5 m (not-encapsulated). Other INNS, typically 2 m.	• Does not require a set-aside area and ongoing control (regarding arisings)	• Expensive • Soil import required to backfill void • Limits use of area above burial site • Requires a large hole to receive material • Does not meet the stated aim of minimising waste creation
Disposal Off-Site	Excavation of impacted soils and removing the material to a landfill registered to receive such waste using covered haulage vehicles.	• No restrictions left on site (regarding arisings)	• Very expensive • Soil import required to backfill void • Least environmentally sound option • Does not meet the stated aim of minimising waste creation

Appendix D - Photographs

Photograph 1 - Japanese Knotweed growing on the bank of the Ditch

Photograph 2 – Cherry Laurel hedge growing south of the Maternity Ward

Photograph 3 – False Acacia growing outside of the Maternity Building

Photograph 4 – Rhododendron growing outside the Maternity Building

Photograph 5 – Snowberry and Turkey Oak growing outside of the Maternity Building

Photograph 6 – Hollyberry Cotoneaster growing outside of the Elderly Day Hospital

Photograph 7 – Entire leaved Cotoneaster growing in Main Car Park

Photograph 8 – Cherry Laurel, Entire Leaved Cotoneaster and Buddleia growing in Main Car Park

Photograph 9 – Three-cornered garlic in flower bed in the Education Centre Courtyard

Photograph 10 – Himalayan Balsam recorded in the 2020 Surveys

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Appendix H Water Frame Directive Assessment

Hillingdon Hospital Redevelopment

Water Framework Directive Assessment

Hillingdon Hospitals NHS Foundation Trust

Project number: 60642181
THHR-ACM-ZZ-XX-RP-Y-000014

April 2022

Delivering a better world

Quality information

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Revision History

Revision	Revision date	Details	Authorised	Name	Position
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Tables

1. Introduction

Background

1.1 AECOM Ltd has been commissioned by Hillingdon Hospitals NHS Foundation Trust to undertake a Water Framework Directive (WFD) Assessment in support of the planning application for the Hillingdon Hospital Redevelopment, hereafter referred to as the Proposed Development.

1.2 The Proposed Development comprises a major re-development of the existing hospital site. A hybrid planning application has been prepared:

1. A full application seeking planning permission for demolition of existing buildings and redevelopment of the site to provide the new Hillingdon Hospital, multi-storey car park and mobility hub, vehicle access, highways works, associated plant, generators, substation, new internal roads, landscaping and public open space, utilities, servicing area, surface car park/ expansion space, and other works incidental to the proposed development.

2. An outline planning application (all matters reserved, except for access) for the demolition of buildings and structures on the remaining site (excluding the Grade II Furze and Tudor Centre) for a mixed-use development comprising residential (Class C3) and supporting Commercial, Business and Service uses (Class E), new pedestrian and vehicular access; public realm, amenity space, car and cycling parking.

1.3 At this stage, some design details with regards to the watercourse have not been confirmed. Risks and opportunities have therefore been assessed for WFD compliance as far as possible from the information available at the time of submission. A precautionary approach has been adopted, with the likely worst-case scenario considered in terms of WFD impacts and compliance. The Proposed Development landscape general arrangement upon which this assessment is based is included as Appendix A.

1.4 The Proposed Development is adjacent to a small, extensively culverted unnamed watercourse that flows across the south-east corner of the application site, in a north-east to south-west direction. Existing development is up to the bank tops. The unnamed watercourse connects to the River Pinn downstream approximately 750m west-southwest, but is culverted from the study site for 500m before becoming open channel towards the River Pinn. Heading upstream, the watercourse is culverted beneath Colham Green Road, is open channel for approximately 200m through Colham Green Recreation Ground, but is culverted again upstream of Pield Heath Road, and from there appears to be a ‘lost river’, being entirely culverted to uncertain origins in the Colham Green - Hillingdon Heath area. Given the size of the stream, and the level of urbanisation, aquatic habitat quality and connectivity is low.

1.5 Potentially, there may be opportunity to enlarge a short culvert near the existing maternity building, which could offer opportunity to improve local channel habitat, although the area would still be effectively isolated from any other river habitats. Some existing culverts supporting access across the watercourse may need to be extended (i.e. roads widened / culverts lengthened along the watercourse). There may also be opportunity to provide some residual or riparian habitat in new green space and around a proposed flood storage area where existing buildings are to be demolished. Flood risks mean there are no opportunities to diversify or enhance the watercourse since its full capacity is required for peak flood conveyance.

1.6 The majority of the Proposed Development is away from the watercourse on land that has been already been urbanised. Site drainage could present potential indirect risks to WFD quality elements, but through the drainage and surface water strategies there could also be opportunities to install improved attenuation and treatment trains relative to historic development.

1.7 The Proposed Development activities with potential to influence WFD status and objectives have been identified as:

- Upgraded drainage systems
- New drainage attenuation and treatment facilities
- Discharge of drainage to unnamed water course

- Culvert Extensions
- New flood storage area
- New headwall structures
- Watercourse bank re-profiling

Study Area

1.8 Hillingdon hospital is located at Pield Heath Rd, Uxbridge UB8 3NN. It consists of a main 10-storey tower block with associated hospital buildings (A&E and a maternity building) as well as car parking, landscaping, an ordinary watercourse and woodland. The site is located on Pield Heath Road, Hillingdon, Greater London, and sits entirely within the Pinn (GB106039023070) WFD water body, the Colne Operational catchment, the Colne management catchment and the Thames River Basin District. In addition, the Proposed Development site is underlain by the Lower Thames Gravels groundwater body. The Proposed Development site and associated WFD water bodies are shown in Figure 1-1.

