

Appendix 1A

List of Competent Persons

Competent persons involved in the preparation of this Environmental Statement (ES) are listed in **Table 1A.1**. The second column of this table includes two categories of staff, with different levels of responsibility:

- a. Technical reviewer.
- b. Technical author.

Table 1A.1 List of competent persons

Topic	Responsibility	Name of company	Qualifications / competencies of author
Chapter 1: Introduction	Technical author	Wood	MSc Integrated Environmental Studies, BSc Geography with a Year Abroad, PIEMA, 4.5 years' experience in EIA.
	Technical reviewer	Wood	MSc Environmental Monitoring & Analysis, BSc (Hons) Environmental Science, PIEMA, 16 years' experience in EIA.
Chapter 2: Project need and alternatives	Technical author	Wood	MSc Integrated Environmental Studies, BSc Geography with a Year Abroad, PIEMA, 4.5 years' experience in EIA.
	Technical reviewer	Wood	MSc Environmental Monitoring & Analysis, BSc (Hons) Environmental Science, PIEMA, 16 years' experience in EIA.
Chapter 3: Description of the proposed development	Technical author	Wood	MSc Integrated Environmental Studies, BSc Geography with a Year Abroad, PIEMA, 4.5 years' experience in EIA.
	Technical reviewer	Wood	MSc Environmental Monitoring & Analysis, BSc (Hons) Environmental Science, PIEMA, 16 years' experience in EIA.
Chapter 4: Approach to preparing the EIA	Technical author	Wood	MSc Integrated Environmental Studies, BSc Geography with a Year Abroad, PIEMA, 4.5 years' experience in EIA.
	Technical reviewer	Wood	MSc Environmental Monitoring & Analysis, BSc (Hons) Environmental Science, PIEMA, 16 years' experience in EIA.

Topic	Responsibility	Name of company	Qualifications / competencies of author
Chapter 5: Legislative and policy overview	Technical author	Wood	MSc Integrated Environmental Studies, BSc Geography with a Year Abroad, PIEMA, 4.5 years' experience in EIA.
	Technical reviewer	Wood	MSc Environmental Monitoring & Analysis, BSc (Hons) Environmental Science, PIEMA, 16 years' experience in EIA.
Chapter 6: Air quality	Technical author	Wood	MSc Public Health and Environmental Risks, BSc Biology, AMIAQM, AMIEnvSc, 4 years' experience in Air Quality.
	Technical reviewer	Wood	MEng, Marine Science and Engineering, MSc Diploma, Physical Oceanography, PhD, Physical Oceanography, MIAQM, MIES. Over 19 years of experience in air quality and meteorology related services.
Chapter 7: Biodiversity	Technical author	Ecology Solutions Ltd	MSc Environmental Consultancy, BSc (Hons) Geography, Chartered Institute of Ecology and Environmental Management – Qualifying Member, Natural England Licence holder (Great Crested Newts and bats), Senior Ecologist with over 8 years' experience in ecological consultancy sector. BSc Hons Zoology, Natural England Licence holder (Great Crested Newts), Ecologist with 4 years' experience in ecological consultancy sector.
	Technical reviewer	Ecology Solutions Ltd	BSc (Hons) Zoology, MSc Environmental Conservation, Scholarship at Wildlife Conservation Research Unit Oxford University, Chartered Institute of Ecology and Environmental Management – Member, Society for the Environment – Chartered Environmentalist, Natural England Licence holder (Bats including low impact, Great Crested Newts including low impact, Dormouse), Director with over 20 years of experience working in the UK ecology sector.
Chapter 8: Climate change	Technical author	Wood	MSc., Natural Science in Geography and Earth Science, Ph.D., Paleoclimate and Isotope Geochemistry, 6 years of experience in Climate, Resilience and Sustainability.
	Technical reviewer	Wood	BSc (Hons) Biology, NEBOSH National General Certificate, Occupational Health and Safety, 25+ years of experience in Climate, Resilience and Sustainability.
Chapter 9: Historic environment	Technical author	Wood	DPhil and MSt, Archaeology, Chartered Institute for Archaeologists – Associate, 11 years of experience within the heritage sector in the UK.

Topic	Responsibility	Name of company	Qualifications / competencies of author
	Technical reviewer	Wood	BA (Hons), Archaeology and Prehistory, Post Graduate Diploma, Environmental Management, Chartered Institute of Field Archaeologists – Member, over 27 years of experience working in the UK historic environment sector.
Chapter 10: Landscape and visual	Technical author	Wood	BSc (Hons), Landscape Architecture and Town Planning, MA, Landscape Architecture, Landscape Institute - Licentiate Member, 8 years of landscape design experience in both urban and rural contexts.
	Technical reviewer	Wood	M. LD, Landscape Architecture, BA (Hons) Geography, Chartered member of Landscape Institute (CMLI), over 30 years' experience in landscape planning and design.
Chapter 11: Noise and vibration	Technical author	Wood	BSc (Hons) Physics, PGCE Secondary Science, MSc Environmental Acoustics, Associate Member of the Institute of Acoustics, Certificate of Competence, Environmental Noise Measurement, Institute of Acoustics, over two years' experience working in environmental noise and vibration.
	Technical reviewer	Wood	MSc Environmental Diagnostics, BSc (Hons) Chemistry, Institute of Acoustics Diploma in Acoustics and Noise Control, Member, Institute of Acoustics, over 17 years' experience in undertaking noise and vibration assessments.
Chapter 12: Socio-economics and health	Technical author	Wood	BA (Hons), Town Planning, Royal Town Planning Institute – Member, over 25 years' experience in planning and environmental consultancy.
	Technical reviewer	Wood	BA (Hons), Town Planning, Diploma, Town Planning, Royal Town Planning Institute – Member, over 18 years of experience in the project management of major planning applications and EIA for clean energy, renewables and minerals developments.
Chapter 13: Soils and geology	Technical author	Wood	MEarthSci, Natural & Earth Sciences, Society for the Environment - Chartered Environmentalist, Chartered Institution of Water and Environmental Management - Chartered Member, Science, Technology, Engineering and Maths Network (STEM:NET) Ambassador, over 14 years' experience in environmental consultancy both technical in delivery and project management.
	Technical reviewer	Wood	BSc (Hons), Plant Sciences, MSc, Environmental Rehabilitation, Professional Certificate in Management, Institute of Environmental Management and Assessment – Practitioner, Institute of Environmental Management and Assessment - Environmental Auditor, over 25 years of experience in the assessment and management of environmental issues.
Chapter 14: Traffic and transport	Technical author	Wood	BA (Hons), Geography/Planning, 15 years of experience in transportation planning in both public and private sectors.

Topic	Responsibility	Name of company	Qualifications / competencies of author
	Technical reviewer	Wood	BA (Hons), Planning Studies, MSc, Transport Engineering and Operations, Diploma, Planning, Member Royal Town Planning Institute, over 24 years' experience in transport planning.
Chapter 15: Water environment	Technical author	Wood	BSc (Hons), Geography, MSc, River Environments and their Management, Chartered Institution of Water and Environmental Management – Graduate Member, Over 4 years of experience in flood risk assessment and water resources modelling.
	Technical reviewer	Wood	BSc (Hons), Geography, PhD, Geography, Chartered Institution of Water and Environmental Management - Chartered Scientist & Chartered Water Environment Manager, over 12 years of experience in hydrology and geomorphology; focusing on catchment risks, EIAs and providing geomorphological support to projects
Chapter 16: Land quality	Technical author	Wood	MEarthSci, Natural & Earth Sciences, Society for the Environment - Chartered Environmentalist, Chartered Institution of Water and Environmental Management - Chartered Member, Science, Technology, Engineering and Maths Network (STEM:NET) Ambassador, over 14 years' experience in environmental consultancy both technical in delivery and project management.
	Technical reviewer	Wood	BSc (Hons), Plant Sciences, MSc, Environmental Rehabilitation, Professional Certificate in Management, Institute of Environmental Management and Assessment – Practitioner, Institute of Environmental Management and Assessment - Environmental Auditor, over 25 years of experience in the assessment and management of environmental issues.

Appendix 1B

Applicant's Confirmation of Competent Persons

The applicants (Bloor Homes, Barwood Land, and Jelson Homes) have engaged the services of Wood Group UK and Ecology Solutions Ltd to carry out an Environmental Impact Assessment (EIA) in respect of the Proposed Development and to prepare this Environmental Statement (ES). The applicants confirm, in accordance with Regulation 12(2)(c)(f and g) of the EIA Regulations, that to the best of their knowledge and belief, the project team who have prepared the ES are competent persons. This belief is based on the project team's relevant expertise, level of experience and qualifications in preparing ESs. The evidence of the project team's competence is demonstrated in **Appendix 1A**.

Appendix 1C

Abbreviations

Abbreviation	Meaning
AADT	Annual Average Daily Traffic
AAP	Area Action Plan
AEP	Annual Exceedance Probability
AGL	Above Ground Level
ALC	Agricultural Land Classification
ANC	Acoustics and Noise Consultants
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
APIS	Air Pollution Information System
AQAL	Air Quality Assessment Level
AQEG	Air Quality Expert Group
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AR	Assessment Report
ASP	Activated Sludge Plant
ASR	Annual Status Report
BB93	Building Bulletin 93
BEIS	Business, Energy and Industrial Strategy
BGS	British Geological Survey
BMV	Best and Most Versatile
CCC	Committee on Climate Change
CDM	Construction Design and Management
CEA	Cumulative Effects Assessment

Abbreviation	Meaning
CEMP	Construction Environmental Management Plan
CERC	Cambridge Environmental Research Consultants
CIBSE	Chartered Institution of Building Services Engineers
CIEH	Chartered Institute of Environmental Health
CO	Conservation Objectives
CO₂	Carbon Dioxide
CO₂e	Carbon Dioxide equivalent
CoPA	Control of Pollution Act 1974
CPRE	Campaign to Protect Rural England
CROW	Countryside and Rights of Way
CRTN	Calculation of Road Traffic Noise
CTMP	Construction Traffic Management Plan
DAS	Design and Access Statement
DCMS	Department of Culture, Media and Sport
DCO	Development Consent Order
DEFRA	Department for Environment, Food & Rural Affairs
DfT	Department for Transport
DLL	District Level Licencing
DM	Development Management
DM	Do Minimum
DMOY	Do Minimum Opening Year
DMRB	Design Manual for Roads and Bridges
DPD	Development Plan Documents

Abbreviation	Meaning
Dph	Dwellings per Hectare
DS	Do Something
DSFY	Do Something Future Year
DSOY	Do Something Opening Year
DTM	Digital Terrain Model
EA	Environment Agency
EC	European Commission
EEP	Energy and Emissions Projections
EFT	Emissions Factor Toolkit
EHO	Environment Health Officer
EIA	Environmental Impact Assessment
ELC	European Landscape Convention
EPA	Environmental Protection Act 1990
ES	Environmental Statement
FDC	Flood Defence Consents
FRA	Flood Risk Assessment
FST	Final Settlement Tanks
FTE	Full Time Equivalent
GEART	Guidelines for the Environmental Assessment of Road Traffic
GGBS	Ground Granulated Blast-furnace Slag
GHG	Greenhouse Gas
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, Third Edition
GPS	Global Positioning System

Abbreviation	Meaning
GWP	Global Warming Potential
Ha	Hectare
HBBC	Hinckley and Bosworth Borough Council
HCA	Home and Communities Agency
HDV	Heavy Duty Vehicle
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
HLC	Historic Landscape Characterisation
IAQM	Institute of Air Quality Management
ICE	Inventory of Carbon and Energy
IEMA	Institute of Environmental Management and Assessment
IOA	Institute of Acoustics
IPCC	Intergovernmental Panel on Climate Change
IRZ	Impact Risk Zone
LAeq	Equivalent sound level
LAQM	Local Air Quality Management
LCA	Local Character Areas
LCA	Landscape Character Area
LCC	Leicestershire County Council
LCRM	Land Contamination Risk Management
LDV	Light Duty Vehicle
LEMP	Local Environmental Management Plan
LHER	Leicestershire and Rutland Historic Environment Record

Abbreviation	Meaning
LLFA	Lead Local Flood Authorities
LLITM	Leicester and Leicestershire Integrated Transport Model
LNR	Local Nature Reserve
LOAEL	Lowest Observed Adverse Effect Level
LPA	Local Planning Authority
LRN	Local Road Network
LSOA	Lower-layer Super Output Areas
LVIA	Landscape & Visual Impact Assessment
LWS	Local Wildlife Site
mAOD	Metres Above Ordnance Datum
MHCLG	Ministry of Housing, Communities and Local Government
MMC	Modern Methods of Construction
mph	Miles per hour
NA	Noise Act 1996
NCA	National Character Area
NDC	National Data Collection
NE	Natural England
NERC	Natural Environment and Rural Communities
NHLE	Natural Heritage List for England
NIR	Noise Insulation Regulations 1975
NN NPS	National Policy Statement for National Networks
NNR	National Nature Reserve
NOEL	No Observed Effect Level

Abbreviation	Meaning
NPPF	National Planning Policy Framework
NPSE	Noise Policy Statement for England
NRFA	National River Flow Archive
NRMM	Non-Road Mobile Machinery (NRMM)
NSIP	Nationally Significant Infrastructure Project
NSR	Noise Sensitive Receptors
NTS	Non-technical Summary
ONS	Office for National Statistics
OS	Ordnance Survey
PAS	Publicly Available Standard
PBDE	Polybrominated diphenylethers
PC	Process Contributions
PCU	Passenger Car Unit
PEC	Predicted Environmental Concentrations
PEIR	Preliminary Environmental Impact Report
PFOS	Perfluorooctane sulfonate
PHE	Public Health England
PINS	Planning Inspectorate
pLWS	Potential Local Wildlife Site
PPE	Personal Protective Equipment
PPG	Planning Practice Guidance
PPG-N	Planning Practice Guidance - Noise
ProPG	Professional Practice Guidance

Abbreviation	Meaning
PRoW	Public Right of Way
PRTM	Pan Regional Transport Model
PTP	Passenger Transport Policy
RAM	Reasonable Avoidance Measure
RFC	Ratio of flow to capacity
RIBA	Royal Institute of British Architects
RICS	Royal Institution of Chartered Surveyors
SAB	SuDS Approving Body
SAC	Special Area of Conservation
SATURN	Simulation and Assignment of Traffic to Urban Road Network
SFRA	Strategic Flood Risk Assessment
SI	Statutory Instrument
SLR	Single Lens Reflex
SOAEL	Significant Observed Adverse Effect Level
SOC	Standard Occupational Classification
SPA	Special Protected Area
SPD	Supplementary Planning Document
SPZ	Source Protection Zone
SRN	Strategic Road Network
SSSI	Sites of Special Scientific Interest
STWL	Severn Trent Water Limited
SuDS	Sustainable Urban Drainage System
SUE	Sustainable Urban Extension

Abbreviation	Meaning
TA	Transport Assessment
TAG	Transport Analysis Guidance
TG	Technical Guidance
TP	Travel Plan
UAEL	Unacceptable Adverse Effect Level
UCA	Urban Character Area
UK	United Kingdom
ULAS	University of Leicester Archaeological Services
UNFCCC	United Nations Framework Convention on Climate Change
WFD	Water Framework Directive
WHO	World Health Organization
WRAP	Waste and Resources Action Programme
WRMP	Water Resource Management Planning
WSI	Written Scheme of Investigation
WwTW	Wastewater Treatment Works
ZoI	Zones of Influence
ZTV	Zone of Theoretical Visibility

Appendix 1D

Glossary

Term	Definition
Annex I habitats	Habitats listed in Annex I of the Conservation of Habitats and Species Regulations 2010 (SI 2010/490) (as amended).
Baseline	The environmental conditions, resources and receptors that currently exist on the site and in the surrounding area.
Conservation areas	Designated areas of special architectural or historic interest, the character or appearance of which is desirable to preserve or enhance.
Construction phase	The period during which the contractor must complete construction, subject to the conditions of the contract.
Contaminated land	Land where there may be a presence on site of a noxious substance, which may give rise to a hazard.
Contractors' compound	The area in which on site contractors will manage and oversee the construction of the plant.
Decibel	A unit specifying the logarithm of the ratio between the value of a quantity and a reference value (usually used in the measurement of power and intensity).
Economically inactive	People who are not in employment or unemployed.
EIA scoping opinion	A scoping opinion is provided by the regulator in response to a request for an opinion accompanied by Scoping report and provides direction to the developer on the scope of the EIA.
Environmental statement	The document reporting the process and outcomes of the EIA.
Fauna	Animals
Future baseline	The situation that would occur in the absence of the proposed development. Predicted impacts are compared against this theoretical scenario. It is typically based upon extrapolating the current baseline forward using technical knowledge of changes that may occur.
Gross value added (GVA)	GVA measures the value of goods and services produced in a geographical area, industry or economic sector. It is a measure of economic productivity, calculated by valuing the amount of goods and services that have been produced, less the cost of all inputs and raw materials that are directly attributable to that production.
Groundwater	Water occurring below ground in natural formations (typically rocks, gravels and sands).
Historic parks and gardens	Parks and gardens identified by English Heritage as being of particular interest and quality by reasons of their historic layout, features and architectural ornaments. Like listed buildings they are graded I, II* and II.
Inter-relationship effects	Effects that occur when different individual environmental impacts of the proposed development combine together synergistically to influence particular receptors and have the potential to lead to significant effects. If considered in isolation the individual environmental impacts may not lead to significant effects.

Term	Definition
Landscape character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscaping	A general term used for the means by which, where appropriate, development is made to fit visually into its surroundings by control of siting and layout and use of trees, shrubs or grass (soft landscaping) and/or fences, walls or paving (hard landscaping).
Listed buildings	Buildings and structures which have been identified as being of special architectural or historic interest and whose protection and maintenance are the subject of special legislation. Their curtilage and setting is also protected. Listed building consent is required before any works can be carried out on a listed building.
National nature reserve	National Nature Reserves are designated under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981 (as amended) as land primarily for nature conservation. Such a purpose covers the study, research and preservation of flora, fauna and sites with special geological or physiographical features. The NNRs were established to protect the most important areas of wildlife habitat and geological formations in Britain and as places for scientific research. All NNRs are nationally important and are best examples of a particular habitat/ecosystem.
Operational phase	The period during which the proposed development is operational.
Ordnance datum (Newlyn)	The UK reference point for altitude or height. 'Above Ordnance Datum' (AOD) is a term often used to measure altitude by reference to the sea level at Newlyn, Cornwall.
Primary mitigation	This is often referred to as 'embedded' mitigation and includes modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project, become a fundamental part of the design for which consent is sought, and do not require additional action to be taken (e.g. reduction in the height of a building to reduce visual impact; identifying a key habitat that should remain unaffected by the development's layout and operation e.g. retaining hedgerows as bat foraging routes; developing a transport strategy that reduces trips, avoiding the need for junction improvements).
Public rights of way	These are designated 'highways' under the Countryside and Rights of Way (CroW) Act 2000, which the public can use at any time.
Receptor	Used to refer to human beings or environmental components (such as landscape and habitats) that may be affected by changes arising due to the development and the systems on which they depend. Receptors can be reflected individually or collectively. For example, resident, employees, communities.
Scheduled monument	A feature of national, historical or archaeological importance, either above or below the ground, which is included in the schedule of monuments as identified by the Secretary of State. Not all nationally important archaeological remains are scheduled and sites of lesser importance may still merit protection.
Secondary mitigation	This is often referred to as 'additional' mitigation and includes actions that will require further activity in order to achieve the anticipated outcome. These may be imposed as part of the planning consent
Site of special scientific interest	An area designated as being of special interest by reason of any of its flora, fauna or geological or physiographical features. SSSIs are designated by Natural England under the Wildlife and Countryside Act 1981 (as amended) and the Countryside and Rights of Way Act 2000.

Term	Definition
Source protection zones	Defined by the Environment Agency, these zones show the risk of contamination from any activities that might cause pollution in the area specifically to groundwater sources. This could be from any activity that might cause pollution in the area.
Spatial scope	An area over which a potential change to an environmental component has been considered.
Special area of conservation	A site designated via the European Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) (i.e. the Habitats Directive) to protect rare and endangered habitats and species at a European level. Together with SPAs they form a network of European sites known as Natura 2000.
Special protection area	Designated under Article 4 of the European Directive on the Conservation of Wild Birds (2009/147/EC) (i.e. the Birds Directive) to protect the habitats of threatened and migratory birds.
Surface water	Terrestrial water bodies that are found above ground level, such as lakes, rivers and ditches, and including fresh and inland brackish water.
Sustainable urban drainage systems	A sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques (may also be referred to as sustainable drainage techniques).
Tertiary mitigation	Will be required regardless of any EIA assessment, as it is imposed, e.g. as a result of legislative requirements and/or standard sectoral practices (e.g., applying emission controls to an industrial stack to meet the requirements of the Industrial Emissions Directive (Directive 2010/75/EU)); those measures contained within the Code of Construction Practice/Construction Method Statement that have been reviewed and agreed.
Zone of influence	The maximum geographical area within which project development activities could result in a change to baseline conditions.
Zone of theoretical visibility	The likely (or theoretical) extent of visibility of a development, usually shown on a map.

Appendix 4A

Cumulative Effects Assessment: List of Other Developments

The list of other developments for inclusion in the cumulative effects assessment is presented in **Table 4A.1**.

Table 4A.1 List of other developments for inclusion in the cumulative effects assessment

Project ID	Application ref	Description	Location	Proximity to Site
1	18/00987/OUT	Outline planning permission for erection of 17 flats.	King William 1 The Hollow Earl Shilton Leicester Leicestershire LE9 7NA.	0.5 km west
2	17/01330/FUL	Full planning permission for demolition of existing dwelling and erection of 16 dwellings with associated vehicular access, parking and landscaping.	12 Birch Close Earl Shilton Leicester Leicestershire LE9 7HD.	0.9 km west
3	20/00504/FUL	Full planning application for development of 14 residential apartments.	Former Island House Arthur Street Barwell Leicester Leicestershire LE9 8AH.	2.0 km west
4	14/01279/OUT	Outline planning permission for residential development of up to 350 dwellings, 0.6 ha of employment starter units, expansion of existing community facilities, access, open space and indicative landscaping.	Westfield Farm Keats Lane Earl Shilton Leicester Leicestershire LE9 7DS.	0.7 km north-west
5	16/00488/FUL	Full planning application for erection of 70 bed care home, associated facilities and revised site access.	40 High Street Earl Shilton Leicester Leicestershire LE9 7DG.	0.45 km north-west
6	12/00295/OUT	Outline planning application for a sustainable urban extension on the western edge of Barwell comprising of 2,500 homes, 6.2 ha of employment land, a primary school, health centre, retail and community facilities.	Barwell Sustainable Urban Extension (SUE) Land West of Barwell Ashby Road Barwell Leicestershire	3.1 km west
7	Hinckley National Rail Freight Interchange	NSIP aimed at delivering a Strategic Rail freight interchange to include railway sidings and freight transfer area alongside the two-track railway between Hinckley and Leicester.	North-west of M69 Junction 2, LE9 4LH.	1.1 km south (at closest point)
8	20/01225/FUL	Full planning application for residential development for 108 dwellings with provision of access, open space and associated infrastructure.	Land West Of Clickers Way Earl Shilton Leicestershire	Adjacent to Site
9	21/00135/OUT	Outline planning application for residential development for up to 140 dwellings, with public open space, landscaping and sustainable drainage system. Replaces refused application ref 20/00239/OUT.	Land North Of Hill Top Farm Hill Top Earl Shilton Leicestershire	0.6 km north-west

Project ID	Application ref	Description	Location	Proximity to Site
10	20/00916/FUL	Full planning application for demolition of farm buildings and Ashby House and development of 50 dwellings comprising 49no. affordable houses and 1no. bungalow to replace Ashby House, with access road off Leicester Road, open space, landscaping, drainage basin, and foul pumping station.	Ashby House Hill Top Farm Hill Top Earl Shilton Leicester Leicestershire LE9 7DP	0.6 km north-west
11	16/00116/FUL	Full planning permission for demolition of existing buildings, erection of 2no. retail units (A1) and 24no. flats (C3).	68 Wood Street Earl Shilton Leicester Leicestershire LE9 7ND	0.7 km north-west
12	16/00204/OUT	Outline planning permission for the erection of 14 dwellings (outline - access, layout, scale and appearance).	29 Moore Road Barwell Leicester Leicestershire LE9 8AF	1.6 km west
13	15/01188/HYB	Hybrid planning permission for the redevelopment of factory/warehouse including part demolition and part conversion for up to 42 dwellings to include: (1) Full application for part conversion of existing factory to 7 flats and partial demolition of existing factory and erection of 7 dwellings. (2) Outline application (access only) for the demolition of existing factory and erection of up to 28 dwellings.	Kingsfield House Arthur Street Barwell Leicester Leicestershire LE9 8GZ	1.9 km west

Appendix 6A

ADMS-Roads model verification

The ADMS-Roads dispersion model has been widely validated for this type of assessment and is specifically listed in the Defra's LAQM.TG(16) ^{Error! Bookmark not defined.} guidance as an accepted dispersion model.

Model validation undertaken by the software developer (CERC) will not have included validation in the vicinity of the Proposed Development site. It is therefore necessary to perform a comparison of modelled results with local monitoring data at relevant locations. This process of verification attempts to minimise modelling uncertainty and systematic error by correcting modelled results by an adjustment factor to gain greater confidence in the final results.

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including uncertainties associated with:

- background concentration estimates;
- meteorological data;
- source activity data such as traffic flows and emissions factors;
- model input parameters such as surface roughness length, minimum monin-obukhov length;
- monitoring data, including locations; and
- overall model limitations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

Model setup parameters and input data were checked prior to running the models in order to reduce these uncertainties. The following were checked to the extent possible to ensure accuracy:

- traffic data;
- road widths;
- distance between sources and monitoring as represented in the model;
- speed estimates on roads;
- source types, such as elevated roads and street canyons;
- selection of representative meteorological data;
- background monitoring and background estimates; and
- monitoring data.

Suitable local monitoring data for the purpose of verification is available for annual mean NO_x/NO₂ concentrations as shown in **Table 6A1**. The monitoring locations used for model verification are presented in **Figure 6A1**.