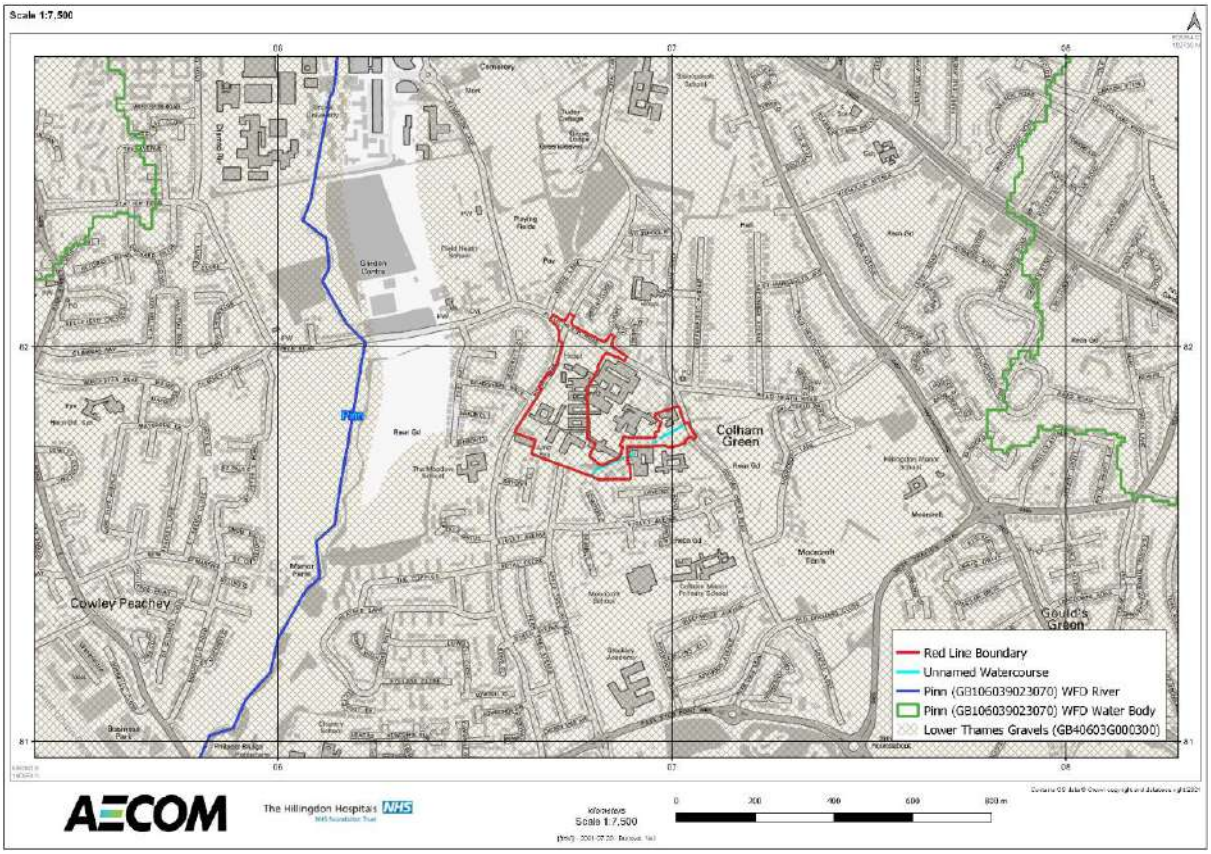

Figure 1-1 Site walkover extent and WFD waterbodies

Introduction to the Water Framework Directive

1.9 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, commonly referred to as the Water Framework Directive (WFD), aims to protect and enhance the water environment.

1.10 The WFD takes a holistic approach to sustainable management of the water environment by considering interactions between surface water, groundwater and water-dependent ecosystems. Ecosystem conditions are evaluated according to interactions between classes of biological, chemical, physico-chemical and hydromorphological elements known as 'Quality Elements'.

1.11 Under the WFD, ‘water bodies’ are the basic management units, defined as all or part of a river system or aquifer. Waterbodies form part of a larger ‘river basin district’ (RBD), for which ‘River Basin Management Plans’ (RBMPs) are used to summarise baseline conditions and set broad improvement objectives. RBMPs are produced every six years, in accordance with the river basin management planning cycle. The current

RBMPs at the date of this assessment are the 2015 Cycle 2 plans, which are due to be updated to Cycle 3 plans in 2021.

1.12 In England, the Environment Agency (EA) is the competent authority for implementing the WFD, although many objectives are delivered in partnership with other relevant public bodies and private organisations, for example local planning authorities, water companies, rivers trusts, and private landowners and developers. The EA is also responsible for managing flood risk and other activities on Main Rivers.

1.13 Local planning authorities or drainage boards are typically responsible for consenting certain activities on Ordinary Watercourses. Local planning authorities, in this case the London Borough of Hillingdon, are typically responsible for highways drains, and landowners are responsible for ditches and watercourses and also piped watercourses and culverts. While the EA is ultimately responsible for the WFD on any water body, local authorities are required to plan and consent WFD related activities on Ordinary Watercourses.

1.14 As part of its regulatory and statutory consultee role on planning applications and environmental permitting (under the Environmental Permitting Regulations (England and Wales) 2016), the EA and WFD-partnering organisations, including developers, must consider whether proposals for new developments have the potential to:

- Cause a deterioration of any quality element of a water body from its current status or potential; and / or
- Prevent future attainment of good status or potential where not already achieved.

1.15 Regulation 17 of the Water Environment Regulations 2017 (i.e. the WFD) states that, like other public bodies, local authorities have a statutory duty to “have regard to the River Basin Management Plan” and “any supplementary plans” covering proposed activities when exercising its functions. Local authorities must therefore reflect water body improvement priorities as outlined in RBMPs.

1.16 In determining whether a development is compliant or non-compliant with the WFD objectives for a water body, the EA and partnering organisations must also consider the conservation objectives of any Protected Areas (i.e. Natura 2000 sites or water dependent Sites of Special Scientific Interest) and adjacent WFD water bodies, where relevant.

2. Methodology

2.1 There are no fixed methods for WFD assessment. The nature of the water environment and the breadth of the legislation mean that assessments are tailored to proposals on a case by case basis.

2.2 The following general guidance is available which has been applied for this assessment:

- Environment Agency (2016a). Water Framework Directive risk assessment. How to assess the risk of your activity.
- Environment Agency (2016b). Protecting and improving the water environment. Water Framework Directive compliance of physical works in rivers.
- The Planning Inspectorate (2017). Advice Note eighteen: The Water Framework Directive

2.3 A stepwise approach consisting of screening, scoping and impact assessment phases is generally followed in order to: (a) rationalise the levels of WFD assessment and impact mitigation that are required; and (b) verify that proposals meet the requirements of the WFD. The general approach is described by The Planning Inspectorate (2017) and briefly summarised below.

2.4 This WFD assessment comprises Screening and Scoping assessments, then Impact assessment for relevant scheme components, with recommendations for mitigation commitments for the planning submission. Finally, it identifies requirements for further WFD impact assessment at future design stages.

Stage 1 Screening

2.5 Screening identifies the zone of influence of a proposed development, and if proposed activities pose a risk to the water environment. It is used to identify if there are activities that do not require further consideration for WFD objectives, for example activities which have been ongoing since before the current RBMP plan cycle and which have thus formed part of the baseline.

Stage 2: Scoping

2.6 Scoping is used to identify any potential impacts of the proposed activities to specific WFD receptors and their water quality elements. This involves review of WFD impact pathways, shortlisting which WFD water bodies and quality elements could or could not be affected by proposed activities, and collecting baseline information from the relevant RBMP on the status and objectives for each water body.

Stage 3: Impact Assessment

2.7 This involves rationalised assessment of water bodies and quality elements that could be affected by proposed activities, in order to identify any areas of WFD non-compliance. Proposed activities are reviewed in terms of both positive and negative impacts, and the baseline mitigation measures, enhancements, and contributions to the WFD objectives described in the RBMP. Any proposed activities with potentially deleterious impacts are reviewed simultaneously with their corresponding mitigation proposals, to determine a net effect on WFD objectives.

Mitigation Commitments

2.8 Proposed mitigation activities relied upon to demonstrate compliance at any of the stages referred to above must be appropriately defined and sufficiently secured. Mitigation could be secured through planning licence conditions, Development Consent Orders, or other legally binding methods.

Article 4.7 Derogation

2.9 Where the potential for deterioration of water bodies is identified, and it is not possible to mitigate the impacts to a level where deterioration can be avoided, additional assessment is needed in the context of WFD Article 4.7, which covers procedures for WFD derogation.

2.10 Article 4.7 is a ‘last resort’ planning and legal process, and it is a matter for the Secretary of State to consider whether derogation under Article 4.7 is justified. An applicant would be required to provide detailed and often complex evidence to justify its case that the following four stringent tests have been met:

- Test (a): All practicable steps are to be taken to mitigate the adverse impacts on the water body concerned.

- Test (b): the reasons for modifications or alterations are specifically set out and explained in the RBMP.
- Test (c)(1): There is an overriding public interest in the Proposed Development and/or Test (c)(2): its benefits outweigh the benefits of the WFD objectives (i.e. that the benefits of the project to human health, human safety or sustainable development outweigh the benefits of achieving the WFD objectives).
- Test (d): The benefits of the project cannot be achieved by a significantly better environmental option (that are technically feasible and do not lead to disproportionate cost).

2.11 In addition, the Development must not permanently exclude or compromise achievement of the WFD objectives in other bodies of water within the same RBD and must be consistent with the implementation of other environmental legislation (Article 4.8). In applying Article 4.7, steps must also be taken to make sure that the new provisions guarantee at least the same level of protection as the existing legislation (Article 4.9).

Desk Study

2.12 A desk-based study was carried out to capture information pertaining the Proposed Development. Reviewal of relevant information relating to the study area was undertaken to develop a baseline for WFD catchments, watercourses and surrounding areas. The following data sources were used for the desk study:

- Environment Agency WFD data
- Ordnance Survey maps
- Historical maps
- Geology and soil data
- Aerial photography
- Natural environment maps and designations on the MAGIC website
- Hydrological information

Limitations and Assumptions

2.13 No WFD-specific hydromorphological walkover surveys, seasonal fish, invertebrate and macrophyte sampling, or water quality monitoring has been undertaken for the purposes of this this assessment. It is based on openly available data presented in the desk study, photographic evidence collected during other site visits (see Appendix C), and expert judgement.

2.14 No consultation with regulators, the client, or the Local Lead Flood Authority has been undertaken for the purposes of this assessment. It is assumed that the screening, scoping and impact assessment phases adequately encompass potential risks to the water environment, and any mitigation measures presented herein are proportional to the expected level of impact.

2.15 Some design details with regards to the watercourse had not been confirmed at the time of submission of this WFD assessment. In particular, there are missing details pertaining to the flood risk assessment and how the proposed flood storage area will connect to the watercourse via overspills / intakes and outfalls; these may require engineered structures to be built into the channel banks.

2.16 Risks and opportunities have therefore been assessed for WFD compliance as far as possible from the information available at the time of submission. A precautionary approach has been adopted, with the likely worst-case scenario being considered in terms of impacts. Some details will need to be finalised through detailed designs, but the detailed design is viewed as an opportunity to optimise the scheme and integrate environmental mitigation for WFD compliance and other policy objectives as far as possible.

3. WFD Screening and Scoping

3.1 This section presents the headline results from the screening and scoping process. For detailed rationalisation of the WFD screening and scoping process employed here, refer to Appendix B.

WFD Screening

3.2 The purpose of the WFD screening stage is to identify a zone of influence of the Proposed Development and to determine whether that influence has the potential to adversely impact upon WFD water body receptors. The screening stage also identifies specific activities of the Proposed Development that could affect receptor water bodies' WFD status and carries them forward to subsequent stages of the assessment process. Water body receptors that are screened out are not carried forward, and justification is provided. Certain activities on or near waterbodies are considered to be low risk by the EA, as summarised in Table 3-1. If the project or components of the project meet the criteria in Table 3-1 they may be screened out of any further assessment.

Table 3-1 WFD Low-Risk Activities (After Environment Agency 2016a)

Activity	Type of Modification
Low impact maintenance activities (encourage removal of obstructions to fish/eel passage)	Re-pointing (block work structures)
	Void filling ('solid' structures)
	Re-positioning (rock or rubble or block work structures)
	Replacing elements (not whole structure)
	Re-facing
	Skimming/ covering/ grit blasting
	Cleaning and/or painting of a structure
Temporary works	Temporary scaffolding to enable bridge re-pointing
	Temporary clear span bridge with abutments set-back from bank top
	Temporary coffer dam (if eel/ fish passage not impeded)
	Temporary flow diversion (if fish/ eel passage not impeded) such as flumes and porta-dams
	Repair works to bridge or culvert which do not extend the structure, reduce the cross-section of the river or affect the banks or bed of the river, or reduce conveyance
	Excavation of trial pits of boreholes in byelaw margin
	Structural investigation works of a bridge/ culvert/ flood defence such as intrusive tests, non-intrusive surveys
Bridges	Permanent clear span bridge, with abutments set-back from bank top
	Bridge deck/ parapet replacement/ repair works
	Replacing road surface on a bridge
Service crossing	Service crossing below the river bed, installed by directional drilling or micro tunnelling if more than 1.5 m below the natural bed line of the river
	Service crossing over a river. This includes those attached to the parapets of a bridge or encapsulated within the bridge's footpath or road
	Replacement, installation or dismantling of service crossing/ high voltage cable over a river
Other structures	Fishing platforms
	Fish/ eel pass on existing structure (where <2% water body length is impacted)
	Cattle drinks
	Mink rafts
	Fencing (if open panel/ chicken wire) in byelaw margin

Screening of WFD Water Bodies

3.3 The proposed Development interacts with a number of WFD surface water and groundwater bodies. WFD Screening of these water bodies is summarised in Table 3-2.