Figure 6A1 Diffusion tubes used for model verification

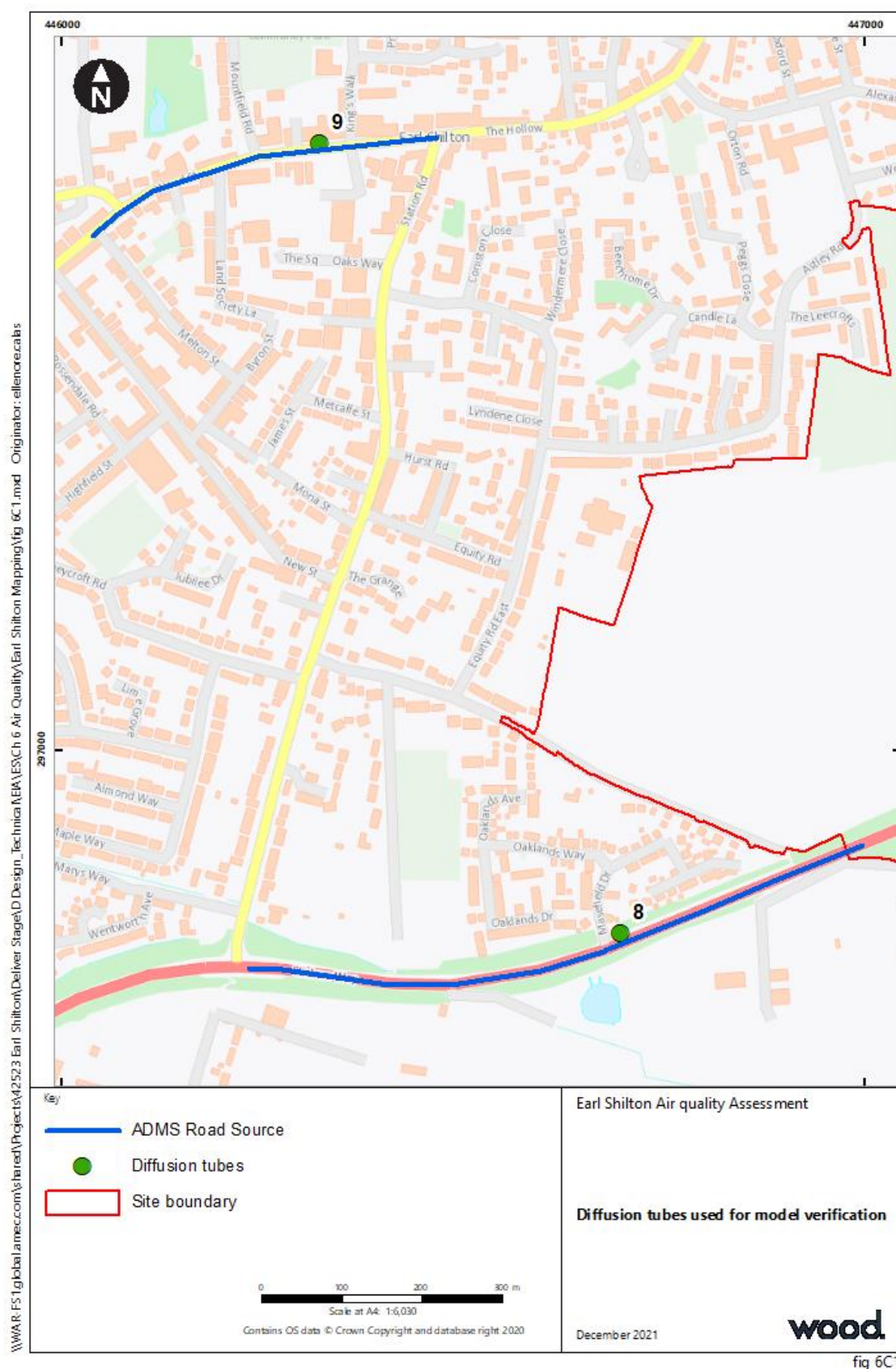


Table 6A1 Local monitoring data suitable for ADMS-roads model verification

Location	2019 Annual Mean NO ₂ (µgm ⁻³)	X	Y
8	19.1	446696	296771
9	23.3	446320	297756

Verification calculations

The verification of the modelling output was performed in accordance with the methodology provided in Annex 3 of LAQM.TG(16). **Table 6A2** shows that there was systematic under prediction of monitored concentrations for all diffusion tubes.

Table 6A2 Verification, modelled versus monitored

Site	2019 Modelled Annual Mean NO ₂ (µgm ⁻³)	2019 Monitored Annual Mean NO ₂ (µgm ⁻³)	% (Modelled- Monitored)/ Monitored
8	17.4	19.1	-9.0%
9	19.1	23.3	-17.9%

Table 6A3 shows the comparison of modelled road-NO_x, a direct output from the ADMS-Roads modelling, with the monitored road-NO_x, determined from the LAQM NO_x to NO₂ conversion tool.

Table 6A3 Comparison of modelled and monitored road NO_x to determine verification factor

Site	2019 Modelled Annual Mean Road NO _x (µgm ⁻³)	2019 Monitored Annual Mean Road NO _x (µgm ⁻³)	Ratio
8	10.9	14.2	1.30
9	14.9	23.1	1.55

Table 6A4 shows the comparison of the modelled NO₂ concentration calculated by multiplying the modelled road NO_x by the adjustment factor of 1.42 and using the LAQM's NO_x to NO₂ conversion tool to calculate the total adjusted modelled NO₂.

Table 6A4 Comparison of adjusted modelled NO₂ and modelled NO₂

Site	2019 Background NO ₂ Concentration (µgm ⁻³)	2019 Adjusted Modelled Annual Mean NO ₂ (µgm ⁻³)	2019 Monitored Annual Mean NO ₂ (µgm ⁻³)	% (Adjusted Modelled- Monitored)/ Monitored
8	11.5	19.8	19.1	3.7%
9	11.2	22.4	23.3	-4.0%

Appendix 6B

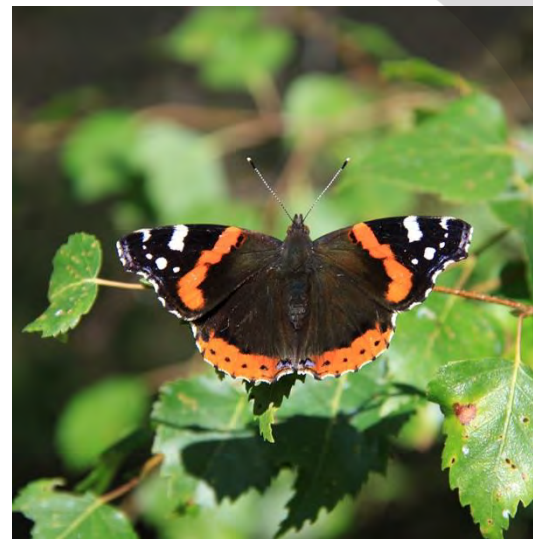
Odour Assessment



Bloor Homes, Jelson Homes, and Barwood Strategic Land II LLP

Earl Shilton Waste Water Treatment Works

Baseline Odour Assessment



Report for

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Document revisions

No.	Details	Date
1	Draft report – internal review	30/10/21
2	Final report – for client review	11/11/21

Executive summary

Purpose of this report

Wood was commissioned by Bloor Homes, Jelson Homes and Barwood Strategic Land II LLP to review and establish the current odour baseline through detailed dispersion modelling of odour emissions from Earl Shilton Waste Water Treatment Works (WWTWs) (the 'site').

As proposals for the sustainable urban extension (SUE) include land directly surrounding the Earl Shilton WWTWs, a baseline odour assessment is required to determine whether the Proposed Development would be affected by odour emissions from the WWTWs. The WWTWs is located at the easterly extent of the town of Earl Shilton, with the closest existing residential receptors being new build houses approximately 125m north-west of the site boundary.

An odour impact assessment for Earl Shilton WWTWs was previously undertaken by Wood (then AMEC) in 2011. Since the site undertook several upgrades in 2019, a review of the odour assessment was required and has been undertaken as part of this assessment.

The results of this odour impact assessment indicate that the majority of the proposed SUE residential areas are located outside the $C_{98,1hr}$ odour concentrations contour of $3 \text{ ou}_E/\text{m}^3$ odour criteria, where the risk of odour complaint is slight to negligible.

Some existing and proposed residential areas are predicted to be located within zones with $C_{98,1hr}$ odour concentrations above 3 and $5 \text{ ou}_E/\text{m}^3$ odour criteria and proposed employment areas within zones with $C_{98,1hr}$ odour concentrations above $10 \text{ ou}_E/\text{m}^3$ odour criteria which may result in complaints. However, there have been no complaints received by Hinckley & Bosworth Borough Council (HBBC) relating to odour from the Earl Shilton WWTWs for the past 10 years. This suggests that either the predicted odour concentrations are higher than the odour concentrations observed at the existing receptors or that the existing receptors are not highly sensitive to the WWTWs odour level, as the receptors are located in proximity to an agricultural environment. This suggests that the risk of odour complaint from these areas might be lower than predicted.

Odour modelling assessments are highly sensitive to the input data used, such as emission rates and meteorological data. This assessment was undertaken using library data, representing a low to moderate level of odour emissions and were selected to provide a worst-case assessment approach.

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Annex A Wind roses for Church Lawford meteorological data

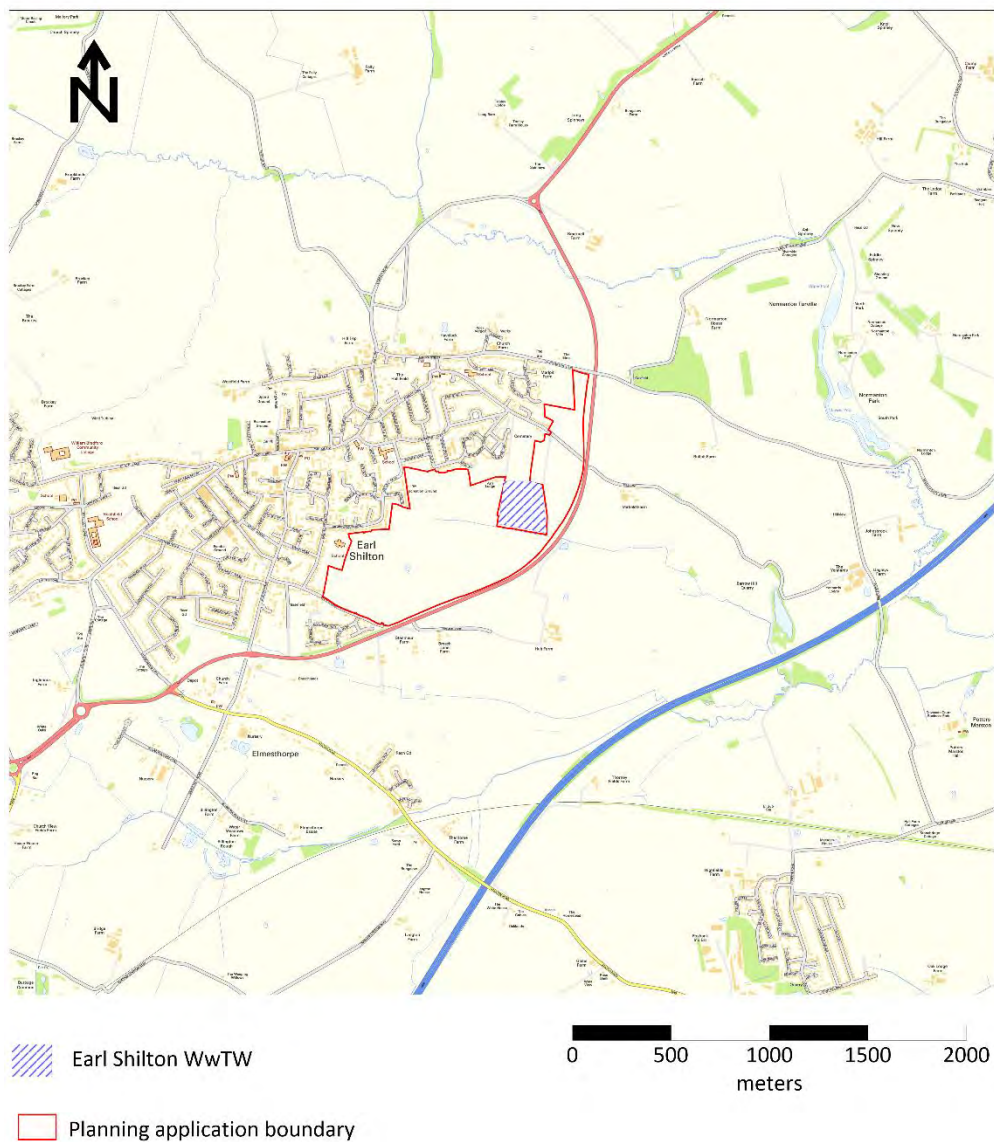
Annex B $C_{98th,1hr}$ odour concentrations contour plots for all years modelled (2015 – 2019)

1. Introduction

1.1 Background

- 1.1.1 Wood Group UK Ltd (hereafter referred to as 'Wood') was commissioned by Bloor Homes, Jelson Homes and Barwood Strategic Land II LLP to review and establish the current odour baseline through detailed dispersion modelling of odour emissions from Earl Shilton Waste Water Treatment Works (WWTWs).
- 1.1.2 As proposals for the Sustainable Urban Extension (SUE) (the 'Proposed Development') include land directly surrounding the Earl Shilton WWTWs, a baseline odour assessment is required to determine whether the Proposed Development would be affected by odour emissions from the WWTWs. The WWTWs is located at the easterly extent of the town of Earl Shilton, with the closest residential receptors being new build houses approximately 125m north-west of the site boundary.
- 1.1.3 An odour impact assessment for Earl Shilton WWTWs was previously modelled by Wood (then AMEC) in 2011. A review of the odour assessment was required, as the WWTWs site had undergone several upgrades in 2019.
- 1.1.4 The WWTWs is operated by Severn Trent Water Ltd. and comprises a single stream treatment works with flows initially passing through an inlet works with screenings and grit removal. The flows then pass through a three-tiered treatment process as follows:
- primary treatment (Primary Settlement Tanks (PSTs));
 - secondary treatment (Activated Sludge Plant (ASP)); and
 - tertiary treatment (Final Settlement Tanks (FSTs)).
- 1.1.5 An upgrade in 2019 resulted in the ASP treatment and associated Surplus Activated Sludge (SAS) treatment replacing the percolating filters and humus. In addition to the above, tankers export sludge for offsite treatment. No sludge is treated on site.
- 1.1.6 Figure 1.1 indicates the location of the WWTWs and its new layout is displayed on Figure 4.1.

Figure 1.1 Site location



1.2 Purpose of this report

- 1.2.1 The purpose of the report is to describe the baseline odour assessment undertaken for Earl Shilton WWTWs and assess its impact on the Proposed Development.

2. Legislation, policy and guidance

- 2.1.1 This section describes the regulatory framework for odour in England and the available technical guidance.

2.2 Legislation

Environmental Protection Act 1990

- 2.2.1 Sections 79, 80 and 82 of the EPA 1990¹ deal with the matter of Statutory Nuisance. This empowers local authorities to conduct surveys of their administrative areas and, if an authority considers that an odour nuisance has occurred and/or is likely to re-occur, then it has a duty to declare this and issue an Abatement Notice, requiring the owner/operator of the trade premises causing the odour to abate it within a certain time scale. Section 79 of the EPA defines the types of nuisance that can arise and the most applicable categories to odour are:

"Fumes or gases emitted from premises so as to be prejudicial to health or a nuisance; and

Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance".

- 2.2.2 The operator of the premises can appeal against the Abatement Notice, using a defence that Best Practicable Means (BPM) are being applied.

Environmental Permitting (England and Wales) Regulations, 2019, as amended

- 2.2.3 The 2010/75 EU Directive² was transposed into Environmental Permitting Regulations (EPR) for England and Wales in 2013³. Environmental permitting regulations were put in place to administer the permitting of installations that were likely to have the potential to generate significant impacts upon the environment. In some cases, this can include effluent treatment plants where significant quantities (>50 tonnes/day) of non-hazardous wastes are biologically or physico-chemically treated for disposal. Environmental Permits commonly contain Conditions that require installation operators to meet certain limits for discharge of emissions to atmosphere, including Hydrogen Sulfide (H₂S) concentrations from both point sources and fugitive releases.
- 2.2.4 The 2019 updates⁴ ensures the regulations remain fully operable post Brexit. There are no changes to the permit requirements for facilities treating greater than 50 tonnes per day of non-hazardous wastes for disposal.
- 2.2.5 In 2018, a revision of the Best Available Technology (BAT) conclusions was published to provide an update of best available techniques for treating waste and BAT associated emission levels (BAT-AELs), including a BAT-AELs for odour concentrations to be applied for channelled emissions.

¹ UK Government (1990). Environmental Protection Act 1990. (Online) Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents> (Accessed November 2021).

² European Commission (2010). European Union, Directive 2010/75/Eu of The European Parliament and of The Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control). (Online) Available at: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:334:0017:0119:en:PDF> (Accessed November 2021).

³ UK Government (2013). The Environmental Permitting (England and Wales) (Amendment) Regulations 2013. (Online) Available at: <https://www.legislation.gov.uk/ukdsi/2013/9780111532126/contents> (Accessed November 2021).

⁴ UK Government (2019). The Environmental Permitting (England and Wales) (Amendment) (EU Exit) Regulations 2019. (Online) Available at: <https://www.legislation.gov.uk/uksi/2019/39/contents/made> (Accessed November 2021).

2.3 Local policy

Earl Shilton and Barwell Area Action Plan

- 2.3.1 Policies and measures specific to odour are specified in the Earl Shilton and Barwell Area Action Plan (2014)⁵.
- Policy 22 – Development and Design:
“Developments will be permitted providing that the following requirements are met: It does not adversely affect the privacy and amenity of nearby residents and occupiers of adjacent buildings, including matters of lighting, air quality (including odour), noise, vibration and visual intrusion; The amenity of occupiers of the proposed development would not be adversely affected by activities in the vicinity of the site.”
 - Paragraph 5.11 of the action plan:
“The design of the Weavers Meadow development must factor in the need to provide an appropriate buffer between the principal sources of odour within the Earl Shilton Waste Water Treatment Works and the development of sensitive land uses such as residential, education, community and employment uses within the SUE. A buffer of 100 metres is advised.”
 - Paragraph 9.16 of the action plan:
“The Earl Shilton Wastewater Treatment works include a number of sources of odour that have been identified by Severn Trent Water through a FIDOL Report. In consultation with the Environmental Health Department It was advised that careful masterplanning is required to ensure that development does not take place within 100m of the primary sources of odour that have been identified by Severn Trent Water.”

2.4 Technical guidance

- 2.4.1 This desk-based odour dispersion modelling assessment complies with the guidance documents outlined in this section.

Defra code of practice on odour nuisance from sewage treatment works

- 2.4.2 This guidance⁶ was produced in 2006 and has now been withdrawn, but still contains useful information for odour assessments. It was aimed at environmental health practitioners, the public and sewage treatment works operators. The overall objective of the guidance is to achieve a balance between reasonable and best practice management of the treatment processes by the operator, understanding on the part of the public and effective regulation by local authorities.

⁵ Hinkley and Bosworth Borough Council (2014). Earl Shilton and Barwell area action plan and appendices. (Online) Available at: <https://www.hinkley-bosworth.gov.uk/downloads/file/4332/earl-shilton-and-barwell-area-action-plan-and-appendices-adopted-23-september-2014> (Accessed November 2021).

⁶ Defra (2006). Code of Practice on Odour Nuisance from Sewage Treatment Works. (Online) Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69223/pb11833-sewageodour-cop.pdf (Accessed November 2021).

Defra odour guidance for local authorities

- 2.4.3 This guidance⁷ was published in 2010 by Defra and is aimed at providing local authorities with an over-arching guide as to how odour issues should be investigated, prevented and managed. It is not specific to the wastewater industry.

IPPC cross sector guidance

- 2.4.4 In 2011, the Environment Agency published its H4 horizontal guidance on odour⁸ which is to be applied to installations permitted under the EPR⁴. This provides guidance to installation operators on how to comply with the Conditions in their Environmental Permits. This guidance is relevant to sites regulated by the Environment Agency.

Institute of Air Quality Management (IAQM) guidance on the assessment for odour planning (v1.1)

- 2.4.5 The IAQM published guidance in 2018⁹ for assessing odour impacts for planning purposes. The guidance presents useful tools for assessing odour, odour assessment criteria and how to draw conclusions from assessment results.
- 2.4.6 The guidance states that "IAQM is of the opinion that the practitioner should observe, from the various scientific studies, case law and practical examples of the investigation of odour annoyance cases, that in any specific case, an appropriate criterion could lie somewhere in the range of 1 to 10 ou_E/m³ as a 98th percentile of hourly mean odour concentrations."
- 2.4.7 This guidance has been used to determine the sensitivity for residential receptors in this assessment.

⁷ Defra (2010). Odour Guidance for Local Authorities. (Online) Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69305/pb13554-local-auth-guidance-100326.pdf (Accessed November 2021).

⁸ Environment Agency (2011). Additional guidance for H4 Odour Management How to comply with your environmental permit. (Online) Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296737/geho0411btqm-e-e.pdf

⁹ IAQM (2018) Guidance on the assessment for odour planning. (Online) Available at: <https://iaqm.co.uk/text/guidance/odour-guidance-2014.pdf> (Accessed November 2021).

3. Methodology

3.1 Odour assessment criteria

Background

- 3.1.1 In 1993 a public inquiry into Newbiggin-by-the-Sea Wastewater Treatment Works (WwTW) established an ambient odour annoyance standard of 5 ou/m³, expressed as a 98th percentile of hourly average modelled values ($C_{98,1hr}$) at a particular location over a calendar year¹⁰. This annoyance standard has been used as an assessment criterion both by the UK water industry and odour assessment practitioners in the UK. The protocol used for the determination of odour at the time of the 1993 public inquiry was a Dutch standard that used a particular concentration of an odorous chemical in air to screen panellists for sensitivity. Since the advent of the European standard on olfactometry, the sensitivity of the test has changed, with the original Dutch standard of 5 ou/m³ being equivalent to the European standard of 2.5 ou_E/m³.
- 3.1.2 In 2002, the Environment Agency published a draft copy of its Horizontal Guidance Document H4¹¹ and, in 2011, a final version. This includes a graduated scale of "indicative odour thresholds", depending upon the perceived offensiveness of the odour, as follows:
- 1.5 ou_E/m³ ($C_{98,1hr}$) for the most offensive odours;
 - 3.0 ou_E/m³ ($C_{98,1hr}$) for less offensive odours; and
 - 6.0 ou_E/m³ ($C_{98,1hr}$) for the least offensive odours.
- 3.1.3 These were derived from studies in Holland on the offensiveness of odours from intensive pig farming in rural areas. It is generally considered that sewage treatment works odours fall into the middle category (3.0 ou_E/m³), unless there is septic wastewater or sludge on the site, in which case the most stringent criterion of 1.5 ou_E/m³ would apply.
- 3.1.4 These thresholds were designed to be applied to those industrial processes regulated under the EPR and it was not clear, initially, how or whether these would apply to the water industry. In the event, this has now been clarified to a certain extent and there are a number of WwTW sites across the UK that are permitted and regulated by the Environment Agency, although this normally covers only those operations relating to sludge treatment and import of wastes.
- 3.1.5 The Chartered Institute of Water and Environmental Management (CIWEM) has issued a Policy Position Statement¹² outlining its position regarding the control of odour and the likely level of impact as indicated by modelling studies. This statement is frequently used by the water industry as the basis of assigning acceptable criteria for odour impact assessments.
- 3.1.6 Within the statement, CIWEM indicates that odour impact criteria should be regarded as indicative guidelines and should not be applied as statutory numerical standards. Based on research undertaken in the UK at the time the statement was issued, the body considered that the following framework of $C_{98,1hr}$ criteria were the most reliable indicators of the likelihood of complaints associated with wastewater treatment facilities:

¹⁰ This equates to experiencing odours above 5 ou/m³ (now 2.5 ou_E/m³), regarded as a faint odour, for only 2% of the hours in a year – approximately 175 hours. For the remainder of the time, the odour experienced would be less than faint.

¹¹ Environment Agency (2002) DRAFT Horizontal Guidance for Odour Part 1 - Regulation and Permitting. (Online) Available at: <https://www.sepa.org.uk/media/61325/ippc-h4-1-odour-pt-1-draft-for-consultation-2002.pdf> (Accessed November 2021).

¹² CIWEM (2012). Policy Position Statement – Control of Odour. (Online) Available at: <https://www.ciwem.org/assets/pdf/Policy/Policy%20Position%20Statement/Control-of-odour.pdf> (Accessed November 2021).

- $C_{98, 1hr} 10 \text{ ou}_E/\text{m}^3$ - complaints are highly likely and odour exposure at these levels represents an actionable nuisance; and
 - $C_{98, 1hr} 5 \text{ ou}_E/\text{m}^3$ - complaints may occur and depending on the sensitivity of the locality and nature of the odour this level may constitute a nuisance.
- 3.1.7 $C_{98, 1hr} < 3 \text{ ou}_E/\text{m}^3$ - complaints are unlikely to occur and exposure below this level are unlikely to constitute significant pollution or significant detriment to amenity unless the locality is highly sensitive or the odour highly unpleasant in nature.
- 3.1.8 Research in the Netherlands¹³ has highlighted the complexity of the assessment of odours from WWTWs. It states that situations exist where $5 \text{ ou}_E/\text{m}^3$ has been achieved and no complaints have been received, yet cases also exist where $1 \text{ ou}_E/\text{m}^3$ has been achieved and complaints were still received. Here, the *Netherlands Emission Guidelines for Air* considers that the exposure concentration where complaints escalate is at concentrations above $2.5 \text{ ou}_E/\text{m}^3$ as the 98th percentile of hourly averages. An appropriate criterion could lie anywhere between $1 \text{ ou}_E/\text{m}^3$ and $10 \text{ ou}_E/\text{m}^3$ as the 98th percentile of hourly averages at a critical receptor¹⁴.
- 3.1.9 For many sewage treatment works and sludge treatment centres in the UK and Ireland, dispersion modelling output has been assessed against an odour annoyance criterion whereby no critical receptor shall be exposed to a concentration of more than $5 \text{ ou}_E/\text{m}^3$ 98th percentile of hourly averages as a result of emissions from a sewage treatment works¹⁵. Wood's extensive experience of applying and designing to this criterion over the last 15 years for sewage and sludge treatment schemes indicates that, where compliance occurs, complaints with respect to odour are unlikely. The use of the $5 \text{ ou}_E/\text{m}^3$ as the 98th percentile of hourly averages has been confirmed in a recent High Court decision¹⁶ where $5 \text{ ou}_E/\text{m}^3$ as the 98th percentile of hourly averages or above is reached, "nuisance will certainly be established".
- 3.1.10 As Earl Shilton WWTWs does not comprises any sludge treatment, it is considered a moderately offensive odour (H4 odour guidance¹¹ and IAQM guidance⁹) and both $5 \text{ ou}_E/\text{m}^3$ and $3 \text{ ou}_E/\text{m}^3$ as the 98th percentile of hourly averages criteria are used as benchmark for this assessment.
- 3.1.11 The odour impact depends on the receptors sensitivity and the odour effect descriptors for "moderately offensive" odour as recommended by the IAQM guidance⁸ are described in Table 3-1 and are used in this assessment to determine the risk of odour complaints. Table 3-2 summarises the receptor sensitivity ratings.