Table 3-2 Screening of WFD Water Bodies Potentially Impacted by the Proposed Development

Water Body ID	Screening Outcome	Justification
Pinn (GB106039023070)	In	Elements of the Proposed Development may have a detrimental impact on WFD quality element receptors, albeit at a localised scale in a small tributary watercourse.
Lower Thames Gravels (GB40603G000300)	Out	The Proposed Development is not expected to have an adverse impact on the underlying WFD ground water body.
Colne (Confluence with Chess to River Thames) (GB106039023090)	Out	The waterbody is located sufficiently downstream to avoid impacts of the Proposed Development.

Screening of Activities

3.4 The Proposed Development comprises a number of activities that present a potential risk to the WFD status of the water body identified in the previous section. The screening assessment of activities pertaining to the Proposed Development is summarised in Table 3-3.

Table 3-3 Screening of the Proposed Development's activities

Activity	Description	Screening Outcome
Upgraded drainage systems	The proposals include new wetlands, swales, rain planters, green roofing and new permeable surfaces to treat runoff prior to discharge at rates equivalent to or less than greenfield runoff.	Out
New water attenuation and treatment facilities	Over-sized pipe attenuation and a below ground crate system type tank will be provided beneath the service yard area to the rear prior to out-falling into the wetland areas.	Out
Discharge of drainage to unnamed watercourse	Discharge to the local unnamed watercourse would remain equal or less than existing greenfield runoff are maintained. Runoff would be treated via a series of treatment trains to eliminate risks to water quality.	Out
New flood storage area	Would be situated outside the floodplain, and historic channel modifications effectively mean there is no active floodplain in this area. Would remain dry until activated by peak flows, but may offer some residual habitat.	In
Culvert modifications	Existing culverts will be upgraded and extended to accommodate widening of the road carriageway and a new walkway.	In
New headwall structures	New headwall structures are likely to be required as part of proposed culvert modifications and flood storage area.	In
Watercourse bank re-profiling	River bank regrading will be required to facilitate construction of the proposed culvert modifications and new headwall structures.	In

WFD Scoping

3.5 The WFD scoping stage defines the level of detail required for further WFD assessment. This includes identifying risks to the WFD receptors from the Proposed Development's activities. The scoping stage assessment is summarised in Table 3-4.

Table 3-4 WFD scoping of the Proposed Development's activities against WFD quality elements

WFD Quality Element	Potential Risk to Receptor	Scoping Outcome
Biological Quality Elements		
Fish	No	Out
Invertebrates	Yes	In
Macrophytes and phytobenthos	No	Out
Physico-chemical Quality Elements		
Thermal Conditions	No	Out
Oxygenation Conditions	No	Out
Salinity	No	Out
Acidification Status	No	Out
Nutrient Conditions	No	Out
Hydromorphological Quality Elements		
Quantity and Dynamics of Water Flow	Yes	In
Connection to Groundwater Bodies	No	Out
River Continuity	Yes	In
River Depth and Width Variation	Yes	In
Structure and Substrate of the River Bed	Yes	In

4. Baseline Conditions and Desk Study

Catchment Characteristics

General Characteristics

4.1 The River Pinn rises at Harrow Weald Common and flows in a broadly southernly direction through the broughs of Harrow and Hillingdon before joining the River Colne at Yiewsley, north-west of London. Catchment landcover is dominated by sub-urban and urban areas, with smaller parcels of improved grassland and deciduous woodland comprising the upper reaches of the catchment landcover. Local landcover, however, is dominated by urban areas.

Catchment Geology and Soils

4.2 Catchment bedrock geology is dominated by London Clay Formation sedimentary rocks comprising of clay, sand and gravels formed approximately 48 to 56 million years BP. Superficial deposits comprise of sands and gravels associated with former a riverine environment. There are no freely available records of superficial geology for the majority of the catchment; however, local to the Proposed Scheme, there are superficial deposits of Quaternary sands and gravels belonging to the Boyn Hill Gravel Member (BGS, 2021).

4.3 Catchment soil composition is comprised predominantly of slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (Cranfield University, 2021).

Catchment Hydrology

4.4 The River Pinn is reported as having a very flashy flow regime due to the heavily urbanised catchment, low soil permeability and low baseflow index (0.21). Despite the river's predominantly urban setting, flows are relatively unimpeded or affected by artificial influences (CEH, 2021). A summary of low flow within the River Pinn is presented in Table 4-1, while flows modelled in the flood risk assessment for the Proposed Scheme are shown in Table 4-2 – this shows negligible change in discharge between baseline and proposed scenarios.

Table 4-1 flow parameters taken from the Pinn at Uxbridge (39098) NRFA gauging station.

Flow Parameter	Discharge (m^3/s)
Q95	0.01
Q70	0.026
Q50	0.054
Q10	0.51
Q5	0.905
Mean Flow	0.2

Table 4-2 Flow parameters used in the flood risk assessment.

Peak flow (m3/s)					
20yr (m^3/s)		10yr (m^3/s)		1000yr (m^3/s)	
Baseline	Proposed	Baseline	Proposed	Baseline	Proposed
1.654	1.654	1.923	1.924	2.461	2.481

Historical Channel Change

4.5 The historical mapping record reveals that the alignment of the unnamed watercourse has changed very little since the mid-19th Century (NLS, 2021). This is probably a consequence of the channel becoming extensively confined by urban expansion: a significant proportion of the watercourse flows through culverts before joining the River Pinn.

WFD Status

WFD Status – Surface Water

4.6 The current WFD status of the Pinn (GB106039023070) WFD water body is summarised in Table 4-3.

Table 4-3 Summary of WFD status for the Pinn (GB106039023070) water body

WFD Parameter	Status / Summary
Water Body ID	GB106039023070
Water Body Name	Pinn
Water Body Type	River
Water Body Area (m)	45,813,537.91
Water Body Length (m)	76,023.30
Hydromorphological Designation	Heavily Modified
Overall Ecological Status	Moderate
Current Overall Status	Moderate
Status Objective	Good by 2027
Biological Quality Elements	Good
Physico-chemical Quality Elements	Moderate
Hydromorphological Quality Elements	Supports Good
Chemical	Fail

Baseline Characteristics Against WFD Quality Elements

Biological Quality Elements

Benthic Invertebrate Fauna

4.7 Routine invertebrate sampling is carried by the Environment Agency on the River Pinn, data for which is available on the EA's Ecology and Fish Data Explorer tool[1]. A total of 80 macroinvertebrate taxa have been recorded in the River Pinn, two of which *Crangonyx* sp. (a freshwater 'shrimp') and the New Zealand mud snail *Potamopyrgus antipodarum* are naturalised non-native species. No protected taxa were recorded.

Hydromorphological Quality Elements

Quantity and Dynamics of Flow

4.8 The photographic record provides limited indication of the quantity and dynamics of flow within the unnamed watercourse. Flow characteristics within the unnamed watercourse are likely to be significantly influenced by extensive culverting, its homogenous planform and over-deep cross-sectional profile; probably giving rise to little variation in hydraulic habitat.

[1] https://environment.data.gov.uk/ecology/explorer/

River Continuity

4.9 Continuity is heavily influenced by culverting and a long history modification. Culverts are especially detrimental to the longitudinal and lateral ecological connectivity of rivers as they sever local migration pathways to fish, inhibit sediment transport processes, and eliminate lateral connectivity with riparian and floodplain habitat.

River Depth and Width Variation

4.10 The photographic record provides limited indication of the depth and width variation within the unnamed watercourse. However, given the heavily modified nature of the watercourse, it is unlikely that the channel exhibits complex variation of bedforms or width.

Structure and Substrate of the River Bed

4.11 Structure and substrate of the river bed is also likely to be influenced by existing culverts, which probably impede sediment transport processes. The available photographic record reveals that the channel substrate, in places is comprised of medium gravels with a considerable quality of silt. Consequently, it is unlikely that the channel exhibits much variation in bedform and substrate characteristics.

Structure of the Riparian Zone

4.12 The riparian zone of the unnamed watercourse is generally poor quality, with excessive shading from trees, an abundance of invasive species (namely Himalayan balsam and Japanese knotweed) and poor lateral connectivity all contributing to the channel's low functioning riparian habitat.

5. WFD Impact Assessment

Site Specific Assessment of the Proposed Development Against WFD Quality Elements

5.1 Site-specific impacts of the Proposed Development on the biological, physico-chemical and hydromorphological quality elements of the water bodies are provided in Table 5-1.

Table 5-1 Operational impacts on the WFD quality elements on the Pinn (GB106039023070) WFD water body.

Quality Element	Sources of Potential Impacts	Potential Mitigation	WFD Compliant?
Biological Quality Elements			
Composition and Abundance of Benthic Invertebrate Fauna	**22.4m of culvert extension** Culvert extensions are not certain, and potentially some existing culverts could be enlarged. A worst case of same size culverts being extended for the maximum length indicated at outline design is considered here. The proposed culvert extensions could lead to a loss of benthic macroinvertebrate habitat, resulting in a potential decline in this quality element receptor. In addition, loss of riparian habitat as a result of the culvert extensions, headwall and retaining structures may also affect aquatic invertebrate populations at key life stages. The proposed culvert extensions are not considered significant in terms of barriers to fish passage in the context of existing culverts downstream. On balance, considering the highly urbanised catchment, the small unnamed stream, and culverts for several hundred metres either side of the study area completely severing any habitat network continuity, potential impacts are not considered significant.	**22.4m of culvert extension** Riparian enhancements, including removal of INNS and seeding with an appropriate species mix would provide a locally diverse habitat which would have knock-on benefits for a range of receptors. Riparian enhancements should ideally be implemented on at least a length for length basis for each metre of lost open water course per bank. However, there is no realistic opportunity for channel habitat diversification or enhancement change, due to the need to maximise drainage capacity for climate change flood flows. Proposals for extensive SuDS features and a flood attenuation area, in new green space to replace existing buildings, could support a variety of wildlife, potentially including some aquatic species.	Yes
	New Headwall Structures Construction of new headwall structures would similarly lead to a loss of riparian habitat, potentially leading to impacts on a number of WFD quality element receptors. New headwalls are likely to extend much less than 1m along the channel banks.	**New Headwall Structures** Riparian habitat, lost as a consequence of the headwall structures, should ideally be replaced on at least a metre for metre basis with an appropriate plant species seed mix. Invasive species management could also be implemented to offset localised impacts of the structures.	
	Watercourse Bank Re-profiling Localised bank reprofiling to facilitate construction of headwalls and the new culvert extensions would also remove riparian habitat and potentially disrupt hydromorphological processes operating locally. This would also be very localised, given the anticipated small headwall structures.	**Watercourse Bank Re-profiling** Reprofiled banks would be enhanced through installation of riparian habitat consisting of an appropriate plant species seed and plug mix. This would be implemented immediately to avoid ingress of fines from exposed bank faces.	

Quality Element	Sources of Potential Impacts	Potential Mitigation	WFD Compliant?
Hydromorphological Quality Elements			
Quantity and Dynamics of Water Flow Connection to Groundwater Bodies River Continuity River Depth and Width Variation Structure and Substrate of the River Bed	**22.4m of culvert extension** The proposed culvert extensions would exacerbate existing impacts on Hydromorphology receptors, particularly lateral connectivity and structure of the riparian zone. On balance, considering the highly urbanised catchment, the small unnamed stream, and culverts for several hundred metres either side of the study area completely severing any habitat network continuity, potential impacts are not considered significant. **New Headwall Structures** Construction of new headwall structures would similarly lead to a loss of riparian habitat, potentially leading to impacts on a number of WFD quality element receptors.	**22.4m of culvert extension** Riparian enhancements offset impacts to hydromorphological receptors. The channel is low functioning in terms of natural processes; however, riparian enhancement would provide localised benefits to the watercourse over and above baseline conditions. **New Headwall Structures** **R**iparian enhancements offset impacts to hydromorphological receptors. The channel is low functioning in terms of natural processes; however, riparian enhancement would provide localised benefits to the watercourse over and above baseline conditions.	Yes
Structure of the Riparian Zone	**Watercourse Bank Re-profiling** Localised bank reprofiling to facilitate construction of headwalls and the new culvert extensions would also remove riparian habitat and potentially disrupt hydromorphological processes operating locally.	**Watercourse Bank Re-profiling** Riparian enhancements offset impacts to hydromorphological receptors. The channel is low functioning in terms of natural processes; however, riparian enhancement would provide localised benefits to the watercourse over and above baseline conditions.	

Assessment of the Proposed Development Against WFD Objectives

5.2 The compliance of the Proposed Development would be determined based upon an assessment against the following objectives relating to the biological, physico-chemical and hydromorphological quality elements:

- Does the Proposed Development cause deterioration in the Ecological Potential or Status of a body of surface or ground water?
- Does the Proposed Development compromise the ability of the water body to achieve Good Ecological Status or Potential?
- Does the Proposed Development cause a permanent exclusion or compromise achievement of the WFD objectives (e.g. mitigation measures) in other water bodies within the same RBD?
- Does the Proposed Development contribute to the delivery of the WFD objectives (e.g. mitigation measures)?

The WFD compliance assessment for the proposed Development is summarised in Table 5-2.