Table 3.1 Odour effect descriptors for impacts predicted for "Moderately offensive" odours

Odour Exposure Level C_{98} , ou_E/m^3	Low sensitivity Receptors	Medium sensitivity Receptors	High sensitivity Receptors
≤ 10	Moderate	Substantial	Substantial
5 - < 10	Slight	Moderate	Moderate
3 - < 5	Negligible	Slight	Moderate
1.5 - < 3	Negligible	Negligible	Slight
0.5 - < 1.5	Negligible	Negligible	Negligible

¹³ Information Centre for the Environment (2001). Netherlands Emission Guidelines for Air. InfoMil.

¹⁴ Hall, D. L., McIntyre, A. E., (2004). The Derivation of Odour Standards and their Role and the Foundation of Odour Management Plans for Planning Regulation. In Proceedings of the Second National Conference Volume Two September 2004. Ed N. J. Horan.

¹⁵ McGovern, JE, Clarkson, CR (1994). The Development of Northumbrian Waters Approach to Odour Abatement for Sewage Facilities.

¹⁶ Citation EWHC 3253 (2011), Dobson & Others vs Thames Water Utilities Ltd. High Court of Justice.

Odour Exposure Level C_{98} , $\mu\text{gE}/\text{m}^3$	Low sensitivity Receptors	Medium sensitivity Receptors	High sensitivity Receptors
<0.5	Negligible	Negligible	Negligible

Table 3.2 Receptor sensitivity to odours

Receptors	Surrounding land where
High sensitivity	- Users can reasonably expect enjoyment of a high level of amenity; and - People would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Example may include residential dwellings, hospitals, schools/education and tourist/cultural.
Medium sensitivity	- Users would expect to enjoy a reasonable level of amenity, but wouldn't reasonably expect to enjoy the same level of amenity as in their home; or - People wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Example may include places of work, commercial/ retail premises and playing/recreational fields.
Low sensitivity	- The enjoyment of amenity would not reasonably be expected; or - There is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Examples may include industrial use, farms, footpaths and roads.

3.2 Model setup

Model

- 3.2.1 This assessment uses the ADMS 5 model, which was developed in the UK by Cambridge Environmental Research Consultants (CERC) in collaboration with the Meteorological Office, National Power and the University of Surrey. ADMS is termed a 'new generation' model, parameterising stability and turbulence in the planetary boundary layer (PBL) by the Monin-Obukhov length and the boundary layer depth. This approach allows the vertical structure of the PBL to be more accurately defined than by the stability classification methods of earlier dispersion models such as R91 or ISC.
- 3.2.2 Like R91 and ISC, ADMS adopts a symmetrical Gaussian profile of the concentration distribution in the vertical and crosswind directions in neutral and stable conditions. However, unlike R91 or ISC, the ADMS vertical concentration profile in convective conditions adopts a skewed Gaussian distribution to take account of the heterogeneous nature of the vertical velocity distribution in the Convective Boundary Layer (CBL).
- 3.2.3 ADMS has been used extensively to predict odour impacts from WWTWs and was therefore considered appropriate for the odour assessment.

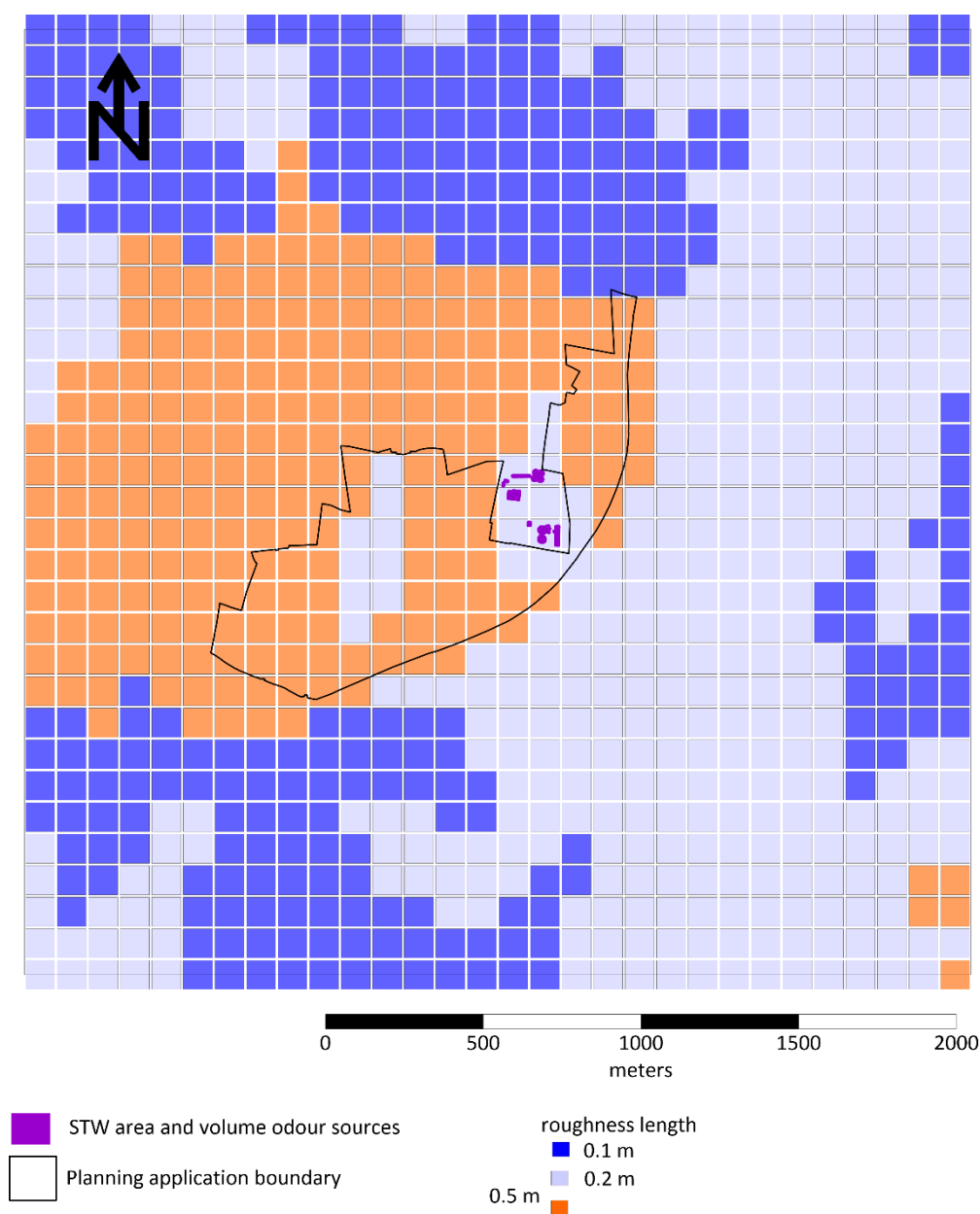
Surface characteristics

- 3.2.4 The predominant surface characteristics and land use in a model domain have an important influence in determining turbulent fluxes and, hence, the stability of the boundary layer and atmospheric dispersion. Factors pertinent to this determination are detailed in the following subsections.

Surface roughness length

- 3.2.5 The surface roughness length represents the aerodynamic effects of surface friction and is defined as the height at which the extrapolated surface layer wind profile tends to zero. This value is an important parameter used by meteorological pre-processors to interpret the vertical profile of wind speed and estimate friction velocities which are, in turn, used to define heat and momentum fluxes and, consequently, the degree of turbulent mixing in the boundary layer.
- 3.2.6 The surface roughness length is related to the height of surface elements; typically, the surface roughness length is approximately 10% of the height of the main surface features. Thus, it follows that surface roughness is higher in urban and congested areas than in rural and open areas.
- 3.2.7 A spatially variable surface roughness length was used for this assessment as shown in Figure 3.1, which takes into consideration the change in land use from the Proposed Development.

Figure 3.1 Variable surface roughness length (m)



Terrain

- 3.2.8 The presence of elevated terrain can significantly affect ground level concentrations of pollutants emitted from elevated sources such as stacks. Terrain in the few kilometres areas around Earl Shilton WWTWs is flat. A review of ordnance survey mapping for the area shows that within 1km of the site, the terrain rises by less than 10m, therefore, terrain was not included in the model.

Buildings

- 3.2.9 Any large object has an impact on atmospheric flow and air turbulence within the locality of the object. This can result in maximum ground level concentrations that are significantly different (generally higher) from those encountered in the absence of buildings. The building 'zone of influence' is generally regarded as extending a distance of 5L (where L is the lesser of the building height or width) from the foot of the building in the horizontal plane and three times the height of the building in the vertical plane. Buildings can influence the air flow from only point sources in

gaussian dispersion model such as ADMS. As there are no point sources in this assessment, no buildings were modelled.

3.3 Meteorological data

- 3.3.1 The nearest weather station is at Church Lawford airport, approximately 25km south of the site. The dispersion model was run using five years of meteorological data from 2015 to 2019 as recommended by the IAQM guidance⁹. Meteorological parameters such as wind speed, wind direction, temperature, relative humidity and pressure are used as input to the air dispersion model to predict odour concentrations at receptors.
- 3.3.2 Figure 3.2 and Figure 3.3 show the wind rose for 2017 meteorological data and 2016 meteorological data respectively, the years that provided the highest odour concentrations at selected receptors. The wind is generally from the South West and South South West direction for both 2017 and 2016. A smaller proportion of the wind is from the North West in 2017, while some from the North East in 2016. Wind roses for all five years modelled are shown in Annex A.

Figure 3.2 Wind rose for year 2017

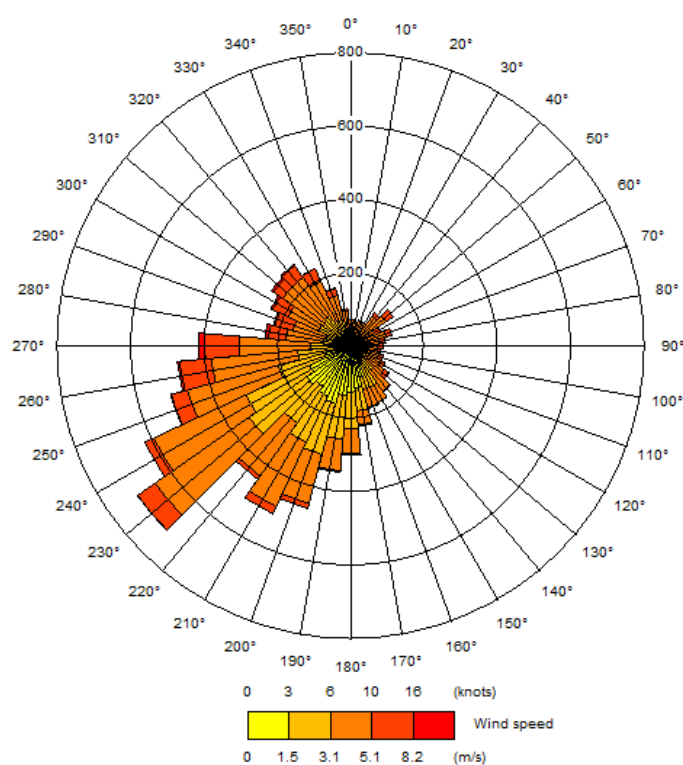
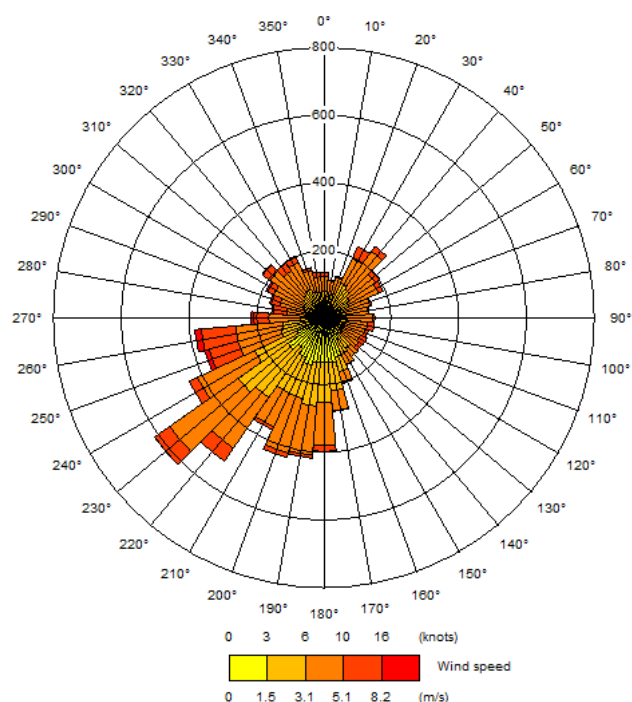


Figure 3.3 Wind rose for year 2016



3.4 Receptors

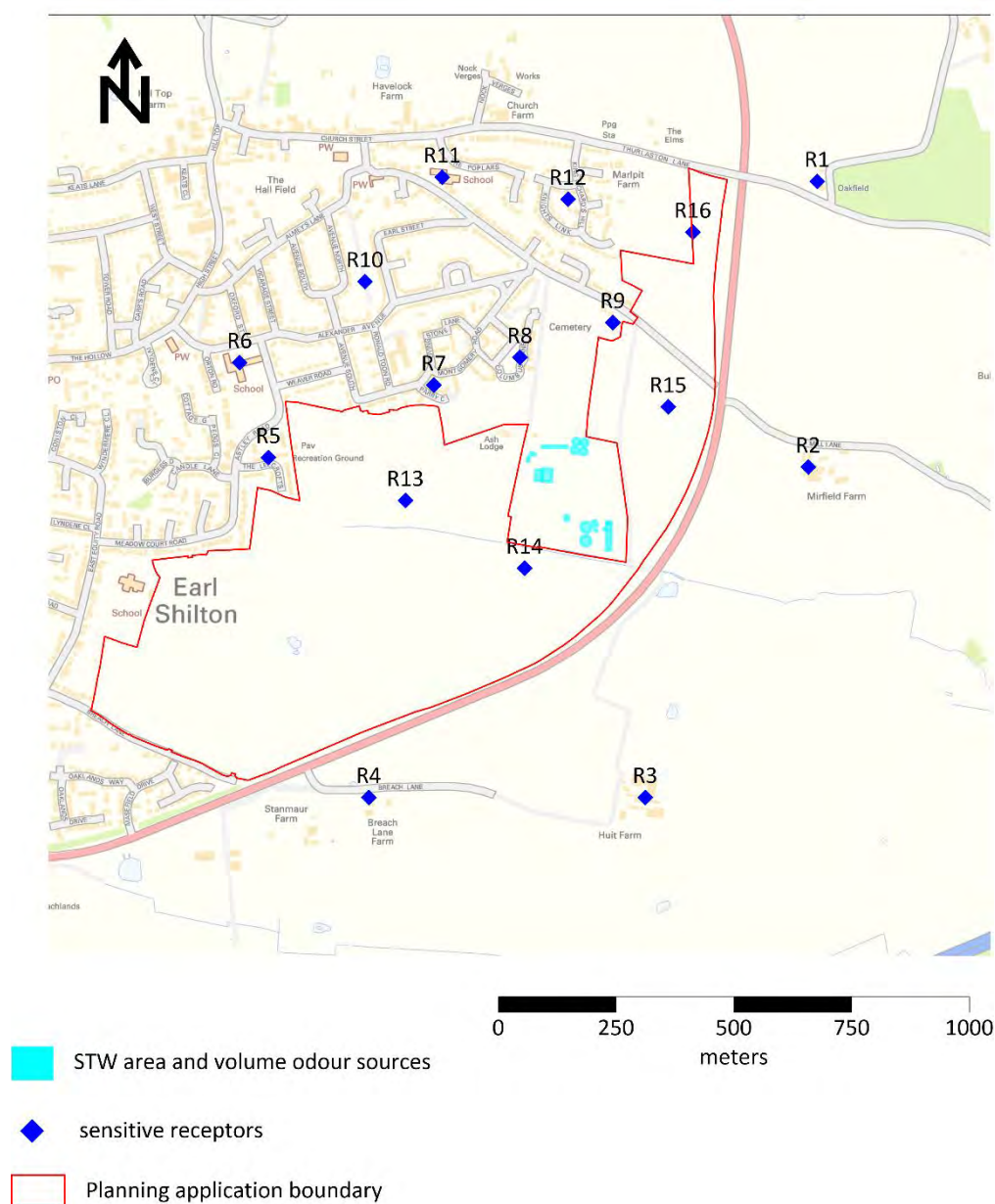
- 3.4.1 This assessment calculated odour concentrations at gridded receptors on a 3km cartesian grid with 60m resolution centred on the WWTWs.
- 3.4.2 Specific receptor points were selected at existing high sensitivity residential locations (e.g. residential properties, schools) and at proposed high sensitivity residential locations and medium sensitivity employment area locations. Sensitivity is determined using the IAQM guidance⁹. The limit of the Proposed Development is indicated on Figure 3.4 as a red line. Specific receptor points are listed in Table 3.3 and plotted on Figure 3.4.

Table 3.3 Modelled sensitive receptors

Receptor ID	Description of receptor	X (m)	Y (m)	Sensitivity
R1	Residential - Oakfield	448132	298146	High
R2	Residential- Mirfield Farm	448113	297539	Low
R3	Residential – Huit Farm	447767	296837	Low
R4	Residential – Lane Farm	447180	296837	Low
R5	Residential – The Leecrofts	446967	297559	High
R6	School – St Simon and St Jude	446906	297761	High

Receptor ID	Description of receptor	X (m)	Y (m)	Sensitivity
R7	Residential – Parry Close	447318	297713	High
R8	Residential – Columbus Lane	447501	297772	High
R9	Residential – Mill Lane	447698	297846	High
R10	Residential – Avenue North	447172	297933	High
R11	School – St Peters Voluntary	447336	298155	High
R12	Residential – King Richard's Hill	447603	298108	High
R13	Proposed Residential – West of site	447258	297468	High
R14	Proposed Residential – South of Site	447511	297324	High
R15	Proposed employment area – North of site	447816	297667	Medium
R16	Proposed Residential – North of site	447868	298038	High

Figure 3.4 Modelled sensitive receptor locations



3.5 Model uncertainty

- 3.5.1 Dispersion modelling is a useful tool in visualising the plume footprint and prediction of ground level concentrations. The use of dispersion models has been widely used in the UK for both regulatory and compliance purposes for several years and is an accepted approach for this type of assessment.
- 3.5.2 In order to try to counter uncertainty within dispersion modelling, a number of steps are taken to calibrate the model inputs to a “worst-case” position, such that the model outputs should be at or close to the upper bound of the likely results. These include:
- Assumptions in the model that the processes will be emitting odour for most sources at their maximum rates throughout the year; and

- Repeating the modelling with five years of hourly sequential meteorological data and reporting the year which yields the highest results.

3.5.3

Some factors cannot be included in the dispersion modelling exercise; these predominantly include infrequent abnormal operations. During these periods, it is expected that the odour emissions could be elevated for a short period of time.

4. Modelled odour emission rates

4.1 Scenario

- 4.1.1 The model scenario included in this assessment represents the existing 2020 site layout (after upgrade of the site with ASPs in 2019).
- 4.1.2 An olfactometry monitoring survey was undertaken by Amec in 2011. However, since the site was upgraded in 2019, it was concluded that the emission factors derived from the site-specific survey would not be applicable for this assessment. Emission factors representative of each source were derived from the assessment undertaken by Odournet for Severn Trent Water in 2010¹⁷ based on library values to represent low to moderate odour emissions levels from the site..
- 4.1.3 The model scenario was run for a five-year period (2015-2019) using meteorological data from Church Lawford weather station.

4.2 Assumptions

- 4.2.1 Based on the Odournet report 2010¹⁷, data information received from Severn Trent Water¹⁸ regarding the changes and upgrades completed in 2019, the following assumptions were made:
- Two new FSTs were built.
 - An Activated Sludge Plant (ASP) was built.
 - Refurbishment of the Primary Settlement Tanks (PSTs).
 - Sixteen filter beds and humus tanks were decommissioned and replaced by the ASP.
 - Only three out of four PSTs are operational at the same time (from satellite view 2020 and 2021).
 - The storm tanks fill simultaneously and any remaining sediment is promptly sluiced, with final effluent delivered using a 'Tipping-Bucket Momentum Washout' system and additional manual cleaning, if necessary, after every storm event. The storm tanks are assumed to fill once a week in autumn and winter (November to April inclusive when rainfall is higher) and remain empty in the spring and summer months (May to October inclusive). This is a total of 24 days a year. The duration of storm events was assumed to be 24 hours.
 - Maximum emissions are applied to Inlet works and PSTs during the spring and summer months (May to October inclusive) and were reduced by a factor of five during the autumn and winter months (November to April inclusive). The reduction in emission rate reflects the dilution effects of increased rainwater and reduction in odorous emissions due to lower ambient temperature.
 - All other sources were assumed continuous.

¹⁷ Odournet, 2010. Desktop odour impact assessment for proposed upgrade schemes at Earl Shilton WWTWS, November 2010 (STRW10B_draft4)

¹⁸ Email received from Severn Trent on 17/8/2020

4.3 Modelled sources

4.3.1 Modelled sources are shown in Figure 4.1.

4.3.2 Table 4.1 details all sources and emission rates included in the model. The emission rates for the sources are taken from the 2010 Odournet report¹⁷ which reflects a works treating an influent with a low to moderate emission potential.

Figure 4.1 Modelled sources

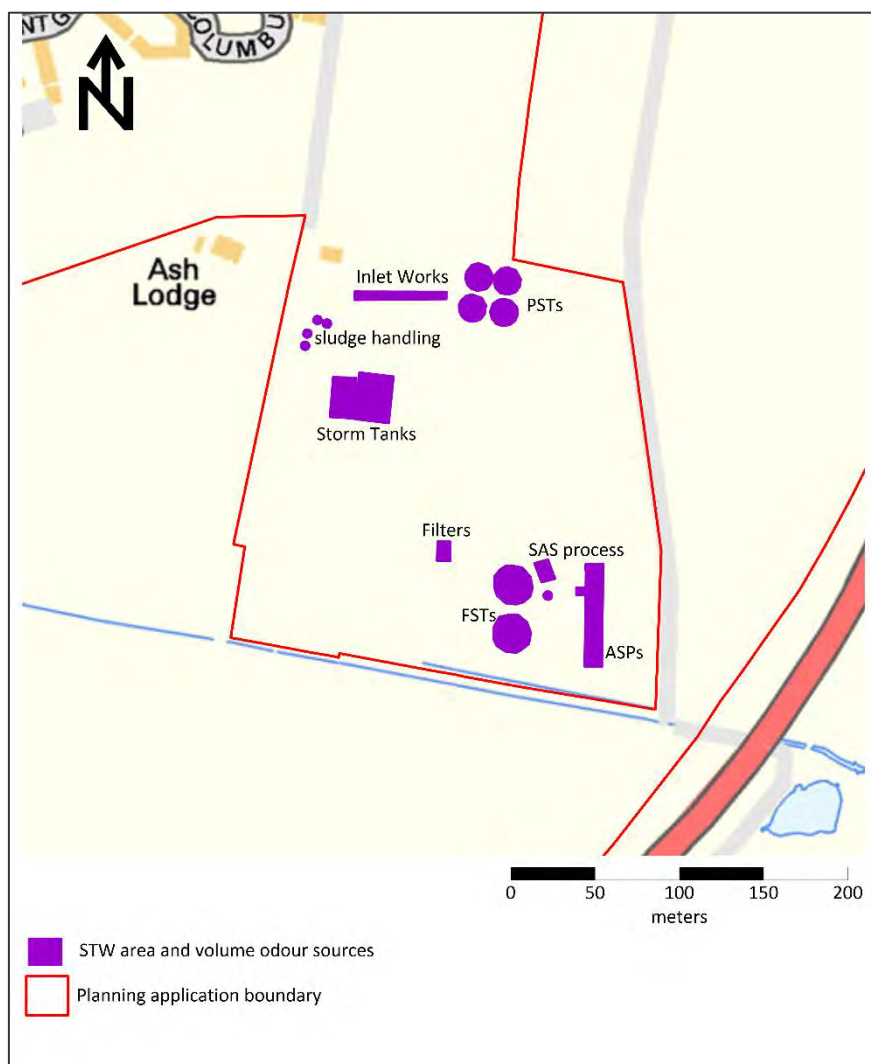


Table 4.1 Odour emissions from Earl Shilton WWTWs

Sources	Number of tanks	Type of source	Release height (m)	Total Area / volume (m ² / m ³)	Emission rates (in ou _E /m ² /s (for Area sources) and in ou _E /m ³ /s (for Volume sources)	Emission rates in ou _E /s
Inlet works	1	Area	0	105	20 (max)	2,100
PSTs	3	Area	0	587	10 (max)	5,871
Storm Tanks	2	Area	0	884	6.7	5,925
ASP	1	Area	4	567	1	567
Anoxic zone	1	Area	4	30.4	3	91
Ras mix chamber	1	Area	4	9.4	1	9
New Ras pumping station	1	Area	4	21	1	21
New SAS thickener building	1	Volume	5	490	0.36 ou _E /m ³ /s	176
New Surplus Activated Sludge (SAS) tank	1	Area	4	18.5	1.75	32
FSTs	2	Area	0.5	800	1	800
Sludge wells	3	Area	1	51.6	20	1032
Sludge handling tanks	3	Area	4	51.7	40	2,068
Cloth filters	1	Volume	3	255	0.18 ou _E /m ³ /s	46

- 4.3.3 The cumulative emission rate for all sources at the site is 18,739 ou_E/s. The major source is the PSTs, which represents approximately 31% of the total emissions, followed by the storm tanks (32%) and the Inlet Works (11%). The remaining sources contribute 26% of the total emissions.

5. Dispersion modelling results

- 5.1.1 Table 5.1 provides the results as maximum of 98th percentile of hourly average odour concentrations ($C_{98,1hr}$) over the five-year period at each sensitive receptor modelled. Maximum concentration above 5 ou_E/m³ are highlighted in bold.
- 5.1.2 Figures 5.1 and 5.2 show $C_{98,1hr}$ isopleths for year 2017 and 2016 respectively. $C_{98,1hr}$ isopleths for all five years are shown in Annex 2.