Table 5-2 Compliance assessment of the Proposed Development

Water body ID	GB106039023070
Water body name	Pinn
Deterioration in the status/potential of the water body	On balance, considering the highly urbanised catchment, the small unnamed stream, and culverts for several hundred metres either side of the study area completely severing any habitat network continuity, potential impacts are not considered significant. Deterioration is not anticipated as a result of the Proposed Development with the mitigation measures described above in place.
Ability of the water body to achieve Good Ecological Potential/Status	The Proposed Development, with mitigation in place, could make a minor contribution to the water body achieving its physico-chemical objectives, and would not impede delivery of objectives.
Impact on the WFD objectives of other water bodies within the same RBD	The site location means there are no anticipated impacts on other water bodies.
Ability to contribute to the delivery of the WFD objectives	Yes, in terms of potentially improving urban runoff quality treatment compared to existing condition. This could make a minor contribution to cumulative improvements at catchment scale.

6. Construction Risks

Potential Construction Phase Risks

6.1 During construction the following adverse impacts may occur:

- Impacts on surface water quality due to deposition or spillage of soils, sediments, oils, fuels, or other construction chemicals, or through mobilisation of contamination following disturbance of contaminated ground or groundwater, or through uncontrolled site run-off.
- Potential changes in on-site and off-site flood risk due to changes in the volume, rate and flow of surface water runoff from the construction site, which could mobilise pollutants into water bodies.
- Construction activities such as earth works, excavations, site preparation, levelling and grading operations result in the disturbance of soils. Exposed soil is more vulnerable to erosion during rainfall events due to loosening and removal of vegetation to bind it, compaction and increased runoff rates. Surface runoff from such areas can contain excessive quantities of fine sediment, which may eventually be transported to watercourses where it can result in adverse impacts on water quality, flora and fauna. Construction works within, along the banks and across watercourses can also be a direct source of fine sediment mobilisation
- Contamination of surface waters, groundwater and soil could result from leakage and spills of fuels, oils, chemicals and concrete during construction affecting watercourses indirectly via site runoff or directly where works are close to and within a water body. Contamination may reduce water quality and impact aquatic fauna and flora.
- Any construction works that impede on the floodplain have the potential to increase rate and volume of runoff and increase risk of blockages in watercourses that could lead to flow being impeded, and a potential rise in flood risk. Earthworks may also alter flow pathways and the compaction of the ground and vegetation clearance will also increase the rate and volume of runoff.
- The potential spread of Invasive Non-Native Species (INNS) and biosecurity risks such as the spread of water-borne diseases.

Construction Mitigation

6.2 Construction would be managed using a Construction Environmental Management Plan (CEMP), which should be developed by the Contractor. It should include a Water Management Plan (WMP) as a technical appendix that would provide site specific information of how the risks to the water environment from potential pollution and the risk of physical damage will be managed. These measures require Contractor input and thus the WMP would not be developed until during the detailed design phase and pre-construction planning period.

6.3 Works should be carried out in accordance with established best practice and the CEMP, which would include information on:

- Permissions and Consents
- Management of Construction Site Runoff
- Management of Construction Site Spillage Risk
- Management of Flood Risks
- Management of Biosecurity Risks.

6.4 It is anticipated that all WFD construction risks could be adequately mitigated with appropriate planning and management.

7. Conclusion

7.1 This WFD Assessment has been prepared by AECOM on behalf of Hillingdon Hospitals NHS Foundation Trust, to assess the impacts and to identify appropriate mitigation measures for the proposed works associated with the Hillingdon Hospital Redevelopment.

7.2 Some design details with regards to the local watercourse had not been confirmed at the time of submission of this WFD assessment. In particular, there are missing details pertaining to the flood risk assessment and how the proposed flood storage area will connect to the watercourse via overspills / intakes and outfalls; these may require engineered structures to be built into the channel banks. Risks and opportunities have therefore been assessed for WFD compliance as far as possible from the information available at the time of submission.

7.3 A precautionary approach has been adopted, with the likely worst-case scenario being considered in terms of impacts. Some details will need to be finalised through detailed designs, but the detailed design is viewed as an opportunity to optimise the scheme and integrate environmental mitigation for WFD compliance and other policy objectives as far as possible.

7.4 The Proposed Development is adjacent to a small, extensively culverted unnamed watercourse that flows across the south-east corner of the application site. Existing development is up to the bank tops. Downstream, the watercourse is culverted from the study site for 500m before becoming open channel towards the River Pinn. Upstream, the watercourse is intermittently culverted and open channel for approximately 200m, but is culverted again upstream of Pield Heath Road, and from there appears to be a ‘lost river’, being entirely culverted to uncertain origins in the Colham Green - Hillingdon Heath area. Given the size of the stream, and the level of urbanisation, aquatic habitat quality and connectivity is low.

7.5 On balance, considering the highly urbanised catchment, the small unnamed stream, and culverts for several hundred metres either side of the study area completely severing any habitat network continuity, the minor potential impacts on the watercourse are not considered significant.

7.6 This assessment concludes that the Proposed Scheme would not impact on the WFD status or objectives of any associated surface water or groundwater bodies in proximity to the Proposed Scheme. However, the detailed design should be used to maximise environmental mitigation measures and enhancements. In particular, a new green space is proposed in place of some existing buildings, and there are opportunities here to create riparian habitats.

7.7 The Proposed Scheme would not prevent the achievement of the wider WFD objectives in the Thames RBMP and is not predicted to have an impact on any other water body within the Thames RBD or mitigation measures developed to achieve Good status. Local improvements to surface water drainage treatment may contribute to catchment scale water quality and physico-chemical objectives.

7.8 In terms of compliance with WFD Objectives, the following key consenting questions can be answered as follows:

- Does the Proposed Development cause deterioration in the Ecological Potential or Status of a body of surface or ground water?
    - No (the proposals are WFD Compliant)
- Does the Proposed Development compromise the ability of the water body to achieve Good Ecological Status or Potential?
    - No (the proposals are WFD Compliant)
- Does the Proposed Development cause a permanent exclusion or compromise achievement of the WFD objectives (e.g. mitigation measures) in other water bodies within the same RBD?
    - No (the proposals are WFD Compliant)
- Does the Proposed Development contribute to the delivery of the WFD objectives (e.g. mitigation measures)?
    - Yes (the proposals are WFD Compliant)

8. References

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Appendix A Landscape General Arrangement Plan

PIELD HEALTH ROAD

ROYAL LANE

COLHAM GREEN ROAD

Proposed multi-storey car park and mobility hub (internal arrangements under separate drawings)

Tower Block Low Rise

Tower Block High Rise

Maternity Building

The Furze

London Ambulance Station

FM Yard

Ambulance Yard

VIE

Tudor Centre

Proposed relocated nursery school, subject of a separate application

PATIENT TRANSFER AMBULANCE DROP-OFF

MAIN ENTRANCE

EMERGENCY DEPARTMENT ENTRANCE

1:500 SCALE LEGEND

HARD LANDSCAPE

- Vehicular grade tarmac to engineers specification
- Pedestrian grade tarmac to engineers specification
- Concrete paving
- Slab paving
- Slab paving - Vehicular
- Concrete slab feature banding
- Decking with guardrail
- Concrete seat wall
- Raised Planter
- Tactile paving

SOFT LANDSCAPE

- Existing Trees to be retained - Identified as CAT A Trees within Arboricultural Report
- Existing Trees to be retained - Identified as CAT B Trees within Arboricultural Report
- Existing Trees to be retained - Identified as CAT C Trees within Arboricultural Report
- Existing Trees/Hedge be coppiced/retained - Identified as CAT C Trees within Arboricultural Report
- Existing Trees to be removed
- Existing Vegetation Retained
- Proposed tree planting in hard landscape
- Proposed tree planting in soft landscape
- Proposed semi mature tree planting in soft landscape
- Proposed mixed planting
- Native Planting
- Proposed Rain Garden
- Proposed Native Hedge Planting
- Proposed grass seeding
- Proposed grass seeding - to include bulb and wildflower
- Proposed grass seeding - for damp conditions
- Proposed green wall
- Proposed swales / attenuation ponds to engineers specification
- Proposed landscape mounds to engineers specification

STREET FURNITURE

- Stainless Steel and timber bench
- Bespoke Timber bench
- Bespoke Timber bench to deck seating area
- Natural Play Elements - Details TBC
- Cycle Stands
- Cycle Shelter
- Bus Shelter
- Gabion Wall
- Split Face Granite Block Wall
- 1.2m Tall Feature Wall
- Overhead Canopy

FENCING

- Security Perimeter fencing 1.8m high

Notes:
- This drawing is copyright.
- Do not scale dimensions from this drawing.
- All discrepancies on this drawing are to be reported to the architect.
- Do not modify any element of this drawing.
- Use drawing only for purpose(s) issued.

North Sign / Key Plan

The following external model files are included within this drawing:

Rev	Date	Revision Notes	Dr	Ry
P03	25/03/2022	New central greenspace (Park), bus diversion scheme, surface parking added to the Landscape GA to the east of the hospital and woodlands area to the south added to the Landscape GA as part of the Phase 2 works.	CH	JB
P02	04/03/2022	Wetland park to west of hospital updated to co-ordinate with drainage design along Royal Lane, some existing trees removed along Royal Lane due to drainage design, new vehicle access to MSCP added from Royal Lane, Native hedgerow added along Royal Lane landscape frontage. Footpath access below canopy of existing tree (T178) amended. Low seat walls removed to soft landscape areas to west of the MSCP due to fire tender access requirements. Raised planting bed, green wall and trees added adjacent to truck bay to east of FM yard.	CH	DW
P01	09/02/2022	First Issue	RK	CH

Client / Contractor

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Project
HILLINGDON HOSPITAL REDEVELOPMENT

Drawing Title
LANDSCAPE GENERAL ARRANGEMENT PLAN

Job Number	Date	Scale@A0
126649	08/02/2022	1:500
Status	Purpose	
S4	STAGE APPROVAL	