Table 5.1 Maximum $C_{98,1hr}$ odour concentration over five years modelled (2015-2019)

Receptor ID	Description of receptor	Maximum $C_{98,1hr}$ (ou _E /m ³)	Year	Receptors' sensitivity
R1	Residential - Oakfield	1.9	2017	High
R2	Residential- Mirfield Farm	0.9	2017	Low
R3	Residential – Huit Farm	0.3	2018	Low
R4	Residential – Lane Farm	0.3	2016	Low
R5	Residential – The Leecrofts	0.3	2016	High
R6	School – St Simon and St Jude	0.2	2016	High
R7	Residential – Parry Close	1.4	2019	High
R8	Residential – Columbus Lane	9.1	2016	High
R9	Residential – Mill Lane	10.5	2017	High
R10	Residential – Avenue North	0.6	2019	High
R11	School – St Peters Voluntary	1.8	2016	High
R12	Residential – King Richard's Hill	3.2.	2019	High
R13	Proposed Residential – West of site	1.2	2016	High
R14	Proposed Residential – South of Site	4.5	2016	High
R15	Proposed employment area – North of site	8.9	2019	Medium
R16	Proposed Residential – North of site	3.6	2017	High

- 5.1.3 Table 5.1 shows that the $C_{98,1hr}$ exceeds the 5 ou_E/m³ criterion at two highly sensitive receptors and one medium sensitive receptor and $C_{98,1hr}$ is between 3 and 5 ou_E/m³ criteria at three highly sensitive receptors. The maximum $C_{98,1hr}$ of 10.5 ou_E/m³ is predicted at existing sensitive receptor R9 (Mill Lane) in 2017.
- 5.1.4 The highest predicted odour concentrations, at sensitive receptors, occur when the 2017 meteorological dataset is used in the model, with the 2016 dataset predicting the second highest concentrations. Figure 5.1 and Figure 5.2 present the predicted isopleth concentrations for 2017 and 2016, with contour intervals of 10, 5 and 3 ou_E/m³. These indicate that a large proportion of the

proposed development is located outside the $C_{98,1hr}$ odour concentrations contour of $3 \text{ ou}_E/\text{m}^3$ odour criteria, where the risk of odour complaint is slight to negligible.

- 5.1.5 The Figures also indicate that $C_{98,1hr}$ $10 \text{ ou}_E/\text{m}^3$ odour contour interval extends across part of the proposed employment area with the $C_{98,1hr}$ 5 and $3 \text{ ou}_E/\text{m}^3$ odour contour interval extending towards the north and east of the WWTWs, where residential areas are proposed.
- 5.1.6 Following CIWEM indicators¹² for the likelihood of complaints associated with wastewater treatment facilities, complaints are highly likely for receptors with odour concentrations, represented as $C_{98,1hr}$, larger than $10 \text{ ou}_E/\text{m}^3$. IAQM guidance⁹ indicates that there is a substantial risk of complaints for employment area receptors in areas above the $10 \text{ ou}_E/\text{m}^3$ odour contour and moderate risk of complaints for dwelling receptors between 3 and $10 \text{ ou}_E/\text{m}^3$ odour contours. Based on the modelling results, this would indicate that complaints may occur for existing dwelling such as receptors R8 (Columbus Lane) and R9 (Mill Lane). However, HBBC Environmental Health Officer (EHO) stated that they have not received any complaints relating to odour from the Mill Lane WWTWs in Earl Shilton¹⁹, within the past 10 years, including after the upgrade of the WWTWs. This would suggest that the predicted odour concentrations are larger than what is observed at existing residential receptors or that existing residential receptors in this area are less sensitive or accustomed to some level of odour being located near agricultural land. This suggests that the risk of odour complaint from these areas might be lower than predicted.
- 5.1.7 Odour modelling assessments are highly sensitive to the input data used, such as emission rates and meteorological data. This assessment was undertaken using library data, representing a low to moderate level of odour emissions and were selected to provide a worst-case assessment approach.

¹⁹ Email received from HBBC EHO on 27/10/2020

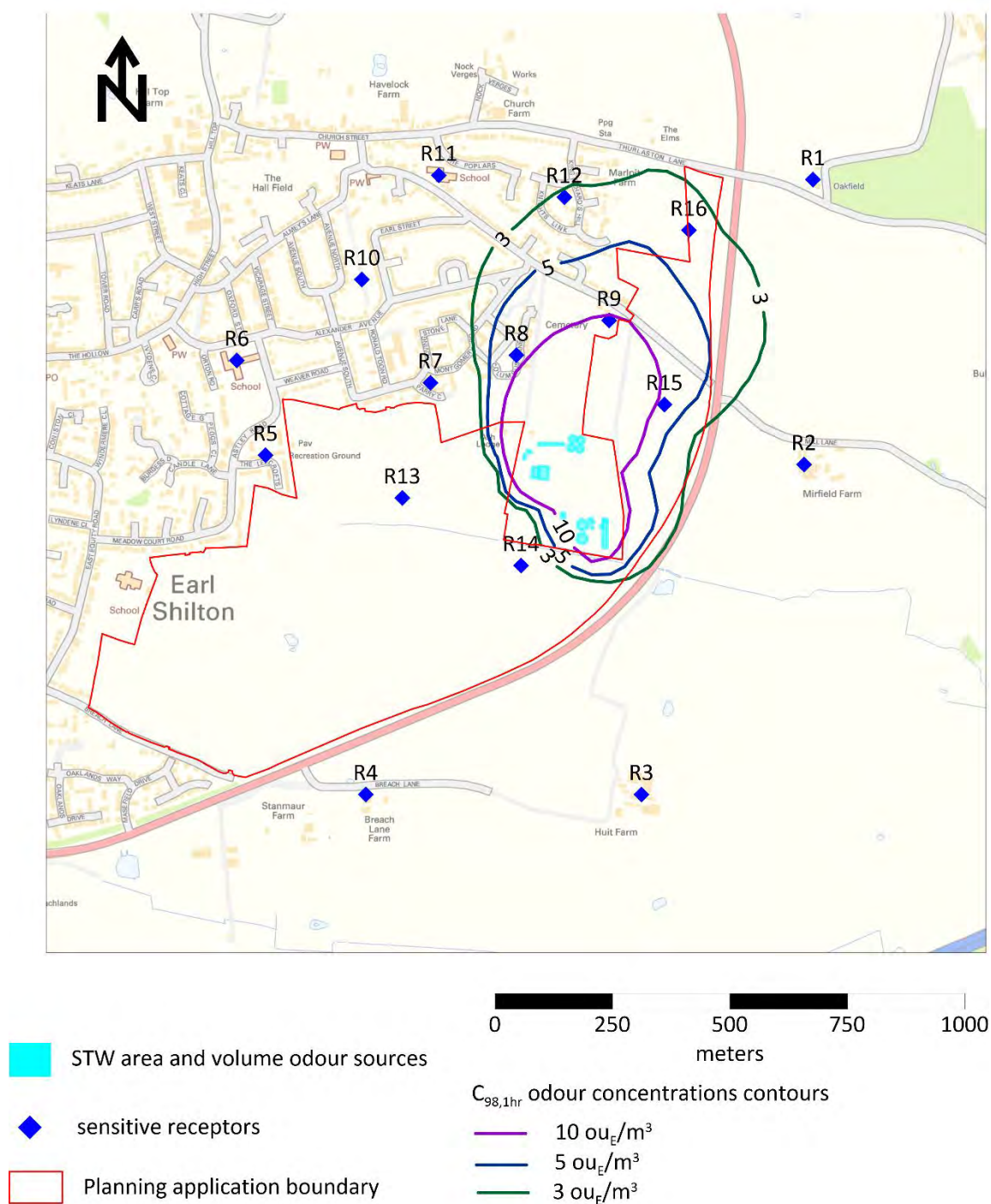
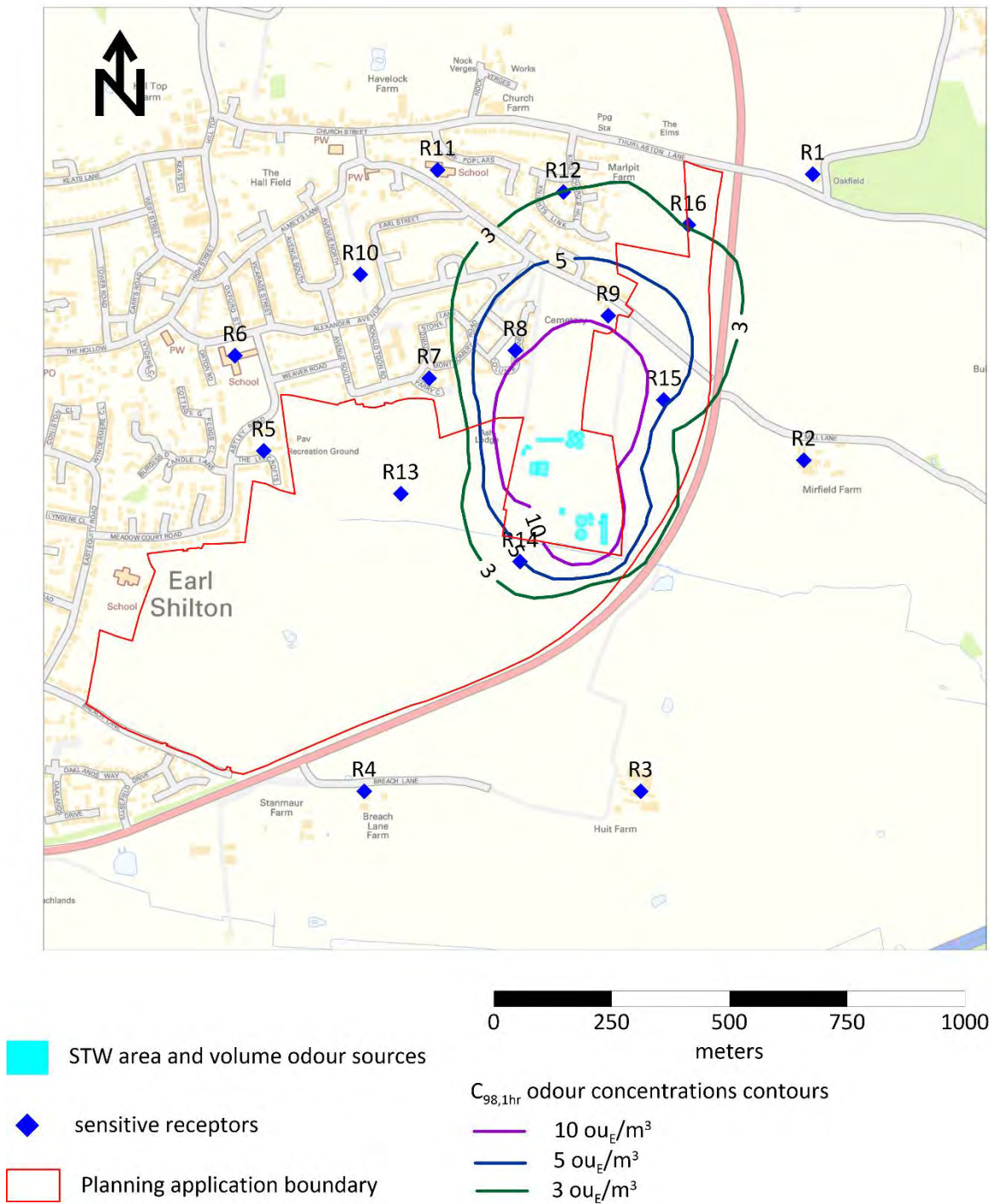
Figure 5.1 $C_{98,1hr}$ odour concentrations predicted with 2017 meteorological data (ou_E/m^3)

Figure 5.2 $C_{98,1hr}$ odour concentrations predicted with 2016 meteorological data (ou_E/m^3)

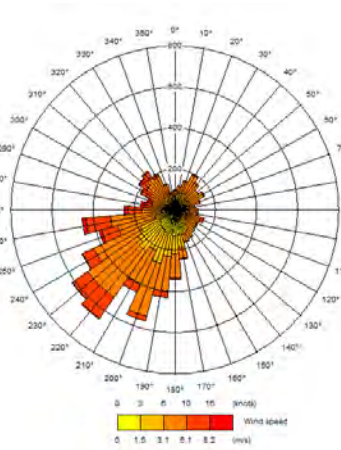
6. Conclusion

- 6.1.1 Detailed dispersion modelling has been undertaken with five years of meteorological data (2015-2019) from the Church Lawford meteorological station. The dispersion modelling indicated that the 2017 meteorological data resulted in the worst-case scenario for the WWTWs.
- 6.1.2 The results of this odour impact assessment indicate that the majority of the proposed residential areas is located outside the $C_{98,1hr}$ odour concentrations contour of 3 ou_E/m³ odour criteria, where the risk of odour complaint is slight to negligible.
- 6.1.3 The results predict odour concentrations at existing and proposed highly sensitive receptors above the 3 and 5 ou_E/m³ odour criteria, represented as $C_{98,1hr}$, at several locations and proposed employment areas with odour concentrations as $C_{98,1hr}$ above 10 ou_E/m³ odour criteria. This suggests there is a moderate risk of odour complaints from the proposed residential areas.
- 6.1.4 Although proposed and existing residential areas are located within zones which are predicted to be at a moderate risk of complaints, there have been no complaints received by HBBC relating to odour from the Earl Shilton WWTWs for the past 10 years¹⁹. This suggests that either the predicted odour concentrations are higher than the odour concentrations observed at the existing receptors or that the existing receptors are less sensitive to some level of odour being located in proximity to an agricultural environment. This suggests that the risk of odour complaint from these areas might be lower than predicted.

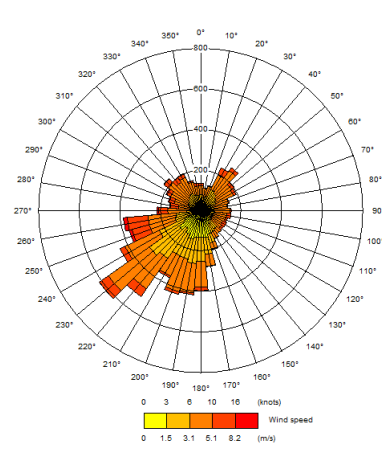
Annex A

Wind roses for Church Lawford meteorological data

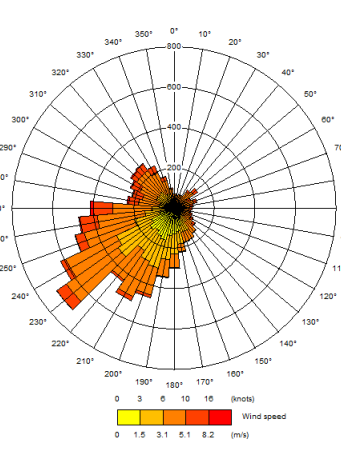
2015



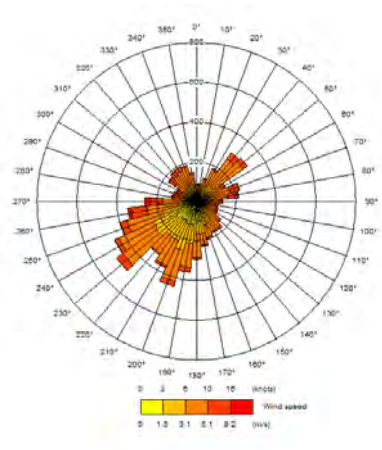
2016



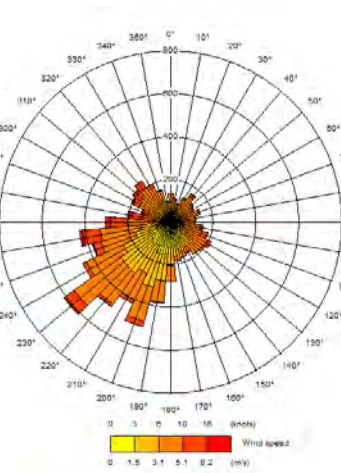
2017



2018



2019



Annex B

C_{98th,1hr} odour concentrations contour plots for all years modelled (2015 – 2019)

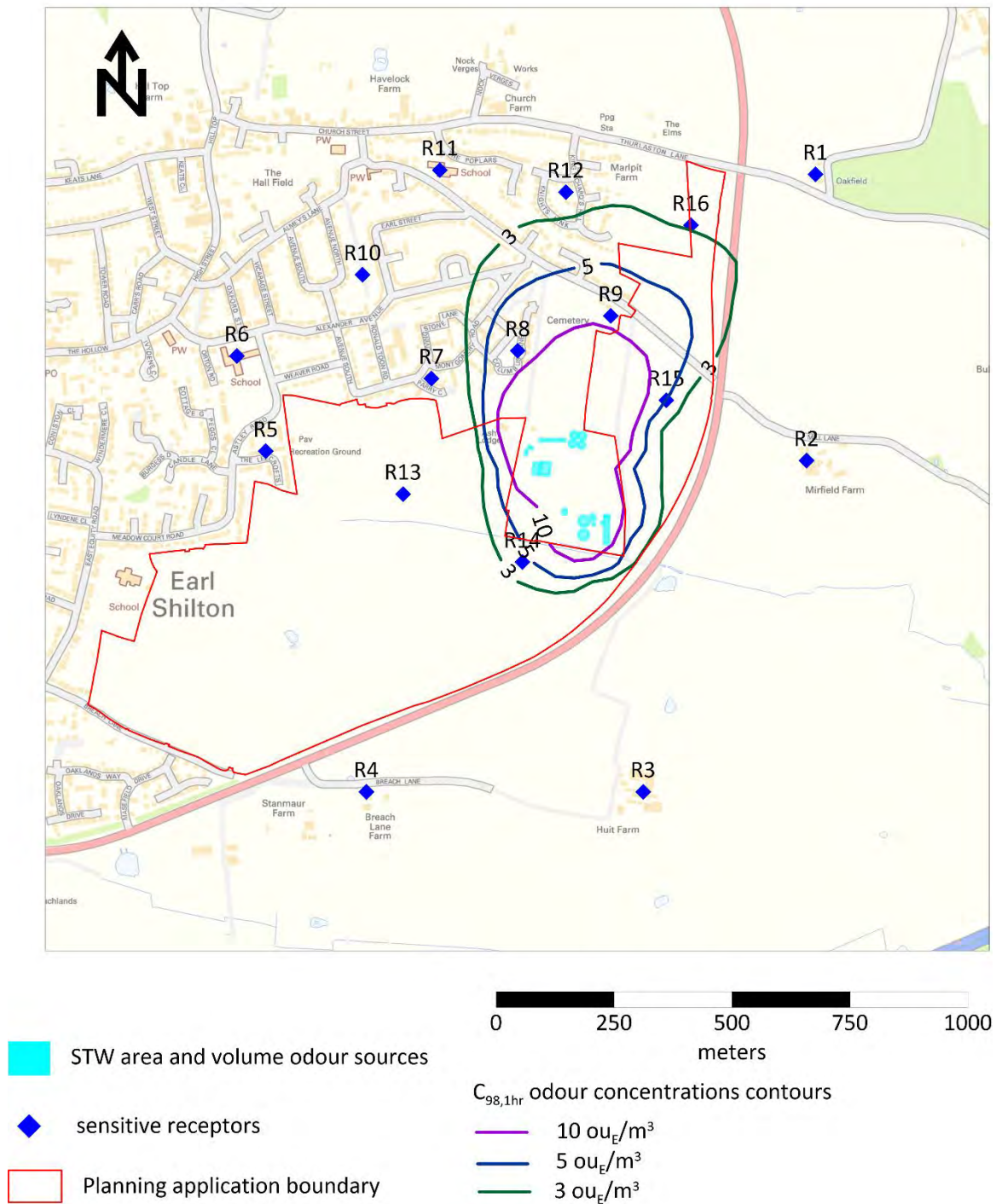
Figure B.1 $C_{98th,1hr}$ odour concentrations predicted with 2015 meteorological data (ou_E/m^3)

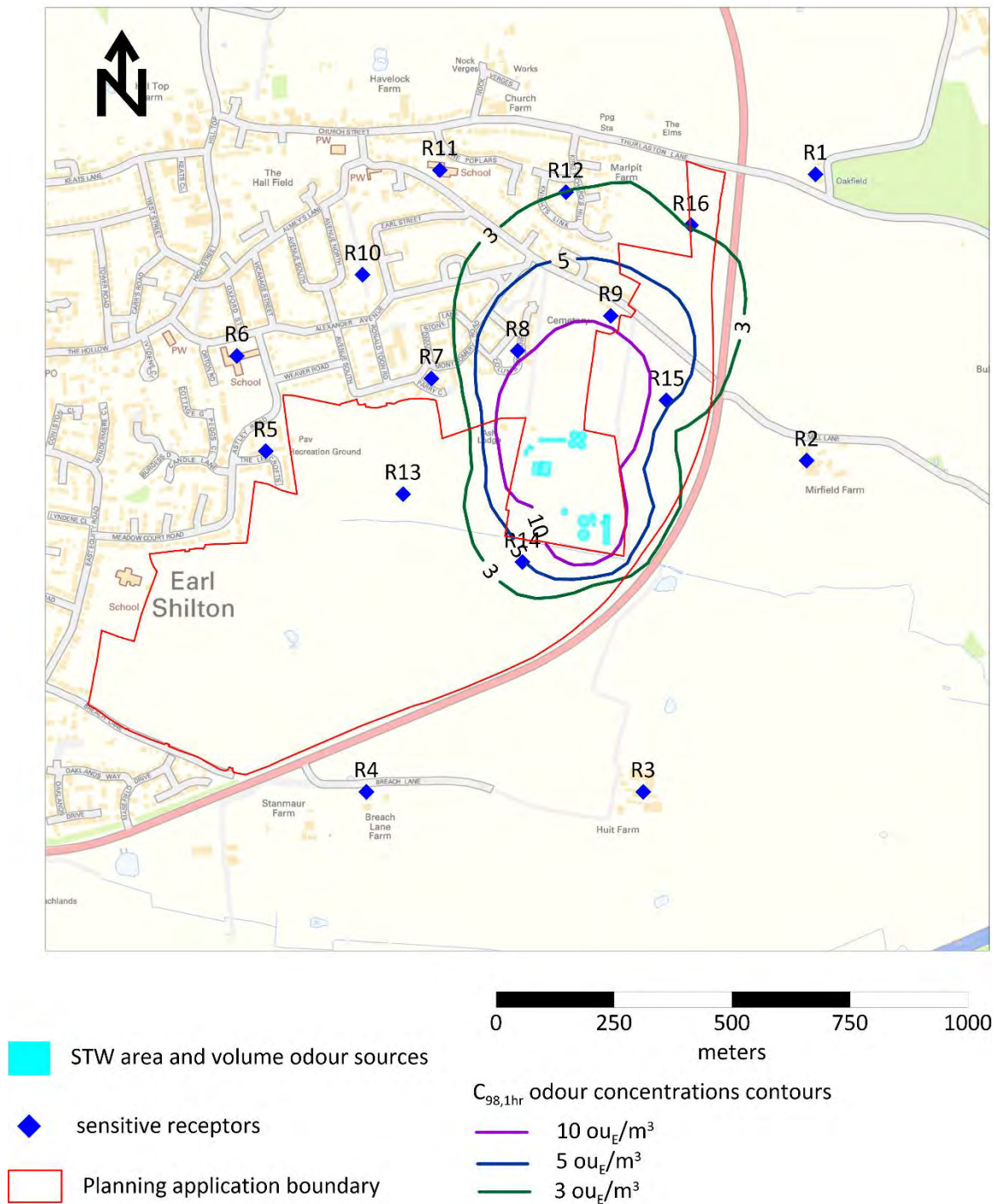
Figure B.2 $C_{98th,1hr}$ odour concentrations predicted with 2016 meteorological data (ou_E/m^3)

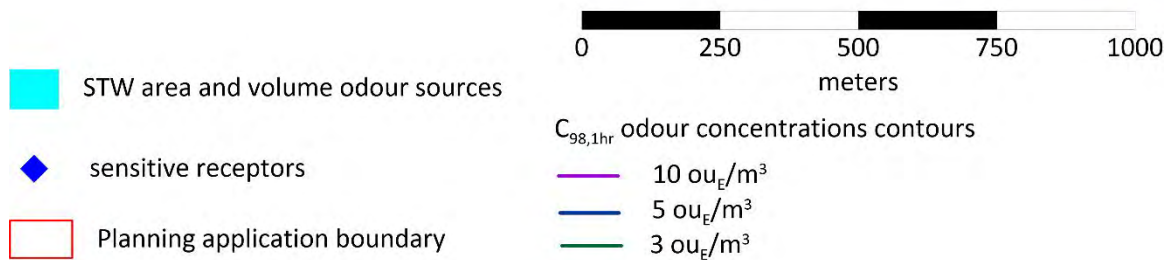
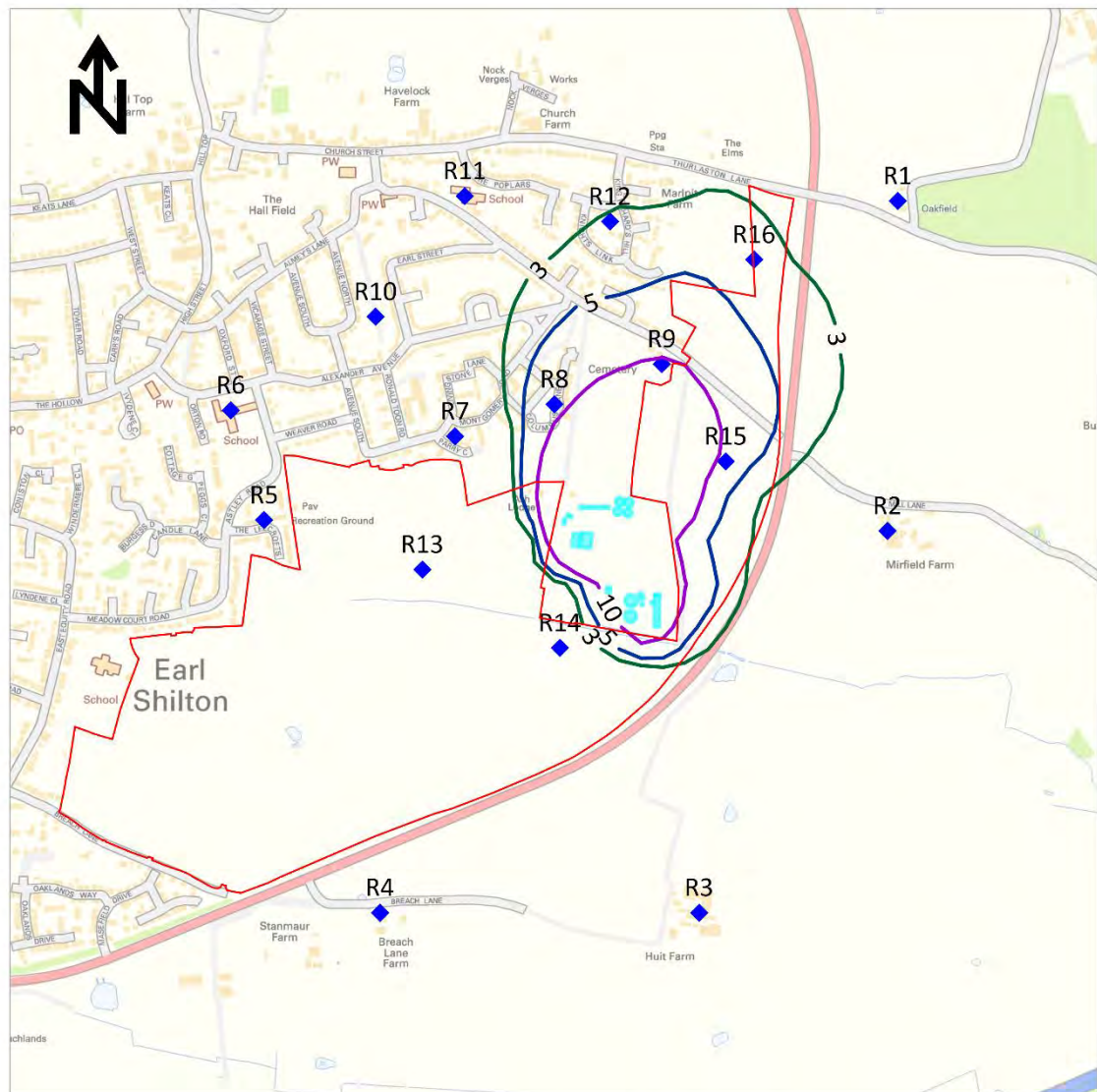
Figure B.3 $C_{98th,1hr}$ odour concentrations predicted with 2017 meteorological data (ou_E/m^3)

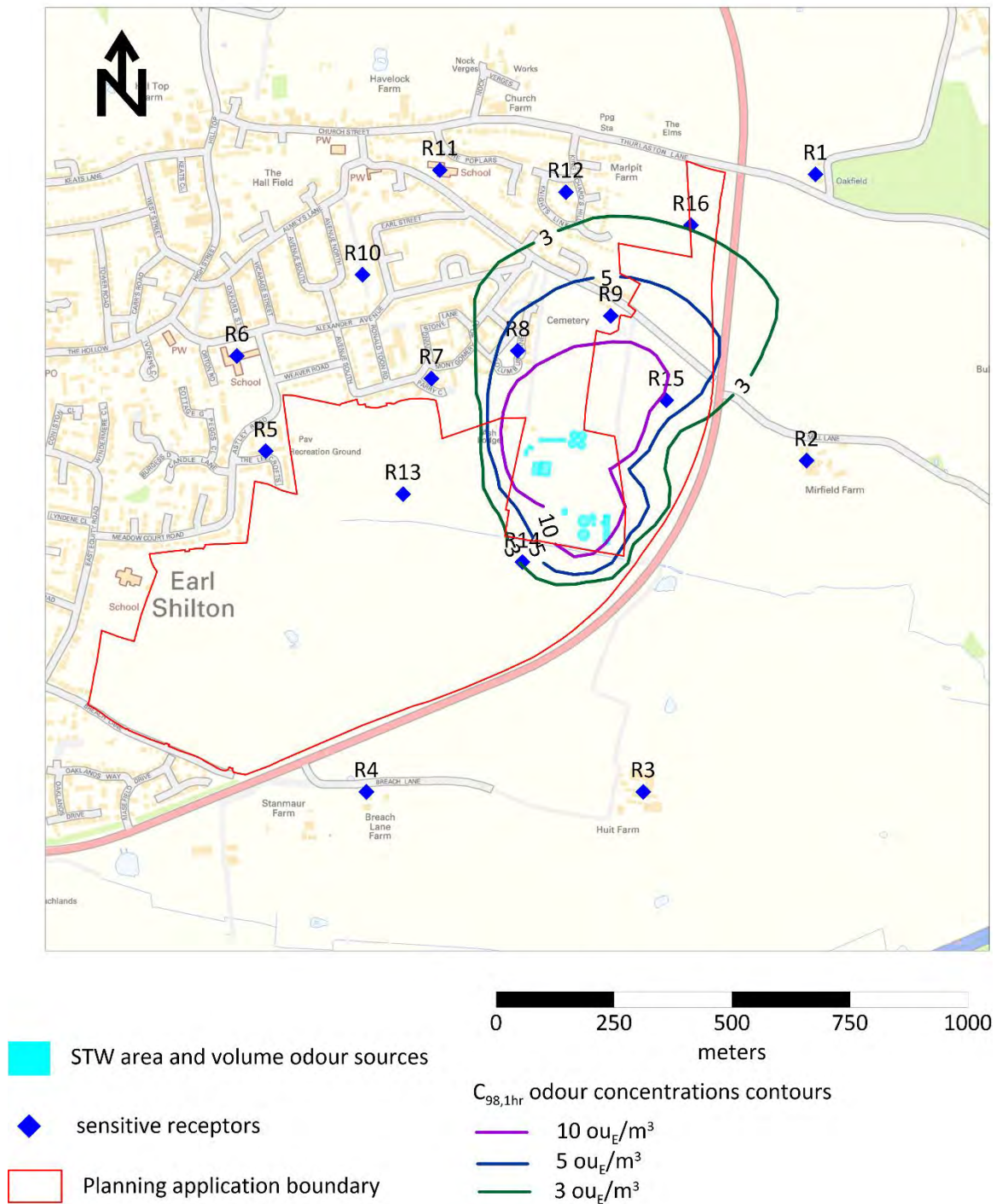
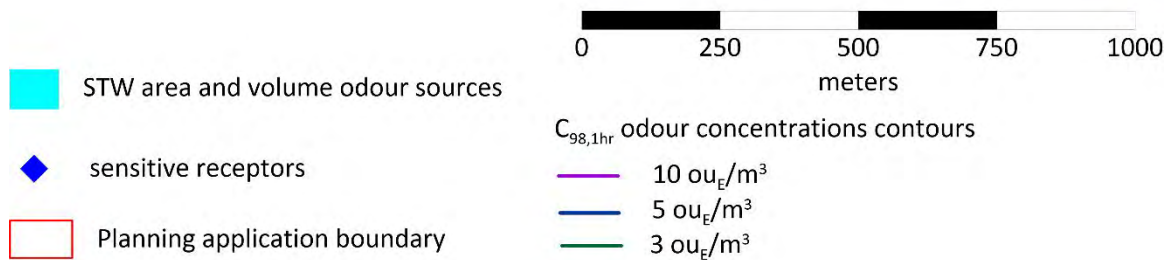
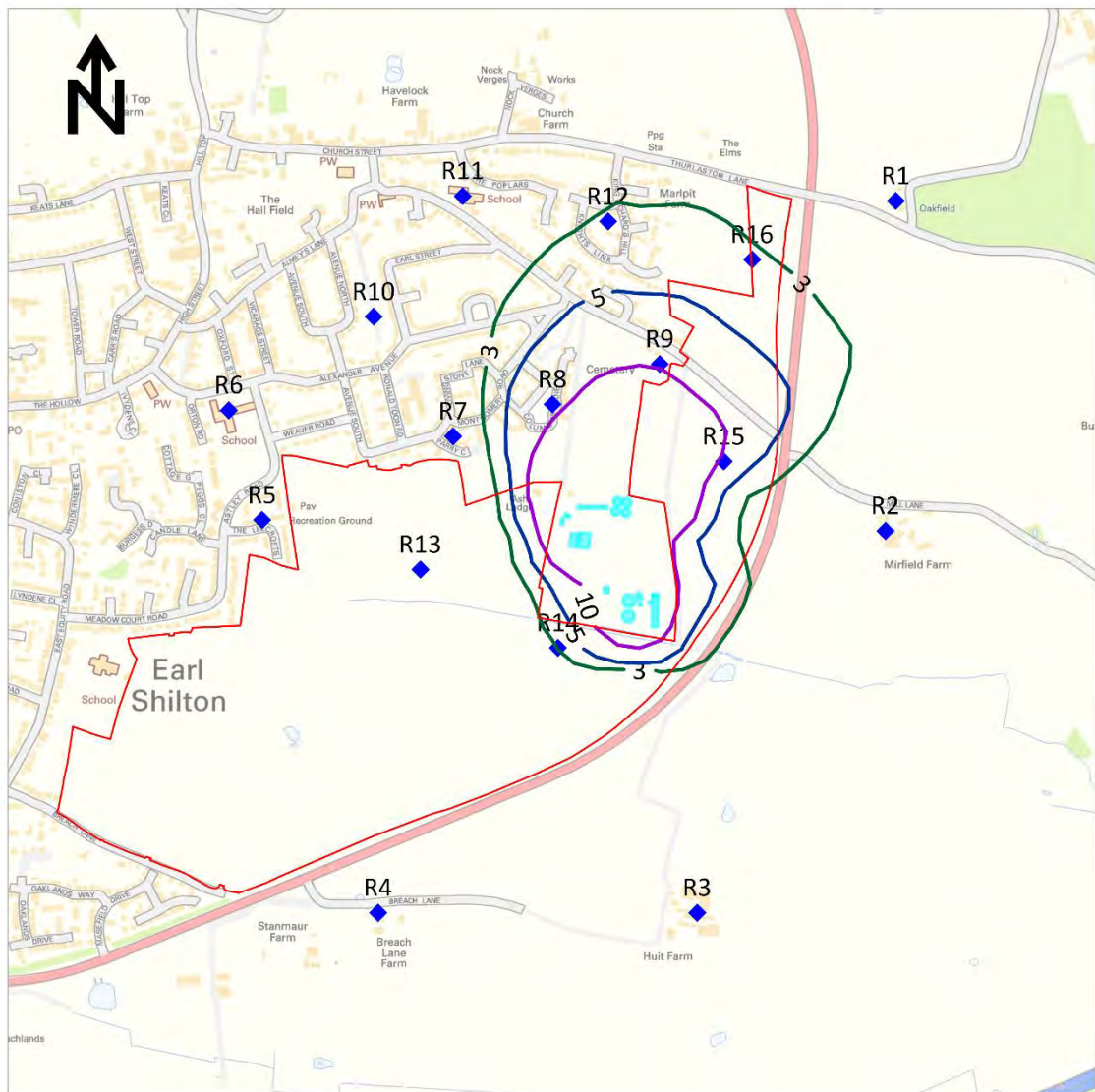
Figure B.4 $C_{98th,1hr}$ odour concentrations predicted with 2018 meteorological data (ou_E/m^3)

Figure B.5 $C_{98th,1hr}$ odour concentrations predicted with 2019 meteorological data (ou_E/m^3)



Appendix 6C

ADMS-Roads input

The full list of receptors modelled using ADMS-Roads is presented in **Table 6C1** and their locations are represented in **Figure 6C1** to **6C3**.

Table 6C1 Modelled receptors

Receptor ID	Location	Type	X	Y
R1	Knoll Farm, Hinckley Rd	Existing residential	449056	300268
R2	Shelbrooke House, Hinckley Rd	Existing residential	449638	301127
R3	Hinckley Rd	Existing residential	450091	301521
R4	Bungalow Farm, Hinckley Rd	Existing residential	448092	299543
R5	The Station, Leicester Rd	Existing residential	447266	299001
R6	Masefield PI	Existing residential	446842	296847
R7	Masefield PI	Existing residential	446778	296816
R8	Masefield Dr	Existing residential	446687	296788
R9	Oaklands Dr	Existing residential	446531	296747
R10	Station Rd	Existing residential	446249	296787
R11	Wentworth Av	Existing residential	445991	296722
R12	St Marys Way	Existing residential	445869	296634
R13	Station Rd	Existing residential	445940	296529
R14	Station Rd	Existing residential	446030	296487
R15	Station Rd	Existing residential	446151	296453
R16	Station Rd	Existing residential	446257	296444
R17	Clickers Way	Existing residential	445607	296439
R18	Inglenook Farm, Leicester Rd	Existing residential	445302	296580
R19	The Common	Existing residential	444924	296359
R20	The Common	Existing residential	444917	296447
R21	The Common	Existing residential	44485	296494
R22	Leicester Rd	Existing residential	445058	296037
R23	Normandy Way	Existing residential	443340	295813

Receptor ID	Location	Type	X	Y
R24	Normandy Way	Existing residential	443207	295747
R25	Ashby Rd	Existing residential	443063	295780
R26	Ashby Rd	Existing residential	443116	295857
R27	Normandy Way	Existing residential	443035	295686
R28	Normandy Way	Existing residential	442964	295694
R29	Ashby Rd	Existing residential	443127	295681
R30	Ashby Rd	Existing residential	443093	295638
R31	Ashby Rd	Existing residential	443148	295616
R32	Station Rd	Existing residential	446257	296861
R33	Station Rd	Existing residential	446262	296993
R34	Station Rd	Existing residential	446332	297130
R35	Station Rd	Existing residential	446361	297274
R36	Station Rd	Existing residential	446418	297435
R37	Station Rd	Existing residential	446435	297641
R38	The Hollow	Existing residential	446510	297762
R39	The Hollow	Existing residential	446692	297788
R40	High St	Existing residential	446795	297871
R41	Alexander Av	Existing residential	446837	297806
R42	Alexander Av	Existing residential	446966	297833
R43	Alexander Av	Existing residential	447151	297847
R44	Alexander Av	Existing residential	447313	297897
R45	Alexander Av	Existing residential	447526	297943
R46	Mill Lane	Existing residential	447621	297938
R47	Mill Lane	Existing residential	447731	297887
R48	Primary School, Astley Rd	Existing Primary School	446904	297782
R49	B4668 Leicester Rd	Existing residential	444341	295348
R50	B4668 Leicester Rd	Existing residential	443996	295214
R51	B4668 Leicester Rd	Existing residential	443890	295095
R52	B4668 Leicester Rd	Existing residential	443864	295031

Receptor ID	Location	Type	X	Y
R53	Astley Road	Existing residential	446971	297783
R54	Astley Road	Existing residential	446951	297602
F1	Proposed Development	Future residential	447358	297061
F2	Proposed Development	Future residential	446947	296905
F3	Proposed Development	Future residential	447194	296996
F4	Proposed Development	Future residential	447546	297151
F5	Proposed Development	Future residential	447702	297267
F6	Proposed Development	Future residential	447849	297508
F7	Proposed Development	Future residential	447898	297651
F8	Proposed Development	Future residential	447902	297818
F9	Proposed Development	Future residential	447911	297954
F10	Proposed Development	Future residential	447931	298123
Eco1	Burbage Common and Woods LRN	Ecological	444728	295422
Eco2	Burbage Common and Woods LRN	Ecological	444667	295203

Figure 6C1 Modelled receptors and roads links 1/2

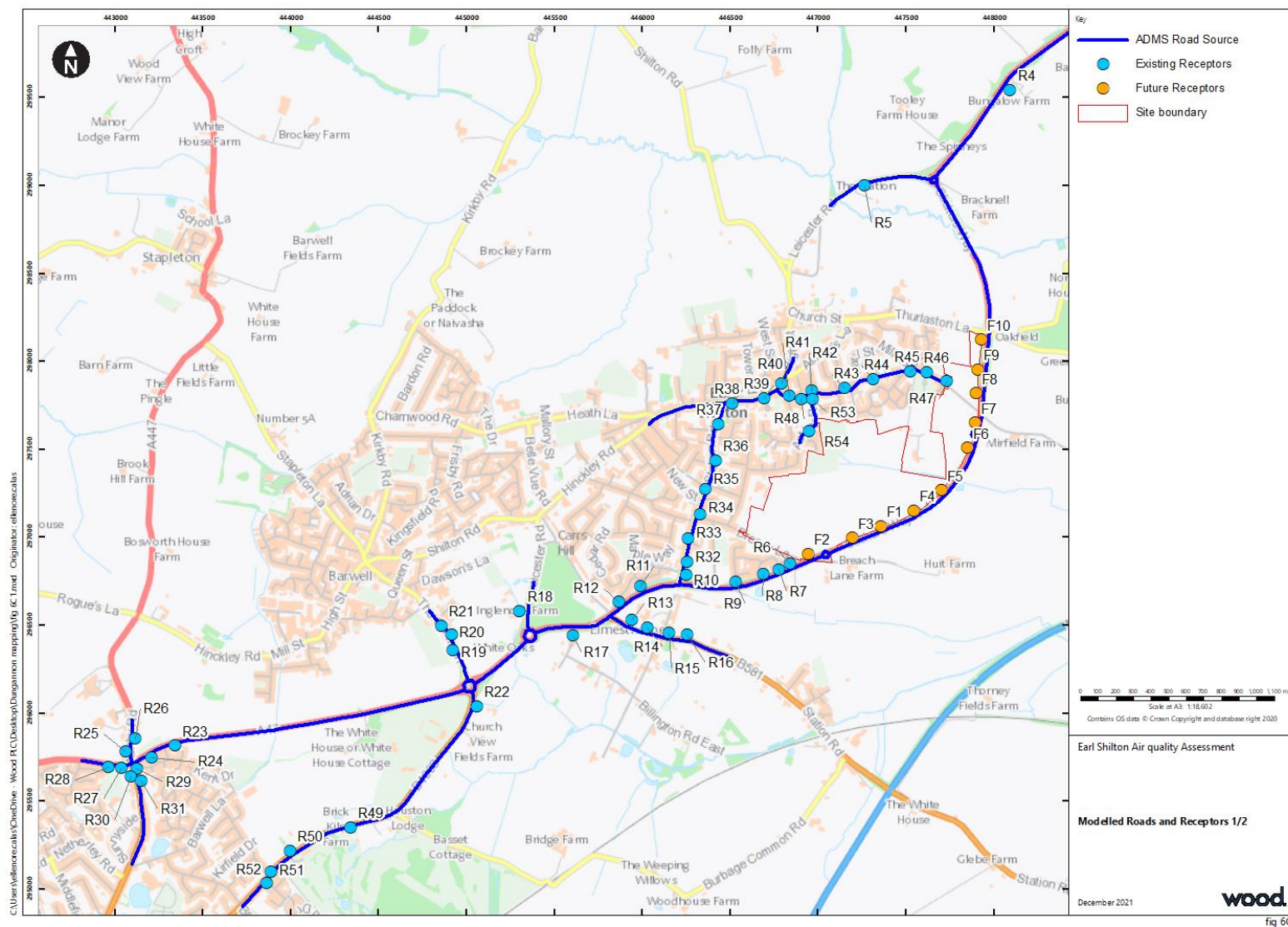


Figure 6C2 Modelled receptors and roads links 2/2

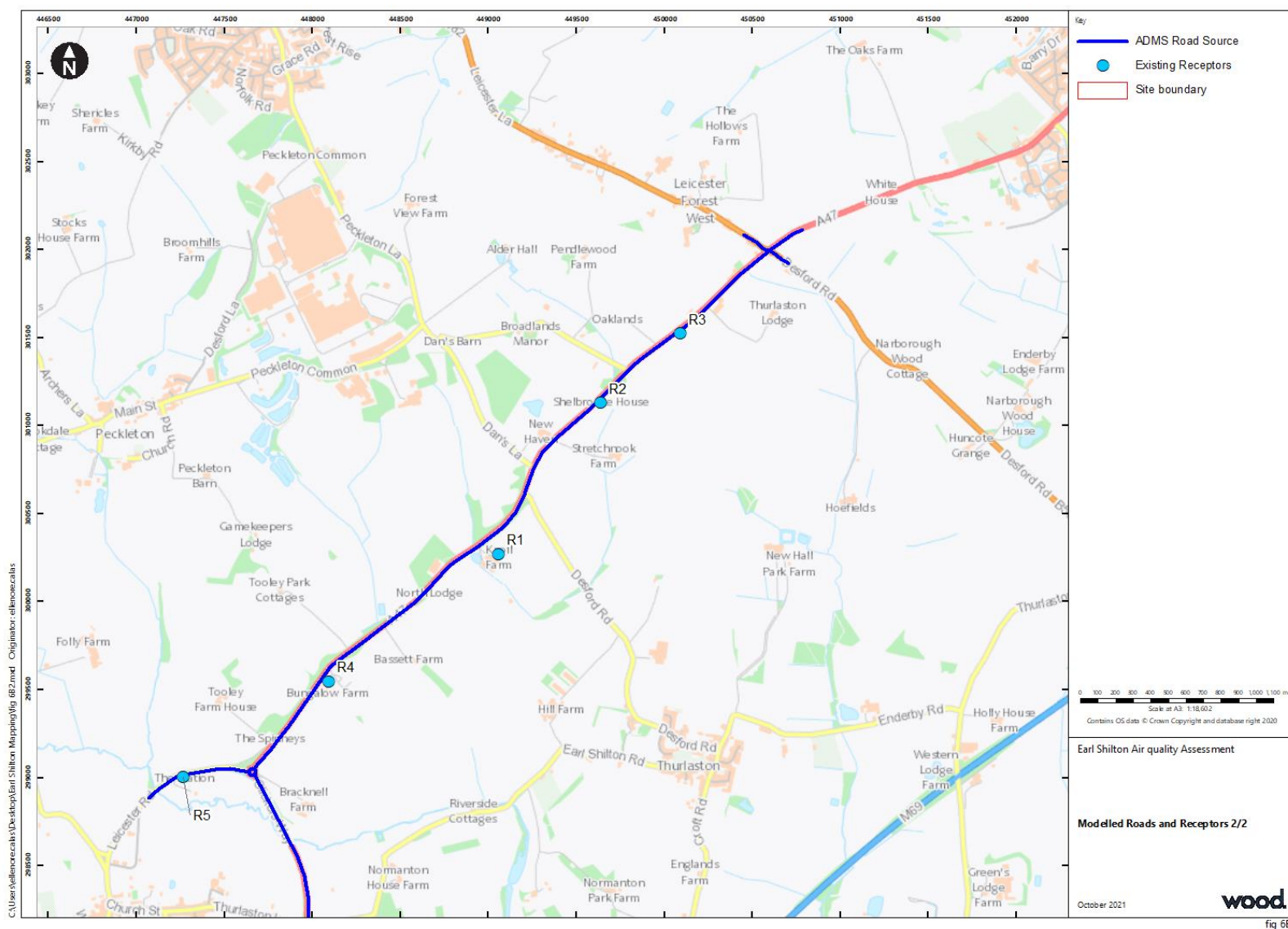


Figure 6C3 Burbage Common and Woods LRN receptors modelled

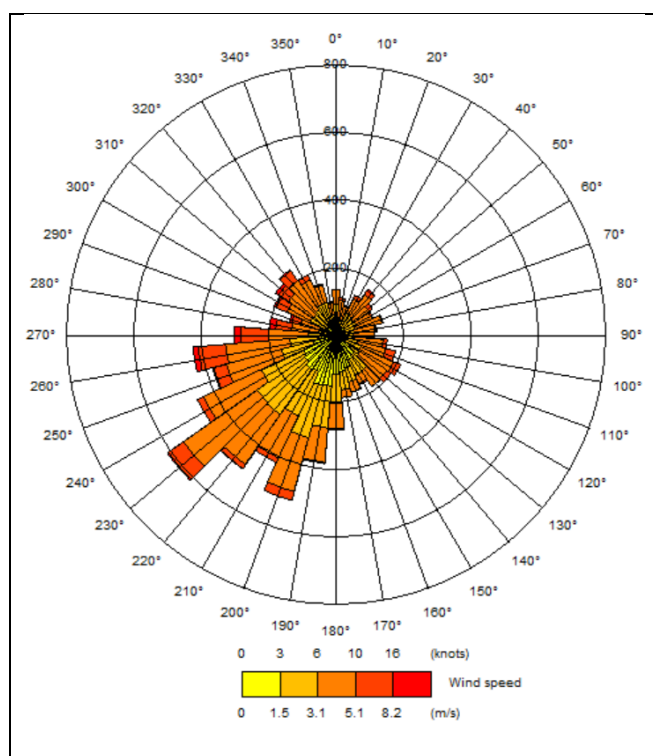


Meteorological data

Detailed dispersion modelling requires hourly sequential meteorological data from a representative synoptic observing station. Hourly sequential meteorological data was obtained for the year 2019 for Church Lawford, which is considered to provide representative data for the Proposed Development site. The station is located approximately 23km to the south of the site. The meteorological data for 2019 has been used with monitoring data from 2019 in the traffic assessment and model verification.

Figure 6C4 summarises the hourly wind speed and wind direction for the meteorological data as a wind rose. The windrose shows a predominance of winds from the south-west which the usual pattern is observed in the south of England.

Figure 6C4 Church Lawford wind rose for 2019



Road traffic

Table 6C2 shows the traffic data used in the dispersion modelling. Traffic data comprising AADT and numbers of different vehicle types, was obtained from Wood's transport team.