Drawing Number: THHR_01-IBI-WS-XX-DR-L-700000
Revision: P03

Appendix B WFD Screening and Scoping Matrix

Pinn	Biological Elements			Physico-chemical Elements						Hydromorphological Elements					
	1. macrophytes	2. Macroinvertebrates	3. Fish	4. Dissolved Oxygen	5. pH	6. Phosphate	7. Ammonia	8. Temperature	9. Specific Pollutants (Annex VIII)	10. Quantity and dynamics of river flow	11. Connection to Groundwater	12. River continuity	13. River depth and width variation bed	14. Structure and substrate of river bed	15. Structure of riparian zone
Overall: Moderate	N/A	Good	Good	High	High	Poor	High	High	High	Supports Good			Supports Good		
Overall: Good by 2027	Not assessed by 2015	Good by 2015	Good by 2015	Good by 2015	Good by 2015	Good by 2027	Good by 2015	Good by 2015	High by 2015	Supports Good by 2015			Supports Good by 2015		
Description of Activity	Risk of impact on quality element (green = none, amber = possible, red = likely)			Risk of impact on quality element (green = none, amber = possible, red = likely)						Risk of impact on quality element (green = none, amber = possible, red = likely)					
The update drainage arrangement will prioritise Sustainable Drainage Systems (SuDS) that manage runoff as close to source as possible and contribute to the four main pillars of SuDS; amenity, biodiversity, water quality and water quantity. The proposed scheme includes new wetlands, swales, rain planters, green roofing and new permeable surfaces	Quality element not monitored for this water body	The upgraded drainage systems will eliminate risks to water quality and excessive runoff; therefore risks to macroinertebrates is negligible. Risk of impact on quality element: None	The watercourse is unlikely to support a population of fish and impacts are likely to be negligible. Risk of impact on quality element: None	The upgraded drainage systems will eliminate risks to water quality and excessive runoff. Risk of impact on quality element: None	The upgraded drainage systems will eliminate risks to water quality and excessive runoff. Risk of impact on quality element: None	The upgraded drainage systems will eliminate risks to water quality and excessive runoff. There may be a slight improvement of phosphate levels. Risk of impact on quality element: None	The upgraded drainage systems will eliminate risks to water quality and excessive runoff. Risk of impact on quality element: None	The upgraded drainage systems will eliminate risks to water quality and excessive runoff. Risk of impact on quality element: None	The upgraded drainage systems will eliminate risks to water quality and excessive runoff. Risk of impact on quality element: None	The upgraded drainage systems will eliminate risks to water quality and excessive runoff. No impacts to hydromorphology receptors are anticipated. Risk of impact on quality element: None	The upgraded drainage systems will eliminate risks to water quality and excessive runoff. No impacts to hydromorphology receptors are anticipated. Risk of impact on quality element: None	The upgraded drainage systems will eliminate risks to water quality and excessive runoff. No impacts to hydromorphology receptors are anticipated. Risk of impact on quality element: None	The upgraded drainage systems will eliminate risks to water quality and excessive runoff. No impacts to hydromorphology receptors are anticipated. Risk of impact on quality element: None	The upgraded drainage systems will eliminate risks to water quality and excessive runoff. No impacts to hydromorphology receptors are anticipated. Risk of impact on quality element: None	The upgraded drainage systems will eliminate risks to water quality and excessive runoff. No impacts to hydromorphology receptors are anticipated. Risk of impact on quality element: None
Below ground, over-sized pipe attenuation would be incorpoated into the Proposed Scheme to ensure discharge rates remain equal or less than existing greenfield runoff are maintained. A below ground crate system type tank will be provided beneath the service yard area to the rear prior to outfalling into the wetland areas	Quality element not monitored for this water body	New water attenuation and treatment facilities will eliminate risks to water quality and excessive runoff; therefore risks to macroinertebrates is negligible. Risk of impact on quality element: None	New water attenuation and treatment facilities will eliminate risks to water quality and excessive runoff; therefore risks to macroinertebrates is negligible. Risk of impact on quality element: None	New water attenuation and treatment facilities will eliminate risks to water quality and excessive runoff; therefore risks to macroinertebrates is negligible. Risk of impact on quality element: None	New water attenuation and treatment facilities will eliminate risks to water quality and excessive runoff; therefore risks to macroinertebrates is negligible. Risk of impact on quality element: None	New water attenuation and treatment facilities will eliminate risks to water quality and excessive runoff; therefore risks to macroinertebrates is negligible. Risk of impact on quality element: None	New water attenuation and treatment facilities will eliminate risks to water quality and excessive runoff; therefore risks to macroinertebrates is negligible. Risk of impact on quality element: None	New water attenuation and treatment facilities will eliminate risks to water quality and excessive runoff; therefore risks to macroinertebrates is negligible. Risk of impact on quality element: None	New water attenuation and treatment facilities will eliminate risks to water quality and excessive runoff; therefore risks to macroinertebrates is negligible. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None
Discharge to the local unnamed watercourse would remain equal or less than existing greenfield runoff are maintained. Runoff would be treated via a series of treatment trains to eliminate risks to water quality.	Quality element not monitored for this water body	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None	Discharge to the unnamed watercourse will remain equal to or less that existing greenfield rates and will be treated prior to outfalling. Risk of impact on quality element: None
The extension and upgrade of two exisitng culverts would be required to accommodate a wider road carriageway and a new proposed walkway. 22.4m of existing open channel would be lost as a result.	Quality element not monitored for this water body	Culverts have a significant detrimental affect on watercourses and invariably lead to the perminant loss of aquatic habitat. Extending culverts would exacerbate this loss. Risk of impact on quality element: Possible	Culverts have a significant detrimental affect on watercourses and invariably lead to the permeant loss of aquatic habitat. However, the unnamed watercourse is unlikely to support a population of fish, particularly sensitive species Risk of impact on quality element: None	The proposed culvert modifications are unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed culvert modifications are unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed culvert modifications are unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed culvert modifications are unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed culvert modifications are unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed culvert modifications are unlikely to adversely influence this quality element. Risk of impact on quality element: None	Culverts have the potential to disrupt the natural flow regime of rivers by constricting flow and preventing lateral connectivity. The proposed culvert extensions could exacerbate this process. Risk of impact on quality element: Possible	Culverts have the potential to eliminate connection to groundwater for the length of river in which they are constructed. It is unlikely, however, that the proposed culvert extensions would exacerbate this impact significantly. Risk of impact on quality element: None	Culverts have the potential to impede sediment delivery processes and eliminate lateral connectivity along the length of river in which they are constructed. The proposed culvert extensions could exacerbate this process albeit locally. Risk of impact on quality element: Possible	Culverts have the potential to remove any variability in width and depth variation within the uniform structure. The proposed culvert extensions could exacerbate this existing impact albeit locally. Risk of impact on quality element: Possible	Culverts have the potential to remove river substrate, impede sediment transport processes and generate scour, leading to a detrimental impact on this quality element. The proposed culvert extensions could exacerbate this process albeit locally. Risk of impact on quality element: Possible	Culverts eliminate riprian habitat alogn the length of river in which they are constructed. The proposed culvert extensions would exacerbate this existing impact. Risk of impact on quality element: Possible
New headwalls will require excavation of the existing carriageway and reinstatement to the increased widths with new kerbs and footways.	Quality element not monitored for this water body	Loss of riparian habitat as a result of the new headwall structures could have knock-on impact to invertebrate receptors. Risk of impact on quality element: Possible	The unnamed watercourse is unlikely to support a popoulation of fish, particularly sensetive species; therefore it is unlikely this activity would affect fish in the wider Pinn cacthment. Risk of impact on quality element: None	The proposed headwall structures are unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed headwall structures are unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed headwall structures are unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed headwall structures are unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed headwall structures are unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed headwall structures are unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed headwall structures may have a localised influence on flow dynamics within the channel. Risk of impact on quality element: Possible	The proposed headwall structures are unlikely to restrict connection to groundwater. Risk of impact on quality element: None	The proposed headwall strctures may limit lateral connectivity. Risk of impact on quality element: Possible	The proposed headwall strctures would eliminate any channel width variation locally. Risk of impact on quality element: Possible	The proposed headwall strctures may constrict flow and lead to localised bed scour. Risk of impact on quality element: Possible	The proposed headwall strctures would lead to a direct loss of riparian habitat locally. Risk of impact on quality element: Possible
Bank regrading would be required to accommodate the new headwalls and a retaining wall structure.	Quality element not monitored for this water body	Loss of riparian habitat as a result of bank reprofiling could have knock-on impact to invertebrate receptors. Risk of impact on quality element: Possible	the unnamed watercourse is unlikely to support a popoulation of fish, particularly snsetive species Risk of impact on quality element: None	The proposed bank reprofiling is unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed bank reprofiling is unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed bank reprofiling is unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed bank reprofiling is unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed bank reprofiling is unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed bank reprofiling is unlikely to adversely influence this quality element. Risk of impact on quality element: None	The proposed river bank reprofiling may lead to disruption to flow dynamics locally; however, this may also present opportunities for enhancement. Risk of impact on quality element: Possible	Localised reprofiling od river banks is unlikely to restrict connection to groundwater. Risk of impact on quality element: None	The proposed river bank reprofiling may lead to to a loss of laterally connectivity, albeit locally. Risk of impact on quality element: Possible	The proposed bank reprofiling is unlikely to detrimentally impact upon width and depth variation of the unnamed watercourse. Risk of impact on quality element: None	The proposed bank reprofiling may generate ingress of fines which could smother gravels. Risk of impact on quality element: Possible	River bank reprofiling would lead to a direct loss of riprian habitat. However, it may also present opportunities to enhance the affected area. Risk of impact on quality element: Possible

Appendix C Site Photographs






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