Table 6C2 ADMS-Roads input data

Road Name	ID	2019 AADT	2019 HDV %	2026 Without Development AADT	2026 Without Development HDV %	2026 With Development AADT	2026 With Development HDV %	Speed (kmh ⁻¹)
A47 (Hinkley Road North) - North of junction with B582	1	15,477	8.1%	18,840	7.9%	19,241	8.0%	97
B582 Desford Lane - South of junction with A47	2	15,956	4.3%	20,912	4.4%	21,069	4.4%	97
A47 (Hinkley Road South) - South of junction with B582	3	16,241	7.8%	20,915	8.2%	21,651	8.2%	80
B582 Leicester Lane - Northwest of junction with A47	4	11,214	2.7%	14,818	2.7%	14,793	2.7%	64
Leicester Road - West of junction with A47	5	5,745	4.3%	6,882	4.4%	6,795	4.4%	80
A47 Clickers Way - North of junction with the proposed site access (north)	6	10,738	5.6%	12,858	5.7%	12,096	5.6%	97
A47 Clickers Way - South of junction with the proposed site access (north)	7	10,738	5.6%	12,858	5.7%	10,074	5.4%	97
A47 Clickers Way - Northeast of junction with Masfield Drive	8	10,738	5.6%	12,858	5.7%	17,447	5.5%	64
A47 Clickers Way - Southwest of junction with Masfield Drive	9	11,226	5.5%	13,363	5.6%	17,957	5.4%	64
Masfield Drive - North of junction with A47	10	976	1.9%	1,005	1.9%	1,005	1.9%	48
A47 Clickers Way - West of junction with Wilkinson Lane	11	14,738	4.0%	17,306	4.0%	21,110	3.9%	64
Wilkinson Lane - North of junction with A47	12	6,057	1.4%	5,804	1.3%	4,987	1.4%	48
Station Road - South of junction with A47	13	12,392	2.8%	13,172	2.8%	13,359	2.8%	64

Road Name	ID	2019 AADT	2019 HDV %	2026 Without Development AADT	2026 Without Development HDV %	2026 With Development AADT	2026 With Development HDV %	Speed (kmh ⁻¹)
A47 - Southwest of junction with Station Road	14	20,888	3.6%	23,562	3.6%	26,842	3.5%	64
A47 - Southwest of junction with Leicester Road	15	30,740	3.4%	34,528	3.4%	37,025	3.4%	64
Leicester Road - North of junction with A47	16	12,502	1.7%	14,141	1.6%	13,691	1.7%	64
B4668 Leicester Road - South of junction with A47	17	17,724	1.7%	19,760	1.7%	21,003	1.7%	80
A47 Normandy Road - West of junction with B4668 and The Common	18	15,249	3.4%	18,076	3.4%	18,929	3.4%	97
The Common - North of junction with A47	19	7,450	1.6%	8,564	1.6%	7,781	1.6%	48
B4667 Ashby Road - South of junction with A47	20	16,344	1.7%	15,624	1.6%	15,740	1.6%	64
A47 Normandy Road - West of junction with Ashby Road	21	19,176	3.5%	21,180	3.6%	21,835	3.5%	64
A447 Ashby Road - North of junction with A47	22	18,003	1.8%	15,517	1.7%	15,828	1.7%	64
Mill Lane At Site Access	23	43	0.0%	47	0.0%	1,814	0.0%	48
Alexander Avenue - South of Mill Lane	24	718	18.5%	753	18.6%	1,154	18.6%	48
Astley Road (South of Alexander Avenue)	25	1,276	13.4%	1,382	13.4%	3,604	13.4%	48
Astley Road (South of the Proposed Site Access)	26	1,276	13.4%	1,382	13.4%	1,606	13.5%	48
Alexander Avenue - West of junction with Astley Road	27	711	14.2%	706	14.2%	1,573	14.3%	48

Road Name	ID	2019 AADT	2019 HDV %	2026 Without Development AADT	2026 Without Development HDV %	2026 With Development AADT	2026 With Development HDV %	Speed (kmh ⁻¹)
High Street - South of junction with Alexander Avenue	28	5,772	15.1%	6,160	15.0%	7,152	15.0%	48
High Street - North of junction with Alexander Avenue	29	4,873	20.5%	5,234	20.7%	5,385	20.8%	48
Wood Street - West of junction with Station Road	30	6,632	15.1%	6,888	15.0%	7,436	15.0%	32

Appendix 6D

ADMS-Roads model

Introduction

The ADMS-Roads dispersion model, developed by CERC⁶, is a tool for investigating air pollution problems due to small networks of roads that may be in combination with industrial sites, for instance small towns or rural road networks. It calculates pollutant concentrations over specified domains at high spatial resolution (street scale) and in a format suitable for direct comparison with a wide variety of air quality standards for the UK and other countries. The latest version of the model, version 3.1.4, was used in this study.

ADMS-Roads is referred to as an advanced Gaussian or, new generation, dispersion model as it incorporates the latest understanding of the boundary layer structure. It differs from old generation models such as ISC, R91 and CALINE in two main respects:

- It characterises the boundary layer structure and stability using the boundary layer depth and Monin-Obukhov length to calculate height-dependent wind speed and turbulence, rather than using the simpler Pasquill-Gifford stability category approach; and
- It uses a skewed-Gaussian vertical concentration profile in convective meteorological conditions to represent the effect of thermally generated turbulence.

Model Features

A description of the science used in ADMS-Roads and the supporting technical references can be found in the model's User Guide¹. The main features of ADMS-Roads are:

- it is an advanced gaussian, "new generation" dispersion model;
- includes a meteorological pre-processor which calculates boundary layer parameters from a variety of input data e.g. wind speed, day, time, cloud cover and air temperature;
- models the full range of source types encountered in urban areas including industrial sources (up to 3 point sources, up to 3 lines sources, up to 4 area sources, up to 25 volume sources) and road sources (up to 150 roads, each with 50 vertices);
- generates output in terms of average concentrations for averaging times from 15 minutes to 1 year, percentile values and exceedances of threshold values. averages can be specified as rolling (running) averages or maximum daily values;
- the option to calculate emissions from traffic count data, speed and fleet split (light duty/ heavy duty vehicles) using UK emission factors, alternatively, road emissions may be entered directly as user specified values;
- models plume rise by solving the integral conservation equations for mass, momentum and heat;
- models the effect of street canyons on concentrations within the canyon and vehicle-induced turbulence using a formulation based on the Danish OSPM model. it is usually only important to

¹ CERC (2011) ADMS-Roads, an Air Quality Management System, Version 3.1 User Guide (Online). Available at: http://www.cerc.co.uk/environmental-software/assets/data/doc_userguides/CERC_ADMS-Roads3.1_User_Guide.pdf (Accessed 19 October 2012).

model street canyons when the aspect ratio (ratio of the height of buildings along the road to the width of the road) is greater than 0.5;

- models the effects of noise barriers on concentrations outside the road;
- models NO_x chemistry using the 8 reaction generic reaction set plus transformation of SO₂ to sulphate particles, which are added to the PM₁₀ concentration;
- models the effect of a small number of buildings on dispersion from point sources;
- Models the effect of complex terrain (hills) and spatially varying surface roughness. terrain effects only become noticeable for gradients greater than 1:10, but for ground level sources in a built up area, such as urban roads, low gradients will have a negligible effect;
- models concentrations in units of $\mu\text{g m}^{-3}$ for odour studies;
- link to mapinfo and ArcGIS for input of source geometry, display of sources, aggregation of emissions and plotting of contours; and
- link to an emissions inventory in Microsoft Access for input and export of source and emissions data.

In this study noise barriers, buildings and complex terrain were not modelled.

Validation

ADMS-Roads has been validated using UK and US data and has been compared with the DMRB spreadsheet model and the US model, CALINE. Validation of the ADMS and ADMS-Urban models are also applicable to the performance of ADMS-Roads as they test common features: basic dispersion, modelling of roads and street canyons, the effect of buildings and the effect of complex terrain. These validation studies are all reported on the CERC web site². In addition, ADMS-Urban has been validated during its use in modelling many urban areas in the UK for local authorities as part of LAQM, Heathrow Airport for the Department for Transport³ and all of Greater London for a Defra model inter-comparison exercise⁴.

² CERC (2021). Model Validation (Online). Available at: <https://www.cerc.co.uk/environmental-software/model-validation.html> (Accessed 09 December 2021)

³ CERC (2007) Air Quality Studies for Heathrow: Base Case, Segregated Mode, Mixed Mode and Third Runway Scenarios Modelled Using ADMS-Airport, prepared for the Department for Transport, HMSO Product code 78APD02904CERC

⁴ Carslaw, D. (2011), Defra urban model evaluation analysis – Phase 1, a report to Defra and the Devolved Authorities. (Online) Available at: http://uk-air.defra.gov.uk/library/reports?report_id=654 (Accessed 19 October 2012)

Appendix 6E

ADMS-Roads model results

Table 6E1 Annual mean NO₂ predicted concentrations (µgm⁻³)

Model ID	2019	2026 Do Minimum	2026 Do Maximum	Difference	% AQO of difference	Impact Descriptor
R1	19.8	8.7	8.7	0.02	0%	Negligible
R2	22.4	11.0	11.1	0.10	0%	Negligible
R3	11.7	11.0	11.1	0.09	0%	Negligible
R4	11.1	9.6	9.6	0.04	0%	Negligible
R5	11.3	8.8	8.8	0.00	0%	Negligible
R6	15.0	10.6	11.2	0.52	1%	Negligible
R7	15.0	10.9	11.5	0.62	2%	Negligible
R8	12.8	11.5	12.3	0.77	2%	Negligible
R9	11.6	10.5	11.0	0.46	1%	Negligible
R10	14.5	11.7	12.0	0.29	1%	Negligible
R11	15.0	10.3	10.6	0.31	1%	Negligible
R12	15.5	11.7	12.2	0.49	1%	Negligible
R13	14.4	10.6	10.7	0.16	0%	Negligible
R14	16.4	10.7	10.8	0.08	0%	Negligible
R15	14.0	10.7	10.7	0.07	0%	Negligible
R16	16.2	10.4	10.5	0.06	0%	Negligible
R17	14.6	10.1	10.3	0.18	0%	Negligible
R18	14.8	10.8	11.0	0.14	0%	Negligible
R19	14.8	10.8	10.8	-0.01	0%	Negligible
R20	14.4	11.4	11.3	-0.11	0%	Negligible
R21	13.7	10.9	10.8	-0.09	0%	Negligible
R22	14.7	12.5	12.7	0.25	1%	Negligible
R23	14.5	12.1	12.2	0.11	0%	Negligible
R24	15.6	12.8	13.0	0.13	0%	Negligible
R25	14.7	12.2	12.2	0.08	0%	Negligible

Model ID	2019	2026 Do Minimum	2026 Do Maximum	Difference	% AQO of difference	Impact Descriptor
R26	17.7	12.3	12.3	0.07	0%	Negligible
R27	16.8	12.2	12.3	0.08	0%	Negligible
R28	17.9	12.4	12.5	0.09	0%	Negligible
R29	17.4	14.8	14.9	0.10	0%	Negligible
R30	18.0	11.3	11.3	0.04	0%	Negligible
R31	17.2	12.3	12.3	0.04	0%	Negligible
R32	17.6	11.0	11.0	0.00	0%	Negligible
R33	22.1	10.2	10.2	-0.04	0%	Negligible
R34	15.6	10.4	10.3	-0.10	0%	Negligible
R35	17.8	10.5	10.3	-0.14	0%	Negligible
R36	15.4	10.3	10.2	-0.13	0%	Negligible
R37	14.1	10.7	10.6	-0.12	0%	Negligible
R38	14.2	12.8	13.3	0.43	1%	Negligible
R39	14.5	10.5	10.7	0.24	1%	Negligible
R40	14.2	12.7	13.0	0.34	1%	Negligible
R41	14.9	9.7	10.0	0.31	1%	Negligible
R42	18.2	10.0	10.9	0.87	2%	Negligible
R43	14.6	8.9	9.0	0.14	0%	Negligible
R44	17.8	8.8	8.9	0.10	0%	Negligible
R45	12.8	8.9	9.1	0.21	1%	Negligible
R46	13.1	8.7	9.1	0.38	1%	Negligible
R47	11.7	8.8	9.0	0.22	1%	Negligible
R48	11.6	9.4	9.6	0.24	1%	Negligible
R49	11.7	12.1	12.4	0.23	1%	Negligible
R50	11.3	11.7	11.8	0.14	0%	Negligible
R51	11.4	14.1	14.4	0.29	1%	Negligible
R52	12.2	12.7	12.9	0.20	0%	Negligible
R53	17.4	9.3	10.2	0.86	2%	Negligible
R54	16.1	9.5	9.6	0.10	0%	Negligible
F1	N/a	N/a	10.3	N/a	N/a	N/a

Model ID	2019	2026 Do Minimum	2026 Do Maximum	Difference	% AQO of difference	Impact Descriptor
F2	N/a	N/a	10.5	N/a	N/a	N/a
F3	N/a	N/a	10.2	N/a	N/a	N/a
F4	N/a	N/a	9.5	N/a	N/a	N/a
F5	N/a	N/a	9.4	N/a	N/a	N/a
F6	N/a	N/a	9.8	N/a	N/a	N/a
F7	N/a	N/a	13.8	N/a	N/a	N/a
F8	N/a	N/a	9.1	N/a	N/a	N/a

Table 6E2 Annual mean PM₁₀ predicted concentrations (µg m⁻³)

Model ID	2019	2026 Do Minimum	2026 Do Maximum	Difference	% AQO of difference	Impact Descriptor
R1	19.8	13.7	13.7	0.01	0%	Negligible
R2	22.4	14.2	14.3	0.03	0%	Negligible
R3	11.7	14.5	14.5	0.03	0%	Negligible
R4	11.1	14.2	14.2	0.02	0%	Negligible
R5	11.3	13.5	13.5	0.00	0%	Negligible
R6	15.0	13.2	13.3	0.15	0%	Negligible
R7	15.0	13.2	13.4	0.17	0%	Negligible
R8	12.8	13.1	13.3	0.14	0%	Negligible
R9	11.6	13.2	13.3	0.14	0%	Negligible
R10	14.5	13.2	13.2	0.05	0%	Negligible
R11	15.0	13.5	13.6	0.08	0%	Negligible
R12	15.5	13.6	13.7	0.10	0%	Negligible
R13	14.4	13.5	13.5	0.03	0%	Negligible
R14	16.4	13.2	13.2	0.02	0%	Negligible
R15	14.0	13.2	13.2	0.02	0%	Negligible
R16	16.2	13.1	13.1	0.01	0%	Negligible
R17	14.6	13.4	13.4	0.04	0%	Negligible
R18	14.8	13.4	13.4	0.02	0%	Negligible
R19	14.8	12.8	12.8	-0.01	0%	Negligible

Model ID	2019	2026 Do Minimum	2026 Do Maximum	Difference	% AQO of difference	Impact Descriptor
R20	14.4	13.0	13.0	-0.03	0%	Negligible
R21	13.7	12.9	12.9	-0.03	0%	Negligible
R22	14.7	13.9	13.9	0.05	0%	Negligible
R23	14.5	13.3	13.3	0.03	0%	Negligible
R24	15.6	13.2	13.3	0.02	0%	Negligible
R25	14.7	13.2	13.2	0.01	0%	Negligible
R26	17.7	13.3	13.3	0.02	0%	Negligible
R27	16.8	13.3	13.3	0.02	0%	Negligible
R28	17.9	13.5	13.5	0.02	0%	Negligible
R29	17.4	13.6	13.6	0.02	0%	Negligible
R30	18.0	13.0	13.0	0.01	0%	Negligible
R31	17.2	13.3	13.3	0.01	0%	Negligible
R32	17.6	13.2	13.2	-0.01	0%	Negligible
R33	22.1	13.0	13.0	-0.01	0%	Negligible
R34	15.6	12.6	12.6	-0.03	0%	Negligible
R35	17.8	12.7	12.6	-0.04	0%	Negligible
R36	15.4	12.6	12.6	-0.04	0%	Negligible
R37	14.1	12.7	12.6	-0.04	0%	Negligible
R38	14.2	12.8	12.9	0.06	0%	Negligible
R39	14.5	12.7	12.8	0.06	0%	Negligible
R40	14.2	12.9	12.9	0.05	0%	Negligible
R41	14.9	12.4	12.5	0.08	0%	Negligible
R42	18.2	12.4	12.5	0.09	0%	Negligible
R43	14.6	13.0	13.1	0.04	0%	Negligible
R44	17.8	13.0	13.1	0.03	0%	Negligible
R45	12.8	13.0	13.0	0.03	0%	Negligible
R46	13.1	13.0	13.1	0.10	0%	Negligible
R47	11.7	13.0	13.1	0.06	0%	Negligible
R48	11.6	12.4	12.4	0.05	0%	Negligible
R49	11.7	13.8	13.8	0.06	0%	Negligible

Model ID	2019	2026 Do Minimum	2026 Do Maximum	Difference	% AQO of difference	Impact Descriptor
R50	11.3	13.2	13.3	0.04	0%	Negligible
R51	11.4	13.9	14.0	0.08	0%	Negligible
R52	12.2	13.5	13.6	0.06	0%	Negligible
R53	17.4	12.4	12.6	0.18	0%	Negligible
R54	16.1	12.4	12.4	0.02	0%	Negligible
F1	N/a	N/a	13.3	N/a	N/a	N/a
F2	N/a	N/a	13.2	N/a	N/a	N/a
F3	N/a	N/a	13.9	N/a	N/a	N/a
F4	N/a	N/a	13.2	N/a	N/a	N/a
F5	N/a	N/a	13.2	N/a	N/a	N/a
F6	N/a	N/a	13.2	N/a	N/a	N/a
F7	N/a	N/a	13.5	N/a	N/a	N/a
F8	N/a	N/a	13.2	N/a	N/a	N/a

Table 6E3 Annual mean PM_{2.5} predicted concentrations (µgm⁻³)

Model ID	2019	2026 Do Minimum	2026 Do Maximum	Difference	% AQO of difference	Impact Descriptor
R1	19.8	8.1	8.1	0.00	0%	Negligible
R2	22.4	8.5	8.5	0.02	0%	Negligible
R3	11.7	8.5	8.6	0.02	0%	Negligible
R4	11.1	8.4	8.4	0.01	0%	Negligible
R5	11.3	8.1	8.1	-0.00	0%	Negligible
R6	15.0	8.3	8.4	0.09	0%	Negligible
R7	15.0	8.3	8.4	0.10	0%	Negligible
R8	12.8	8.3	8.4	0.08	0%	Negligible
R9	11.6	8.3	8.4	0.08	0%	Negligible
R10	14.5	8.3	8.3	0.03	0%	Negligible
R11	15.0	8.3	8.4	0.05	0%	Negligible
R12	15.5	8.4	8.5	0.06	0%	Negligible
R13	14.4	8.3	8.4	0.02	0%	Negligible

Model ID	2019	2026 Do Minimum	2026 Do Maximum	Difference	% AQO of difference	Impact Descriptor
R14	16.4	8.3	8.3	0.01	0%	Negligible
R15	14.0	8.3	8.3	0.01	0%	Negligible
R16	16.2	8.3	8.3	0.01	0%	Negligible
R17	14.6	8.3	8.3	0.02	0%	Negligible
R18	14.8	8.3	8.3	0.01	0%	Negligible
R19	14.8	8.2	8.2	-0.01	0%	Negligible
R20	14.4	8.4	8.3	-0.02	0%	Negligible
R21	13.7	8.3	8.3	-0.02	0%	Negligible
R22	14.7	8.5	8.6	0.03	0%	Negligible
R23	14.5	8.5	8.5	0.02	0%	Negligible
R24	15.6	8.5	8.5	0.01	0%	Negligible
R25	14.7	8.5	8.5	0.01	0%	Negligible
R26	17.7	8.5	8.5	0.01	0%	Negligible
R27	16.8	8.5	8.5	0.01	0%	Negligible
R28	17.9	8.6	8.6	0.01	0%	Negligible
R29	17.4	8.7	8.7	0.01	0%	Negligible
R30	18.0	8.4	8.4	0.00	0%	Negligible
R31	17.2	8.6	8.6	0.01	0%	Negligible
R32	17.6	8.3	8.3	-0.00	0%	Negligible
R33	22.1	8.2	8.2	-0.01	0%	Negligible
R34	15.6	8.2	8.2	-0.02	0%	Negligible
R35	17.8	8.3	8.2	-0.02	0%	Negligible
R36	15.4	8.2	8.2	-0.02	0%	Negligible
R37	14.1	8.3	8.2	-0.02	0%	Negligible
R38	14.2	8.3	8.4	0.03	0%	Negligible
R39	14.5	8.3	8.3	0.04	0%	Negligible
R40	14.2	8.4	8.4	0.03	0%	Negligible
R41	14.9	8.1	8.2	0.05	0%	Negligible
R42	18.2	8.1	8.2	0.05	0%	Negligible
R43	14.6	8.1	8.1	0.02	0%	Negligible

Model ID	2019	2026 Do Minimum	2026 Do Maximum	Difference	% AQO of difference	Impact Descriptor
R44	17.8	8.1	8.1	0.02	0%	Negligible
R45	12.8	8.1	8.1	0.02	0%	Negligible
R46	13.1	8.1	8.1	0.06	0%	Negligible
R47	11.7	8.1	8.1	0.03	0%	Negligible
R48	11.6	8.1	8.1	0.03	0%	Negligible
R49	11.7	8.5	8.6	0.04	0%	Negligible
R50	11.3	8.5	8.5	0.02	0%	Negligible
R51	11.4	8.9	9.0	0.05	0%	Negligible
R52	12.2	8.7	8.7	0.03	0%	Negligible
R53	17.4	8.1	8.2	0.11	0%	Negligible
R54	16.1	8.1	8.1	0.01	0%	Negligible
F1	N/a	N/a	8.3	N/a	N/a	N/a
F2	N/a	N/a	8.3	N/a	N/a	N/a
F3	N/a	N/a	8.4	N/a	N/a	N/a
F4	N/a	N/a	8.2	N/a	N/a	N/a
F5	N/a	N/a	8.2	N/a	N/a	N/a
F6	N/a	N/a	8.2	N/a	N/a	N/a
F7	N/a	N/a	8.4	N/a	N/a	N/a
F8	N/a	N/a	8.2	N/a	N/a	N/a

Table 6E4 Predicted annual mean NO_x concentrations (µg/m³)

Model ID	2019 Base	Do Minimum 2026	Do Something 2026	Difference
Eco1	15.9	11.9	12.0	0.06
Eco2	14.9	11.4	11.4	0.03

Table 6E5 Predicted daily mean NO_x concentrations (µg/m³)

Model ID	2019 Base	Do Minimum 2026	Do Something 2026	Difference
Eco1	30.0	22.9	23.0	0.06

Model ID	2019 Base	Do Minimum 2026	Do Something 2026	Difference
Eco2	29.0	22.4	22.4	0.03

Table 6E6 Total nitrogen deposition (kg N/ha/yr)

Model ID	2019 Base	Do Minimum 2026	Do Something 2026	Difference	As a % of the 15 kgN/ha/yr min critical load
Eco1	44.5	34.5	34.5	0.01	0.08
Eco2	44.3	34.4	34.4	<0.01	0.02

Table 6E7 Total acid deposition (kg N/ha/yr)

Model ID	2019 Base	Do Minimum 2026	Do Something 2026	Difference	As a % of the 0.142 kgN/ha/yr min critical load
Eco1	3.16	2.45	2.45	<0.01	0.6
Eco2	3.15	2.45	2.45	<0.01	0.1

Appendix 7A

Ecology Technical Report



ECOLOGYSOLUTIONS

Part of the ES Group

BLOOR HOMES, BARWOOD LAND
AND JELSON HOMES

LAND AT WEAVERS FIELDS,
EARL SHILTON,
LEICESTERSHIRE

**EIA Environmental Statement –
Technical Appendix 7.1 to
Chapter 7: Biodiversity**

December 2021
4955.ES Ecology.VF3

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ANNEXES

ANNEX 7.1	Information Downloaded from MAGIC
ANNEX 7.2	Bat Survey Weather Conditions

7.1 INTRODUCTION

Background

- 7.1.1 Ecology Solutions was originally commissioned in March 2010 by Bloor Homes to undertake an Ecological Assessment of the Earl Shilton Sustainable Urban Extension (SUE), hereafter referred to as the 'Site'. Ecology Solutions was subsequently commissioned by Bloor Homes, Barwood Land and Jelson Homes to undertake ecological surveys during the period 2010-2021 to provide an updated baseline to inform the biodiversity chapter of the Environmental Statement (ES) for the Proposed Development.
- 7.1.2 This assessment relies on habitat and faunal surveys carried out by Ecology Solutions between May 2010 and September 2021. The habitat surveys were based around extended Phase 1 survey methodology¹, as recommended by Natural England. The habitat types present within the Site have been identified and mapped, providing an inventory of the basic habitat types present and allowing the identification of areas of greater ecological value. Faunal activity, whether visually or by call was recorded during the course of the surveys and specific attention was paid to the potential presence of any protected, rare, notable or Priority Species.
- 7.1.3 This technical report sets out any potential impacts arising from the Proposed Development, together with any required strategies to minimise or compensate for those potential impacts.

Site Characteristics

- 7.1.4 The Site is located to the southeast of the town of Earl Shilton. To the north, the Site is bordered by existing urban development and agricultural land. To the south and east, the Site is bordered by the A47 road, with open agricultural land beyond, while to the west the Site is bordered by existing urban development.
- 7.1.5 The Site comprises arable, semi-improved grassland and amenity grassland fields, separated by hedgerows, ditches and trees. There are three buildings/structures present within the Site and two ponds present in the centre of the Site (there is also a balancing pond located just off-site to the north and another pond to the east adjacent to/separated by the A47). Areas of scrub are present, associated with the ponds and boundary features, and Earl Shilton Brook runs through the central and eastern parts of the Site, associated with the Waste Water Treatment Works (WwTW), with small areas of hardstanding also present.

¹ Joint Nature Conservation Committee (1993). *Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit*. England Field Unit, Nature Conservancy Council, reprinted JNCC, Peterborough.

Proposals

- 7.1.6 The Proposed Development comprises residential, education, community hub and employment uses together with areas of formal and informal open space and landscaping and associated supporting infrastructure.

7.2 ASSESSMENT METHODOLOGY

Identifying the Zone of Influence

7.2.1 The potential ecological impacts of the Proposed Development are largely confined to the Site itself, but given the continuity of agricultural land outside the Site boundaries (albeit much is separated by the A47), consideration has also been given to the following likely significant effects, which may extend beyond the Site:

- Disturbance to species (Badger, bats, Water Vole, other mammals, Great Crested Newt and bird) populations within hearing range during the construction phase;
- Fragmentation of 'dispersal corridors' utilised by adjacent populations;
- Disruption to habitats / populations within receiving range of dust etc during the construction phase;
- Disturbance to habitats / populations within walking distance during the operation phase; and
- Pollution to watercourses during the construction and operation phases.

Impact Assessment Methodology

7.2.2 The evaluation and impact assessment method has been undertaken with due regard to the guidelines produced by the Chartered Institute of Ecology and Environmental Management², which avoids the provision of definitions as to how to assign habitats and species different levels of value and relies on an approach that involves professional judgement and the use of available guidance and information.

7.2.3 The value of each resource is determined within a defined geographical context:

- International;
- UK;
- National (England/Northern Ireland/Scotland/Wales);
- Regional;
- County (or Metropolitan – e.g. in London);
- District (or Unitary Authority, City or Borough);
- Local or Parish; or
- Within Zone of Influence (Zol) only.

²CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester

7.2.4 A number of other key considerations include:

- Designated Sites and Features (e.g. Special Protection Areas (SPA), Sites of Special Scientific Interest (SSSI), important hedgerows etc.);
- Biodiversity Value (Use of Biodiversity Action Plans, development plans and other published documents);
- Potential Value;
- Secondary or Supporting Value;
- Social or Economic Value; and
- Legal Issues.

7.2.5 The Leicester, Leicestershire and Rutland Biodiversity Action Plan (2016³) is a useful tool that has been used to assist in valuing features and developing mitigation strategies, where necessary. Consideration has also been given to policies contained within the Local Plans.

7.2.6 Having identified the ecologically important features likely to be affected by the Proposed Development, the current guidance promotes a transparent approach in which an impact is determined to be significant or not on the basis of a discussion of the factors that categorise it. This includes characterising the nature of the likely impacts on each important feature in terms of ecological structure and function, by considering the following parameters:

- Beneficial or adverse;
- Extent;
- Magnitude;
- Duration;
- Reversibility; and
- Timing and frequency.

7.2.7 Where it is concluded that there would be an impact (beneficial or adverse and including cumulative impacts) on a defined site or ecosystem(s) and / or the conservation status of habitats or species within a given geographical area, it is described as significant in the following terms; major, moderate, minor, negligible and none.

³ Space for Wildlife: Leicester, Leicestershire and Rutland Biodiversity Action Plan (LLRBAP).
<https://www.lrwt.org.uk/about-us/caring-wild-places/biodiversity-action-plan>

7.3 SURVEY METHODOLOGY

- 7.3.1 The methodology utilised for the survey work can be split into three areas, namely desk study, habitat survey and faunal survey. These are discussed in more detail in the following subsections.

Desk Study

- 7.3.2 In order to compile background information on the Site and the surrounding area, Ecology Solutions contacted the Leicestershire and Rutland Environmental Records Centre (LRERC) in 2010, with an updated search undertaken in August 2020. This information is detailed within section 7.3.

- 7.3.3 Further information on designated sites from a wider search area was obtained from the online Multi-Agency Geographic Information for the Countryside (MAGIC)⁴ database. This information is reproduced at Annex 7.1 and included, where relevant, on **Figure 7.1**.

Habitat Survey Methodology

- 7.3.4 The Site was subject to habitat surveys at various times between May 2010 and September 2021 to ascertain the general ecological value of the land and to identify the main habitats and associated plant species, with notes taken on fauna utilising the Site.

Extended Phase 1

- 7.3.5 Surveys were completed in accordance with the extended Phase 1 Survey methodology⁵ approved by Natural England, whereby the habitat types present are identified and mapped together with an assessment of the species composition of each habitat. This technique provides an inventory of the basic habitat types present and allows identification of areas of greater potential value, which require further survey. Any such areas identified can then be examined in more detail.

- 7.3.6 The habitats present within the Site were classified into areas of similar botanical community types with a representative sample of those species present at the time of the Site survey being described where necessary. Habitat surveys were undertaken during the optimal period for Phase 1 Habitat surveys and across a number of seasons/years and so it is considered that an accurate assessment of the value has been made.

Fauna

- 7.3.7 General faunal activity, such as birds or mammals observed visually or by call during the course of the habitat surveys, was recorded. Specific

⁴ <http://www.magic.gov.uk>

⁵ Joint Nature Conservation Committee (1993) Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit. Peterborough. 1993.

attention was paid to any potential use of the Site by protected species, priority species, or other notable species.

7.3.8 In addition, specific surveys were carried out at various times between May 2010 and September 2021 for the presence of Badgers *Meles meles*, bats, Water Vole *Arvicola amphibius*, birds (including Barn Owl *Tyto alba*), reptiles and Great Crested Newt *Triturus cristatus*.

7.3.9 Experienced ecologists undertook the faunal surveys with regard to established best practice and guidance issued by Natural England. Details of the methodologies employed are given below.

7.3.10 The scope of the surveys was agreed via engagement with the Leicestershire County Council Ecology Team Leader on 13th May 2015, 17th April 2019 and 17th February 2021.

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Bats

Internal / External Building Assessment

- 7.3.14 The buildings within the Site were assessed for their potential to support roosting bats and were subject to internal and external surveys using ladders, torches, mirrors, binoculars and an endoscope where necessary.
- 7.3.15 Evidence of the presence of bats was searched for, with particular attention paid to the roof areas and gaps between rafters and beams. Specific searches were made for bat droppings, which can indicate present or past use and extent of use, and other signs to indicate the possible presence of bats e.g. presence of stained areas, or areas that are conspicuously cobweb-free.
- 7.3.16 The probability of a building being used by bats increases if it:
- is largely undisturbed;
 - dates from pre-20th Century;
 - has a large roof void with unobstructed flying spaces;
 - has access points for bats (though not too draughty);
 - has wooden cladding or hanging tiles; and/or
 - is in a rural setting and close to woodland or water.
- 7.3.17 Conversely, the probability decreases if a building is of a modern or pre-fabricated design/construction, is in an urban setting, has small or cluttered roof voids, has few gaps at the eaves or is a heavily disturbed premises.
- 7.3.18 The main requirements for a winter/hibernation roost site are that it maintains a stable (cool) temperature and humidity. Sites commonly utilised by bats as winter roosts include cavities/holes in trees, underground sites and parts of buildings. Whilst different species may show a preference for one of these types of roost site, none are solely dependent on a single type.
- 7.3.19 Field surveys were undertaken within the Site with regard to best practice guidelines issued by the Joint Nature Conservation Committee (2004⁶) and the Bat Conservation Trust (2016⁷).
- 7.3.20 All standard and hedgerow trees within the Site were assessed for their potential to support roosting bats during all habitat surveys and updated walkover surveys between 2010 and 2021. Features typically favoured by bats were searched for, including:
- Obvious holes, e.g. rot holes and old Woodpecker holes;
 - Dark staining on the tree, below the hole;

⁶ Mitchell-Jones, A.J. & McLeish, A.P. (Eds.) (2004). *Bat Workers' Manual*. 3rd edition. Joint Nature Conservation Committee, Peterborough.

⁷ Bat Conservation Trust (2016). *Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd Edition)*. Bat Conservation Trust, London.

- Tiny scratch marks around a hole from bat claws;
- Cavities, splits and or loose bark from broken or fallen branches, lightning strikes etc.; and
- Very dense covering of mature Ivy over trunk.

7.3.21 Evening activity surveys were conducted by three surveyors within the Site between June and September 2010 and between May and September 2013 using Anabat SD1 and Anabat SD2 bat detectors to record the data, which was subsequently analysed using Analook bat sound analysis software. Updated evening activity surveys were undertaken by three surveyors between July and October 2015 using SongMeter EM3 bat detectors to record the data, which was subsequently analysed using Analook bat sound analysis software. Further surveys were conducted between May and September 2019 using EchoMeter Touch 2 Pro bat detectors to record the data, which was subsequently analysed using Kaleidoscope Pro bat sound analysis software.

7.3.22 This survey method, aimed to identify the level of foraging, and the species present foraging and commuting within the Site and any areas of potentially high importance for foraging / commuting bats. The evening activity surveys commenced 15 minutes prior to sunset and were terminated at least 2 hours after sunset.

7.3.23 Automated monitoring was also undertaken, with three SongMeter SM4 bat detectors deployed for a minimum of five consecutive nights in May, July and September 2019.

Water Vole

7.3.24 Specific surveys for Water Voles were undertaken along the Earl Shilton Brook and connecting ditches located within the Site in May 2010, June 2021 and September 2021.

7.3.25 The survey work carried out involved careful searching along the banks of suitable water habitat within the Site, using the standard methodology as advocated within The Water Vole Conservation Handbook (1998⁸) and The Water Vole Mitigation Handbook (2016⁹) and recommended by Natural England.

7.3.26 The basis of the surveys undertaken was to determine the presence / absence, and where necessary distribution and abundance, of Water Voles within the watercourse adjacent to the Site through the detection of signs such as burrows, feeding stations, latrines, faeces, lawns, footprints, and potentially from sightings of the animals themselves.

⁸ Strachan, R (1998), 'Water Vole Conservation Handbook' - from Environment Agency

⁹ Dean, M., Strachan, R., Gow, D. and Andrews, R (2016). *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)*. Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

Otter

- 7.3.27 Specific surveys for Otter were undertaken along the Earl Shilton Brook and connecting ditches located within the Site in May 2010, June 2021 and September 2021.
- 7.3.28 The survey work involved careful searching along the banks of the stream within the Site and looking for any signs of the presence of Otter, including spraints (faeces), slides, footprints or other signs such as holts (places of shelter).
- 7.3.29 The surveys also allowed an assessment of the suitability of the existing habitats present to support Otters, to be undertaken.

Birds

- 7.3.30 Breeding bird surveys were carried out in May, June and July 2010 following the Common Bird Census (CBC) technique¹⁰. The CBC involves walking transects routes through the area being studied and recording and plotting all bird species observed or heard and their behaviour.
- 7.3.31 The transect route was selected so that the entire Site was covered and all features likely to support breeding birds were surveyed. Routes and directions were varied between visits so that there was no tendency to visit a particular part of the plot later or earlier in the day.
- 7.3.32 The surveys were carried out from sunrise and were completed over a period of approximately one hour and 30 minutes.
- 7.3.33 In addition, all trees and buildings within the Site were assessed for their suitability to support nesting Barn Owls in 2019 and 2021. Specific regard was given to Barn Owls during all evening bat activity surveys undertaken within the Site.
- 7.3.34 Given the agricultural habitats present, wintering bird surveys were not deemed necessary.
- 7.3.35 Given the findings of the initial surveys it was agreed with the Leicestershire County Council Ecology Team Manager that there was no merit in updating breeding bird surveys (with subsequent focus on Barn Owls).

Reptiles

- 7.3.36 Specific surveys for reptiles were carried out between July and August 2010 and between June and August 2019. The methodology utilised principally derived from guidance given in the Herpetofauna Workers Manual¹¹.

¹⁰ Marchant, T.J. (1983) *Common bird census instructions*. British Trust for Ornithology.

¹¹ Gent, A.H. and Gibson, S.D. (1998) *Herpetofauna workers' manual*. Joint Nature Conservation Committee, Peterborough.

- 7.3.37 Areas of suitable habitat (rough grassland margins in 2010; rough grassland margins and unmanaged grassland fields in 2019) were surveyed for the presence of reptiles using artificial refugia (“tins”). 263 0.5m x 0.5m roofing felt tins were placed within areas of suitable reptile habitat in the Site during 2010 surveys, while 500 0.5m x 0.5m roofing felt tins were set out during 2019 surveys.
- 7.3.38 The tins provide shelter and heat up quicker than the surroundings in the morning and can remain warmer than the surroundings in the late afternoon. Being ectothermic (cold blooded), reptiles use them to bask under and raise their body temperature which allows them to forage earlier and later in the day.
- 7.3.39 To determine presence/absence the tins are left to bed in for a minimum of two weeks and then subsequently checked for reptile activity over seven visits at appropriate times of the day (avoiding the middle of the day when the ambient air temperature is at its highest) in accordance with Natural England’s standing advice. Surveys were conducted during optimum weather conditions for reptile surveying whereby temperatures are between 10°C and 17°C, intermittent or hazy sunshine and little or no wind.

Previous Surveys

- 7.3.40 Surveys for reptiles were previously undertaken by Ecology Solutions in 2009 within the area of the Site that lies to the northeast of Mill Lane (REF:10/00401/FUL).

Great Crested Newt

- 7.3.41 Two ponds (P1 and P2) were identified within the centre of the Site (albeit P2 is no longer present), an off-site pond (P3) adjacent to the northern boundary of the Site and a further offsite located to the east of the Site (P4). All ponds (P1-P4) were surveyed for the presence of Great Crested Newts.
- 7.3.42 Ponds P1-P3 were subject to full aquatic surveys between May and June 2010, between May and June 2012 and between March and May 2016.
- 7.3.43 In April 2019, ponds P1-P4 were subject to environmental DNA (eDNA) surveys. However, ponds P1-P3 were recorded as being dry so only pond P4 could be surveyed. In April 2021, ponds P1-P3 were subject to eDNA surveys. However, ponds P2 and P3 were recorded as being dry and as such, only pond P1 could be surveyed. The surveys were based on methodology set out by the Freshwater Habitats Trust, which has been endorsed by Natural England¹².
- 7.3.44 The full aquatic surveys were completed in suitable weather conditions using three methods (namely torch survey, netting and bottle-trapping) in accordance with Natural England guidance to determine the presence or

¹² Freshwater Habitats Trust. How to collect an eDNA sample <https://freshwaterhabitats.org.uk/wp-content/uploads/2015/08/eDNA-method-protocol.pdf>

absence of Great Crested Newts. In addition, egg searches were also conducted. Surveys were undertaken in accordance with current best practice as recommended by Natural England¹³.

- 7.3.45 Suitable survey weather conditions are deemed to be those nights when the night-time air temperature is more than 5°C, with little or no wind, and no rain; surveys were conducted during such conditions.
- 7.3.46 Torch counting involves the use of high-powered torches to find and count the number of adults of each amphibian species. As recommended within Natural England's guidance¹³, the entire margin of the ponds was walked once, slowly checking for Great Crested Newts.
- 7.3.47 Netting involves sampling for a period dictated by the size of the water body. Natural England recommends 15 minutes of search time for every 50m of shoreline. In practice, the search time significantly exceeded this recommendation.
- 7.3.48 Bottle-trapping involved setting traps made from 2-litre plastic bottles around the pond margins, and leaving the traps set overnight before checking them the following morning. A density of one trap per 2m of shoreline was utilised, where possible, as recommended by Natural England's guidance.
- 7.3.49 Terrestrial habitats were also searched for Great Crested Newts. This involved searching under logs, rocks and rubbish, which are favoured hiding places.
- 7.3.50 The land within and surrounding the Site was assessed in terms of its habitat quality and its ability to support Great Crested Newts.
- 7.3.51 The eDNA survey involved collecting 20 samples of 40ml of pond water at equally spaced locations around the perimeter of the pond. These 20 samples were then mixed together in a plastic sample bag to form a single amalgamated sample of the water in the pond. The amalgamated sample was mixed thoroughly to ensure any DNA present does not collect at the base of the sample bag.
- 7.3.52 A sample of 15ml was taken from the amalgamated sample and added to 35ml of ethanol within a sample tube, to preserve any DNA present. The sample tubes were then shaken vigorously to mix the water sample and ethanol thoroughly and prevent degradation of any DNA. This technique was repeated six times, using water from the amalgamated sample, such that six sample tubes are filled.
- 7.3.53 The six sample tubes were then sent to SureScreen Scientifics to be analysed using Polymerase Chain Reaction (PCR) amplification techniques. The analysis involves producing DNA sequences that verify the taxonomic assignment of amplified DNA signals.

¹³ English Nature (2001). *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.

- 7.3.54 Each sample is run in 12 replicates. The results are reported as the proportion of these 12 replicate samples that are successfully amplified, indicating whether Great Crested Newt DNA is present (e.g. 1/12, 12/12).

7.4 BASELINE CONDITIONS

Introduction

7.4.1 The objectives of establishing the ecological baseline are twofold:

- to describe aspects of the natural environment and to identify important and protected habitats and species that could be adversely affected by the proposed development; and
- to characterise features that could be positively enhanced, created, restored or managed, by establishing the occurrence, distribution and extent of ecological features on site and in the surrounding area; and/or those species that could be positively managed to enhance their conservation status, distribution and abundance.

Context

7.4.2 Unlike the intensive agricultural habitats within the Site, natural and semi-natural habitats usually support the greatest diversity of wildlife. Important species are those protected by international or national legislation; those that have been identified in the 'UK Post-2010 Biodiversity Framework'¹⁴ as Priority Species, and those identified as locally distinctive in a local BAP, such as the 'Leicester, Leicestershire and Rutland Biodiversity Action Plan' (e.g. 'local keystone', 'flagship' and 'umbrella species'¹⁵).

7.4.3 National Character Areas (NCAs) are sub-divisions of England, each with a characteristic association of wildlife and natural features defined by Natural England. Each National Character Area has a unique identity resulting from the interaction of wildlife, landforms, geology, land use and human impact.

7.4.4 The Site is located within the Leicestershire Vales National Character Area¹⁶. This National Character Area comprises a relatively open, uniform landscape comprising low lying clay vales dissected by river valleys.

Designated Sites

Statutory

7.4.5 There are no statutory designations of nature conservation value within the Site or immediately adjacent to the Site. The nearest statutory designation is Burbage Common and Woods Local Nature Reserve (LNR) which lies approximately 1.9km southwest of the Site. This LNR is designated for its unimproved acidic grassland, woodland and scrubland habitats, which supports a range of botanical, invertebrate and bird

¹⁴ JNCC and Defra (on behalf of the Four Countries' Biodiversity Group) (2012) *UK Post-2010 Biodiversity Framework*. July 2012. <http://jncc.defra.gov.uk/page-6189>

¹⁵ Developing Naturally. 2000. A Handbook for Incorporating the Natural Environment into Planning and Development.

¹⁶ Natural England (2014) NCA Profile: 94 Leicestershire Vales.
<http://publications.naturalengland.org.uk/publication/4900422342934528>

species. This LNR is separated from the Site by the newly constructed A47 by-pass with open countryside beyond.

7.4.6 The nearest SSSI is Croft Hill SSSI which lies approximately 3km to the east of the Site. This SSSI is designated for its short tussocky grassland habitats. This SSSI is separated from the Site by the A47 by-pass, the M69 and open countryside beyond.

7.4.7 The Site lies within one SSSI impact risk zone¹⁷, which highlights potential impacts from “*any discharge of water or liquid waste of more than 20m³/day to ground (i.e. to seep away) or to surface water such as a beck or stream*”. This potential impact corresponds to Narborough Bog SSSI, located approximately 6.8km east of the Site boundary. The Site does not lie within any further IRZs relating to any other statutory designated sites.

Non-Statutory

7.4.8 There are no non-statutory designated sites within the Site. There are a number of Local Wildlife Sites (LWS) and potential Local Wildlife Sites (pLWS) located within the search area, the closest of which is Normanton Wood Hedgerow pLWS which comprises a species-rich hedgerow and is located approximately 0.25km east of the Site boundary. The closest LWS is Hay Meadow LWS, which is designated for its mesotrophic grassland habitat. This LWS is located approximately 2.2km southwest of the Site boundary.

7.4.9 Normanton Wood Hedgerow pLWS is separated from the Site by the A47 road, while Hay Meadow LWS is well-separated from the Site by open agricultural land and the A47 road.

7.4.10 A number of additional non-statutory sites are located in the vicinity and these are identified on **Figure 7.1**.

Habitats

7.4.11 The following main habitat / vegetation types were identified within the Site:

- Arable;
- Semi-improved Grassland (including species-rich grassland);
- Rough Grassland Margins;
- Amenity Grassland;
- Hedgerows;
- Trees;

¹⁷ The Impact Risk Zones (IRZs) are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

- Scrub;
- Stream and Ditches;
- Ponds;
- Japanese Knotweed; and
- Buildings and Hardstanding.

7.4.12 The locations of these habitats are shown on **Figure 7.2**.

Arable

7.4.13 The majority of the southern and northeastern sections of the Site comprise arable fields. A variety of crops were recorded within these fields during surveys across the years including Wheat *Triticum aestivum*, Maize *Zea sp.* and grass cover crops.

Semi-improved Grassland

7.4.14 The semi-improved grassland fields within the Site have been ranked according to their species diversity and content according to the number of calcareous, neutral, acidic and wet grassland indicator species, in line with Leicestershire County Council's Flora surveying guidance¹⁸ and the Environmental Stewardship's Farm Environment Plan Manual¹⁹ indicator species. Fields F3, F5 and F1 are thus considered as having the greatest ecological significance in the context of the Site as they contain the greatest number of indicator species. These fields have been classified as being species-rich grassland of greater ecological value.

7.4.15 **F1** is situated in the centre of the Site and contains one pond (P1). The species present are dominated by Cock's Foot *Dactylis glomerata* with abundant Meadow Vetchling *Lathyrus pratensis*, while frequently found species comprise Perennial Rye Grass *Lolium perenne*, Yorkshire Fog *Holcus lanatus*, Pignut and *Conopodium majus* False Oat Grass *Arrhenatherum elatius*. Ribwort Plantain *Plantago lanceolata*, Lesser Stitchwort *Stellaria graminea*, Red Clover *Trifolium pratense*, Dandelion *Taraxacum officinale* agg., Meadow Buttercup *Ranunculus acris*, Creeping Buttercup *Ranunculus repens*, Common Sorrel *Rumex acetosa* subsp. *acetosa*, Fescues *Festuca sp.*, White Clover *Trifolium repens*, Sweet Vernal Grass *Anthoxanthum odoratum*, Bird's-Foot Trefoil *Lotus corniculatus* and Germander Speedwell *Veronica chamaedrys* are occasionally found. Rarely found species comprise Curled Dock *Rumex crispus*, Soft Rush *Juncus effusus*, Autumn Hawkbit *Leontodon autumnalis*, Common Cat's Ear *Hypochaeris radicata*, Common Mouse-Ear *Cerastium fontanum*, Creeping Cinquefoil *Potentilla reptans*, Tufted Hair Grass *Deschampsia cespitosa* subsp. *cespitosa*, Creeping Thistle *Cirsium arvense*, Hogweed *Heracleum sphondylium*, Hawthorn *Crataegus monogyna* saplings, Oak *Quercus robur* saplings, Common Knapweed *Centaurea nigra*, Meadow Foxtail *Alopecurus pratensis*,

¹⁸ Jeeves, M. 2011. The Flora of Leicestershire and Rutland: checklist and Rare Plant Register. LRWT.

¹⁹ Natural England. 2010. Higher Level Stewardship Farm Environment Plan (FEP) Manual

Lesser Celandine *Ranunculus ficaria* and Annual Meadow-grass *Poa annua*. Of these species, Meadow Vetchling, Pignut, Red Clover, Meadow Buttercup, Sorrel, Bird's-Foot Trefoil, Soft Rush, Autumn Hawkbit and Common Knapweed are the indicator species.

- 7.4.16 **F3** is a triangular field in the west of the Site, adjacent to F2. Species present within the sward comprise abundant Cock's Foot with frequent Meadow Foxtail, Fescues, and Soft Brome. Yorkshire Fog and Crested Dog's Tail *Cynosurus cristatus* are found occasionally. Herbaceous species present comprise abundant Red Clover and Meadow Buttercup, with frequently found Dandelion, Common Sorrel, Meadow Vetchling and Creeping Buttercup. Occasionally found species comprise Ribwort Plantain, Cow Parsley *Anthriscus sylvestris*, Common Mouse-Ear, Great Burnet, Tufted Vetch *Vicia cracca* and Germander Speedwell. Rarely found species comprise Creeping Thistle, Cuckoo Flower *Cardamine pratensis*, Hogweed, Pignut, Curled Dock, Lesser Stitchwort, Common Cat's Ear, Chickweed *Stellaria media*, Creeping Cinquefoil and Yarrow. Surrounding pond P2 there is Soft Rush, Brooklime *Veronica beccabunga*, Lesser Celandine and Bog Stitchwort *Stellaria uliginosa* present. Of these species, Red Clover, Meadow Buttercup, Common Sorrel, Meadow Vetchling, Great Burnet, Tufted Vetch, Cuckoo Flower, Pignut and Soft Rush are the indicator species.
- 7.4.17 **F5** is dominated by Cock's Foot and Yorkshire Fog with abundant Common Sorrel. Frequently found species comprise Sweet Vernal Grass, Meadow Foxtail, Pignut and Lesser Stitchwort. Occasionally found species comprise Perennial Rye Grass, Broad-Leaved Dock *Rumex obtusifolius*, Fescues, Meadow Buttercup, Annual Meadow-grass, Creeping Buttercup, Ribwort Plantain, Common Mouse-Ear, Creeping Thistle, Great Burnet *Sanguisorba officinalis*, Common Knapweed, Red Clover and Meadow Vetchling. Rarely found species comprise Bramble *Rubus fruticosus* agg., Hogweed, Hairy Sedge *Carex hirta*, Scented Mayweed *Matricaria recutita*, Germander Speedwell, Lady's Bedstraw *Galium verum*, Yarrow *Achillea millefolium*, Bird's-Foot Trefoil, Dandelion, Soft Rush and Common Sedge *Carex nigra*. Of these species, Common Sorrel, Pignut, Meadow Buttercup, Great Burnet, Common Knapweed, Red Clover, Meadow Vetchling, Hairy Sedge, Lady's Bedstraw, Bird's-Foot Trefoil and Soft Rush are the indicator species.
- 7.4.18 None of the remaining fields contain wetland indicator species, although fields F2, F7, F8 and F9, comprise a smaller number of lowland meadow indicator species, with fields F2, F8 and F9 also containing Pignut. These fields have therefore been classified as species-rich grassland.
- 7.4.19 **F2** is a small field in the west of the Site. Species present within the sward comprise abundant Cock's Foot, with frequent Meadow Fox Tail, Rough Meadow Grass *Poa trivialis*, Fescues and Soft Brome *Bromus hordeaceus* subsp. *hordeaceus*. Perennial Rye Grass, Annual Meadow-grass and Sweet Vernal Grass are found occasionally, while Yorkshire Fog and Creeping Bent *Agrostis stolonifera* are found rarely. Herbaceous species comprise frequently found Meadow Buttercup, with occasionally

found Common Nettle *Urtica dioica*, Dandelion, Creeping Thistle, Common Sorrel, Creeping Buttercup, Common Mouse-Ear, White Clover, Ribwort Plantain, Red Clover and Yarrow. Pineappleweed *Matricaria discoidea*, Hogweed, Pignut, Common Knapweed, Lesser Stitchwort, Oak saplings, Goat's Beard *Tragopogon pratensis*, Meadow Vetchling and Germander Speedwell are found rarely. Of these, Meadow Buttercup, Common Sorrel, Red Clover, Pignut, Common Knapweed, Meadow Vetchling and Goat's Beard are the indicator species.

- 7.4.20 **F7** is situated adjacent to the north of the Site and lies within the wider study area. sward is dominated by False Oat Grass with abundant Cock's Foot and Fescues. Yorkshire Fog and Meadow Foxtail are found frequently, with Crested Dog's Tail occasionally found, and Perennial Rye Grass is rarely found. Herbaceous species present comprise abundant Hogweed with frequently found Ribwort Plantain. Occasionally found species comprise Red Clover, White Clover, Meadow Buttercup, Dandelion, Bird's Foot Trefoil, Oxeye Daisy *Leucanthemum vulgare*, Common Sorrel, Cut-Leaved Crane's-Bill *Geranium dissectum*, Bush Vetch *Vicia sepium*, Creeping Thistle, Creeping Buttercup, Spear Thistle *Cirsium vulgare*, Common Mouse-Ear, Common Ragwort *Senecio jacobaea*, Lesser Trefoil *Trifolium dubium*, Lesser Stitchwort, and White Dead Nettle *Lamium album*. Rarely found species comprise Germander Speedwell, Curled Dock, Common Cat's Ear, Oak saplings, Broad-Leaved Dock, Smooth Hawk's Beard *Crepis capillaris* and Common Knapweed. Of these species, Red Clover, Meadow Buttercup, Bird's-Foot Trefoil, Oxeye Daisy, Common Sorrel and Common Knapweed are the indicator species.
- 7.4.21 **F8** is dominated by False Oat Grass with frequently found Fescues, Yorkshire Fog, Annual Meadow-grass and Cock's Foot. Hawthorn and Bramble are encroaching into the field along the eastern boundary. Occasionally found species comprise Hogweed, Common Sorrel, Creeping Thistle, Meadow Buttercup, Meadow Foxtail and White Clover. Rarely found species comprise Ribwort plantain, Cow Parsley, Pignut, Yarrow, Common Mouse-Ear, Blackthorn *Prunus spinosa* saplings, Common Knapweed, Ash *Fraxinus* sp. saplings, Lesser Stitchwort, Oak saplings, Bird's-Foot Trefoil, Broad-Leaved Dock, Sedge *Carex* sp., White Clover, Creeping Buttercup, Perennial Rye Grass, Wavy Hair Grass *Deschampsia flexuosa*, Hawthorn saplings and Cleavers *Galium aparine*. Of these species, Common Sorrel, Meadow Buttercup, Pignut, Common Knapweed, Bird's-Foot Trefoil, Sedge and Wavy Hair Grass are the indicator species.
- 7.4.22 **F9** is situated in the centre of the Site. The sward is dominated by Cock's Foot with abundant Rough Meadow Grass and False Oat Grass. Fescues, Sweet Vernal Grass and Perennial Rye Grass are found frequently, while Yorkshire Fog, Crested Dog's Tail and Creeping Bent are found occasionally. Herbaceous species present comprise frequently found Creeping Cinquefoil with occasionally found Ribwort Plantain, Meadow Buttercup, Lesser Stitchwort, Common Mouse-Ear, Common Sorrel, Red Clover and Meadow Vetchling. Rarely found species comprise Pignut, Sedge, Broad-Leaved Dock, Germander Speedwell,

Hogweed, Creeping Buttercup and Curled Dock. Of these species, Meadow Buttercup, Pignut, Common Sorrel, Meadow Vetchling, Red Clover and Sedge are the indicator species.

- 7.4.23 Fields F4, F6 and F10 are the grasslands considered as having the least ecological value within the context of the Site, each containing only 1 lowland meadow indicator species, and are therefore classified as being semi-improved grassland.
- 7.4.24 **F4** is situated in the west of the Site and lies adjacent to the western boundary of the Site. There is a stand of Japanese Knotweed along the western boundary of the Site, adjacent to the school playing fields. The sward is dominated by False Oat Grass, with frequent Cock's Foot, Sweet Vernal Grass and Fescues, occasional Rough Meadow Grass and rarely found Crested Dog's Tail and Yorkshire Fog. Herbaceous species comprise frequently found Meadow Buttercup, Ribwort Plantain and Dandelion. Occasionally found species comprise Common Cat's-Ear, Hogweed, Common Mouse-Ear, White Clover, Creeping Thistle, Bramble, Creeping Buttercup, Horsetail *Equisetum arvense*, Common Sorrel and Red Clover, with rarely found Oak saplings, Lesser Stitchwort, Common Ragwort, Common Knapweed, Lesser Trefoil and Broad-Leaved Dock. Of these species, Meadow Buttercup, Common Sorrel, Red Clover and Common knapweed are the indicator species.
- 7.4.25 **F6** is situated in the north of the Site. Species present within the sward comprise abundant Cock's Foot and False Oat Grass, with frequently found Meadow Fox Tail, Yorkshire Fog and Bents *Agrostis sp.*. Sweet Vernal Grass, Perennial Rye Grass, Fescues and Annual Meadow-grass are occasionally found. Herbaceous species comprise frequently found Common Nettle, with occasionally found Ribwort Plantain, Hogweed, Meadow Vetchling, Bush Vetch, Common Sorrel, White Dead Nettle, Creeping Thistle, Cow Parsley and Bramble. Rarely found species comprise suckering Blackthorn, Yarrow, Broad-Leaved Dock, Dandelion, Cleavers, Common Mouse-Ear, Tufted Vetch, Red Clover, White Clover, Prickly Sow Thistle *Sonchus asper* and Greater Plantain *Plantago major*. Of these, the Bents, Meadow Vetchling, Common Sorrel, Tufted Vetch and Red Clover are the indicator species.
- 7.4.26 **F10** is situated in the northeast of the Site. The sward is dominated by Cock's Foot with abundant False Oat Grass and Cock's Foot. Perennial Rye Grass, Timothy *Phleum pratense*, Fescues and Soft Brome are found occasionally. Herbaceous species present comprise encroaching Bramble scrub at the boundaries of the field, with frequent Broad-Leaved Dock and Creeping Buttercup, with occasionally found Cleavers, Cow Parsley, Creeping Thistle, Common Nettle, Dandelion, Spear Thistle and White Clover. Hedgerow Crane's Bill *Geranium pyrenaicum*, White Dead Nettle, Hogweed, Common Ragwort, Common Cat's Ear, Common Sorrel, Fox and Cubs *Pilosella aurantiaca*, Broad-Leaved Willowherb *Epilobium montanum*, Cut-leaved Crane's-Bill, Perennial Sow Thistle *Sonchus arvensis*, Common Mouse-Ear and Hawkbit *Leontodon*. Of these, Common Sorrel and Hawkbit are the indicator species.

Rough Grassland Margins

- 7.4.27 Rough grassland margins are associated with the arable fields. Species present include Cock's-foot, Yorkshire-fog, Creeping Bent, White Dead-nettle, Common Chickweed, Cow Parsley, Herb-robert, Creeping Buttercup, Common Nettle, Cleavers, Common Nettle, Red Dead-nettle, Hogweed and Creeping Thistle.

Amenity Grassland

- 7.4.28 Two amenity grassland fields (**F19** and **F20**) are present in the northwest of the Site that are utilised as sports pitches. The grassland is cut to a short sward and comprises Annual Meadow-grass, Red Fescue, Dandelion, Daisy, White Clover, Creeping Buttercup. Species restricted to the margins of the amenity grassland include Yorkshire-fog, Creeping Thistle, Cow Parsley and Common Nettle.

Hedgerows

- 7.4.29 There are 9 species-rich hedgerows within the Site that potentially qualify as 'important' under the Hedgerow Regulations 1997, as they comprise of seven or more woody species. These include: H1, H2, H5, H8, H15, H16, H28, H34 and H57. A further 22 hedgerows contain five woody species, and are considered as species-rich, these include: H3, H7, H9, H10, H12, H13, H17, H18, H20, H21, H22, H26, H29, H30, H31, H35, H37, H38, H39, H42, H44 and H47.
- 7.4.30 **H1** is gappy in places, is unmanaged and is approximately 4-6m in height. This hedgerow is co-dominated by Hawthorn *Crataegus monogyna* and Blackthorn *Prunus spinosa*, with other species present comprising Elder *Sambucus nigra*, Pedunculate Oak *Quercus robur*, Field Maple *Acer campestre*, Dog-rose *Rosa canina*, Willow *Salix* sp. and Ash *Fraxinus excelsior*. Species present in the ground flora comprise Bramble *Rubus fruticosus*, Bluebell *Hyacinthoides non-scripta* and Lords-and-Ladies *Arum maculatum*.
- 7.4.31 **H2** is approximately 3-4m in height, is unmanaged and gappy in nature and a section of H2 is situated along a bank. This hedgerow comprises Hawthorn, Blackthorn, Dog-rose, Ash, Holly *Ilex aquifolium*, Pedunculate Oak and Elm *Ulmus* sp.. Species present in the ground flora comprise Bramble, Ivy *Hedera helix* and Bluebell.
- 7.4.32 **H3** is approximately 4-6m in height, is unmanaged and comprises Hawthorn, Blackthorn, Ash, Dog-rose and Pedunculate Oak while the ground flora comprises Bramble.
- 7.4.33 **H4** is approximately 4-6m in height, is unmanaged and is dominated by Hawthorn, with Ash, Blackthorn and Elm also present. Bramble and tufted vetch *Vicia cracca* are present within the ground flora.
- 7.4.34 **H5** is approximately 4-6m in height, is unmanaged and is associated with a wet ditch. This hedgerow is dominated by Blackthorn and also

comprises Elm, Dog-rose, Hawthorn, Field Maple, Pedunculate Oak and Ash. Species present within the ground flora comprises Cow Parsley.

- 7.4.35 **H6** is approximately 2-3m in height, is unmanaged and is gappy in nature. This hedgerow comprises Blackthorn, Elder, Hawthorn, Pedunculate Oak and Bramble and is adjacent to residential development.
- 7.4.36 **H7** is approximately 4-6m in height, is unmanaged and comprises Hawthorn, Holly, Hazel *Corylus avellana*, Blackthorn, Ash and Elder with Bramble present within the ground flora.
- 7.4.37 **H8** is approximately 4-6m in height, is unmanaged and comprises Hawthorn, Goat Willow *Salix caprea*, Ash, Elder, Pedunculate Oak, Hazel and Field Maple and is associated with a wet ditch. Species present within the ground flora comprise Bramble, Brooklime *Veronica beccabunga* and Greater Willowherb *Epilobium hirsutum*.
- 7.4.38 **H9** is approximately 4-6m in height, is unmanaged and comprises Blackthorn, Ash, Hawthorn, Hazel and Elm, with Bramble and Brooklime present within the ground flora. A wet ditch is associated with this hedgerow.
- 7.4.39 **H10** is approximately 3-4m in height, is unmanaged and is gappy in nature. This hedgerow comprises Hawthorn, Field Maple, Hazel, Elder, Holly and dead Elm with Bluebell present in the ground flora.
- 7.4.40 **H11** is approximately 4-6m in height, is unmanaged and is dominated by Blackthorn, with other species including Dog-rose, Ash, Field Maple, Hazel, Hawthorn, Pedunculate Oak, Elder and dead Elm with Bramble present trailing through.
- 7.4.41 **H12** is unmanaged and gappy in nature and is approximately 2-4m tall. This hedgerow comprises Elder, Dog-rose, Blackthorn, Holly, Field Maple and Hawthorn, with Bramble, Bluebell and Bracken *Pteridium aquilinum* present in the ground flora.
- 7.4.42 **H13** is approximately 2-4m in height, is unmanaged and comprises Sycamore *Acer pseudoplatanus*, Goat Willow, Silver Birch *Betula pendula*, Holly, Blackthorn and mature Pedunculate Oak and Ash. Species present within the ground flora comprise Bramble and Green Alkanet *Pentaglottis sempervirens*.
- 7.4.43 **H14** is approximately 3-4m in height, is unmanaged and is located along a dry ditch. This hedgerow is dominated by Hawthorn, while other species include Ash, Blackthorn, Dog-rose, Elm, Sycamore trees, with Ivy trailing through.
- 7.4.44 **H15** is approximately 4-6m tall and is face-managed but gappy in nature. Species present include Hawthorn, Elder, Holly, Elm, Ash, Dog-rose, Blackthorn, Hazel and Field Maple, with Bramble and Common Nettle present within the ground flora.

- 7.4.45 **H16** is approximately 2m tall, is box-cut and is dominated by Elm, with Hawthorn, Ash, Pedunculate Oak, Elder, Field Maple, and Dog-rose also present. Species present trailing through comprise Black Bryony *Tamus communis*, Cleavers and Bramble.
- 7.4.46 **H17** and **H18** are approximately 2m tall, are box-cut and are associated with a dry ditch. These hedgerows are dominated by Elm with Hawthorn, Field Maple, Dog-rose, Blackthorn and Elder also present. Species present trailing through the hedgerow comprise Bramble, Black Bryony and Ivy.
- 7.4.47 **H19** is approximately 6m in height, is unmanaged and is co-dominated by Hawthorn and Field Maple with White Poplar *Populus alba*, Norway Maple, Beech *Fagus sylvatica*, Sumac *Rhus glabra* and Oak also present. This hedgerow is gappy in places and Bramble is present trailing through this hedgerow.
- 7.4.48 **H20** lies within the wider study area, is approximately 6m in height, is unmanaged and is gappy in nature. Species present within this hedgerow comprise Hawthorn, Elder, Crack Willow *Salix fragilis*, Goat Willow, Blackthorn, Pedunculate Oak and Broom *Cytisus scoparius*. Bramble is present within the ground flora.
- 7.4.49 **H21** is approximately 8m tall and is vertically flailed. Species present within this hedgerow comprise Lime *Tilia* sp., Hawthorn, Elm, Elder, Ash trees and Oak trees with Ivy present trailing through.
- 7.4.50 **H22** is situated along the southern boundary of the Site, along Breach Lane, and is gappy in places and associated with a dry ditch. Species present comprise Hawthorn, Holly, Ash, Elder, sycamore and Elm. Species present within the ground flora comprises Common Nettle, with Ivy and Bramble trailing through.
- 7.4.51 **H23** is approximately 2m tall and is managed through box-cutting. This hedgerow is dominated by Hawthorn with Holly, Field Maple and Blackthorn also present. Ivy is present trailing through.
- 7.4.52 **H24** is approximately 2m in height, is box-cut and comprises Field Maple, Hawthorn, Hazel and Wild Cherry *Prunus avium*. Common Nettle is present in the ground flora, while Bramble, Cleavers and Hedge Bindweed are present trailing through.
- 7.4.53 **H25** is approximately 4-6m in height, is unmanaged and comprises Hawthorn, Pedunculate Oak, Elder and Blackthorn with Bramble present trailing through.
- 7.4.54 **H26** is unmanaged, is over 6m in height and comprises Pedunculate Oak, Ash, Hawthorn, Elder, Apple *Malus* sp. and Blackthorn, with Butterfly Bush *Buddleja davidii* also present. Bramble is present trailing through.

- 7.4.55 **H27** is approximately 4-6m in height, is face-managed and comprises Dogwood, Hawthorn and Elder. Species present trailing through comprise Bramble, Hedge Bindweed and Ivy.
- 7.4.56 **H28** is approximately 4-6m in height, is unmanaged and comprises Hawthorn, Blackthorn, Pedunculate Oak, Field Maple, Ash, Dog-rose, Elder, and Crab Apple *Malus sylvestris*, with Bramble and Ivy present trailing through.
- 7.4.57 **H29** is approximately 6m in height, is face-managed and is dominated by Blackthorn with Hawthorn, Ash, Elder, Rose *Rosa* sp. and dead Elm also present. Bramble and Ivy are present trailing through.
- 7.4.58 **H30** is unmanaged and gappy in places and is approximately 4m in height. Species present comprise Sycamore, Willow, Pedunculate Oak, Hawthorn, Elder, Hazel and Field Maple, with Bramble and Cleavers trailing through. Common Nettle is present in the ground flora.
- 7.4.59 **H31** is approximately 4-6m in height, is unmanaged and gappy in places and is associated with a dry ditch. This hedgerow is dominated by Elm, with Holly, Ash trees, Oak trees and Dog-rose also present. Ivy and Bramble are present trailing through.
- 7.4.60 **H32** is approximately 4-6m tall, is unmanaged and comprises Hawthorn, Ash and Dog-rose with Bramble and Ivy present trailing through.
- 7.4.61 **H33** is approximately 4-6m tall and is unmanaged. This hedgerow is dominated by Hawthorn, with Ash, Blackthorn and Lime also present. Bramble is present trailing through the hedgerow.
- 7.4.62 **H34** is approximately 4-6m in height, is unmanaged and gappy in nature. This hedgerow is dominated by Hawthorn. Ash, Elm, Elder, Blackthorn, Pedunculate Oak and Dog-rose are also present, while Bramble and Ivy are present trailing through.
- 7.4.63 **H35** is approximately 4-6m in height, is face-managed and is gappy in places. This hedgerow is associated with a dry ditch, with species present including Hawthorn, with Blackthorn, Hazel, Field Maple, Elder and Elm also present. Bramble, Cleavers and Ivy are present trailing through, with Common Nettle present in the ground flora.
- 7.4.64 **H36** is approximately 2m in height, is unmanaged and is dominated by Hawthorn. Other species include Field Maple and Hazel, with Bramble trailing through and Common Nettle and Raspberry *Rubus idaeus* present within the ground flora.
- 7.4.65 **H37** is approximately 2m in height, is box-cut and dominated by Hawthorn. Other species present include Blackthorn, Dog-rose, Field Maple, Hazel and Elder. Common Nettle and Cleavers are present in the ground flora.

- 7.4.66 **H38** is over 6m in height, is unmanaged and is associated with a stream. This hedgerow is fragmented at either end, with species present including Ash, Oak, Hawthorn, Lime, Willow and Elder with Rosebay Willowherb *Chamerion angustifolium* and Common Nettle present within the ground flora and Bittersweet *Solanum dulcamara* and Hedge Bindweed found trailing through.
- 7.4.67 **H39** is gappy in places, is approximately 3-6m tall and is unmanaged. This hedgerow is dominated by Elm, with Elder, Hawthorn, Holly and Spindle *Euonymus europaeus* also present. Bramble is present trailing through.
- 7.4.68 **H40** is unmanaged, is approximately 5m tall and comprises Hawthorn, Elm and Elder with Bramble and Ivy trailing through. Common Nettle is present within the ground flora.
- 7.4.69 **H41** lies within the wider study area, is approximately 2m in height, is box-cut and comprises Elm, some dead, and Hazel, with Bramble and Cleavers found trailing through.
- 7.4.70 **H42** is approximately 3-6m tall, is unmanaged and is dominated by Hawthorn. Other species present within this hedgerow include Blackthorn, Elm, Elder and Dog-rose, with Bramble present trailing through.
- 7.4.71 **H43** is approximately 4-6m in height, is gappy in nature and comprises Hawthorn, Elder, Blackthorn and standard Ash trees, with Bramble present trailing through.
- 7.4.72 **H44** is approximately 3-4m in height, is unmanaged and is dominated by Hawthorn. Other species include Ash, Elder, Field Maple and Hazel, with Bramble present trailing through.
- 7.4.73 **H47** is approximately 4-6m tall, is unmanaged and is dominated by Hawthorn, with Dog-rose, Ash, Holly, Pedunculate Oak and Elm also present.
- 7.4.74 **H48** is approximately 1-3m in height, is unmanaged and is dominated by Bramble. Other species present includes Elder and Elm, with Ivy trailing through.
- 7.4.75 **H49** lies adjacent to Mill Lane, is a gappy hedgerow measuring approximately 3m in height. The hedgerow is managed through box-cutting and is dominated by Elm with occasional Hawthorn and Elder. Cleavers, Ivy and Bramble trail through the hedgerow, with Common Nettle present in the ground flora.
- 7.4.76 **H50** is approximately 2m in height, is box-cut and comprises Field Maple, Hawthorn, Hazel and Elder, with Bramble and Cleavers trailing through and Hogweed present in the ground flora.

- 7.4.77 **H51** is approximately 2-4m in height, is face-managed and is dominated by Hawthorn. Other species present include Holly and Elder, with Bramble and Cleavers trailing through and Common Nettle present in the ground flora.
- 7.4.78 **H52** is approximately 1-2m in height, is box-cut and comprises Hawthorn, Oak and Holly, with Cleavers and Ivy trailing through and Common Nettle present in the ground flora.
- 7.4.79 **H53** and **H54** are approximately 1-2m in height, are box-cut and are dominated by Hawthorn. Other species present include Holly, Yew *Taxus baccata* and Elder, with Ivy trailing through and Common Nettle present in the ground flora.
- 7.4.80 **H55** is approximately 2-3m in height, is box-cut in part and face-managed at its eastern end. This hedgerow is dominated by Hawthorn, with other species including Holly, Oak, Ash, Magnolia *Magnolia* sp. and Leyland Cypress. Ivy, Cleavers and Bramble are found trailing through the hedgerow.
- 7.4.81 **H56** is box-cut, is approximately 2m in height and comprises Cherry Laurel, Leyland Cypress, Hawthorn, Field Maple and Silver Birch.
- 7.4.82 **H57** is approximately 3-4m in height and is unmanaged within the Site, but appears to be subject to cutting within the adjacent school. This hedgerow is dominated by Field Maple, with Ash, Dog-rose, Elder, Hawthorn, Guelder-rose *Viburnum opulus* and a Wild Cherry tree.

Trees

- 7.4.83 Within F6 there is a tree belt along the eastern boundary, adjacent to the WWTWs. There are also a small number of stands of trees within this field. Species present in the tree belt comprise Horse Chestnut *Aesculus hippocastanum*, Rowan *Sorbus aucuparia*, Crab Apple, Cherry *Prunus* sp., Hawthorn, Wayfaring Tree *Viburnum lantana*, Field Maple, Spindle, White Poplar and Holly. Species present in the stands of trees comprise Norway Maple *Acer platanoides*, Whitebeam *Sorbus aria* agg., Rowan, Ash, Beech, Sycamore, Silver Birch, Hawthorn, Alder *Alnus glutinosa* and Field Maple.

Scrub

- 7.4.84 There are areas of scrub throughout the Site associated with pond P1 and field margins. Species present comprise Hawthorn, Bramble, Field Maple, Blackthorn, Dog-rose and Barberry *Berberis vulgaris*.

Stream

- 7.4.85 Stream **S1**, Earl Shilton Brook, runs through the central and eastern half of the Site and is associated with the WwTW works. This stream is shallow in nature and species present along the banks of this stream comprise Greater Willowherb, Creeping Buttercup, Brooklime, Hedge

Woundwort *Stachys sylvatica*, Common Nettle, Soft Rush, Common Chickweed, Bog Stitchwort, Redshank *Persicaria maculosa*, Cow Parsley and Bramble.

Ponds

- 7.4.86 There are two ponds present within the Site.
- 7.4.87 Pond **P1** is a shallow pond within F1 which is surrounded by scrub. Species associated with this pond comprise Brooklime, Soft Rush, Great Willowherb, Water Crowfoot *Ranunculus aquatilis*, Floating Sweet Grass *Glyceria fluitans*, Cuckoo Flower and Typha.
- 7.4.88 Pond **P2** was identified during the early surveys, however had dried up during the most recent surveys. The pond was situated within F3 and is associated with hedgerow H8. During surveys between 2010 and 2015, it was recorded as shallow in nature with species comprising Brooklime, Bog Stitchwort, Cuckoo Flower, Soft Rush and Floating Sweet Grass. During surveys in 2019 and 2021, this pond was recorded as no longer present (dried up).

Japanese Knotweed

- 7.4.89 A small stand of Japanese Knotweed was recorded in the west of the Site, during surveys between 2010 and 2013, situated on the western boundary of F4, next to the school. This species was not identified during the most recent surveys in 2019 and 2021 but given the invasive nature of this species and difficulty in removal/treatment its past presence is still noted and given due regard in this assessment.

Buildings and Hardstanding

- 7.4.90 There are three buildings within the Site, **B1-B3**. Buildings B1 and B2 are collectively known as Ash Lodge and which are used as guide huts. These huts are situated within F6, while building **B3** lies adjacent to the amenity grassland fields in the north of the Site.
- 7.4.91 **B1** is constructed of wood with pitched, corrugated steel and asbestos roofing.
- 7.4.92 **B2** is a pre-fabricated building constructed with brick supports and wooden cladding. The roof is pitched and constructed of corrugated asbestos and there are wooden fascias present.
- 7.4.93 **B3** is a small single-storey building constructed of brick with a pitched corrugated metal roof.
- 7.4.94 Areas of hardstanding are present in the north of F20, in the form of tarmac and are associated with a children's play area. In the north of F6 is an area of gravel hardstanding, associated with building B1, which is being colonised by ruderal and grassland species. Recolonising species present include Soft Rush, Crested Dog's Tail, Common Mouse-Ear,

Scentless Mayweed *Tripleurospermum inodorum*, Curled Dock, Cut-Leaved Crane's-Bill, Pendulous Sedge *Carex pendula*, Dove's-Foot Crane's-Bill *Geranium molle*, Moss, Pineappleweed, Scarlet Pimpernel *Anagallis arvensis subsp. arvensis*, Broad-Leaved Willowherb, Bugle *Ajuga reptans* and Yarrow.

Background Records

- 7.4.95 The Leicestershire and Rutland Environmental Records Centre (LRERC) returned no notable plant records from within the Site. The closest record returned was a record of the Schedule 8 species (sale only) Bluebell *Hyacinthoides non-scripta* located approximately 0.36km northeast of the Site in 2019.

Wildlife Use of the Site

- 7.4.96 General observations were made during habitat surveys of any faunal use of the Site, with attention paid to the potential presence of protected species. In addition, specific surveys were carried out between May 2010 and September 2021 for the presence of Badgers, bats, Water Vole, reptiles and Great Crested Newts.

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Bats

Building Surveys

- 7.4.101 **B1** is constructed of wood with pitched, corrugated steel and asbestos roofing. Given the fabric of this building, it is considered to have negligible potential to support roosting bats.
- 7.4.102 **B2** is a pre-fabricated building constructed with brick supports and wooden cladding. The roof is pitched and constructed of corrugated asbestos and there are wooden fascias present. A few gaps are present between the wooden cladding boards, although these are superficial in nature and are not considered to offer suitable roosting opportunities for bats. Internally, there is a false ceiling present with a void that is approximately 1m to the apex. No insulation is present within this void and the roofing sheets are laid directly onto wooden beams. No gaps between the roofing sheets were recorded. As such, it is not considered B2 offers suitable opportunities for roosting bats.
- 7.4.103 **B3** is a small single-storey building constructed of brick with a pitched corrugated metal roof. Given the fabric of this building, it is considered to have negligible potential to support roosting bats.

Tree Surveys

- 7.4.104 A total of 12 trees (T1-T12) were identified within the Site as having potential to support roosting bats during the latest survey assessment in 2021. The locations of these trees are shown on **Figure 7.3**.
- 7.4.105 **T1, T2, T3, T5** and **T6** are Ash trees, each with a single rot hole and are considered to have low-moderate potential to support roosting bats.
- 7.4.106 **T4** is an Ash tree with a dense covering of Ivy and is considered to have low potential to support roosting bats.
- 7.4.107 **T7** and **T9** are Ash trees, each with a single branch scar and are considered to have low-moderate potential to support roosting bats.
- 7.4.108 **T8** is an Oak tree with a single rot hole and is considered to have low-moderate potential to support roosting bats.
- 7.4.109 **T10** is an Oak tree with branch scarring and one rot hole present. This tree is considered to have moderate potential to support roosting bats.
- 7.4.110 **T11** is a dead Oak tree with peeling bark and vertical cracks up its trunk. This tree is considered to have low-moderate potential to support roosting bats.
- 7.4.111 **T12** is an Ash tree with a branch scar and a single rot hole and is considered to have moderate potential to support roosting bats.

- 7.4.112 A dead Ash tree previously identified as having potential to support roosting bats was recorded within H15, however this tree is no longer present.

Activity Surveys

- 7.4.113 On 15th June 2010, a total of 37 Common Pipistrelle *Pipistrellus pipistrellus* registrations were recorded across the Site, with five registrations by Soprano Pipistrelle *Pipistrellus pygmaeus*, one registration of Noctule *Nyctalus noctula* and one registration of *Myotis* sp., all recorded foraging and commuting along hedgerows within the Site. The majority of registrations were concentrated around pond P2, along H16 and along S1.
- 7.4.114 On 22nd July 2010, a total of 60 registrations by Common Pipistrelle were recorded across the Site. No other bat species were recorded during this survey. The activity centred around pond P2, along hedgerows H14, H29, H30 and H31a, and along S1 and the boundary of the associated WwTW.
- 7.4.115 On 9th September 2010, a total of 64 registrations by Common Pipistrelle were recorded across the Site. A total of 10 registrations by Soprano Pipistrelle, one registration by Noctule, one registration by *Myotis* sp., and one registration by Brown Long-Eared *Plecotus auritus* were also recorded across the Site. The activity was recorded across the Site, with the *Myotis* and Brown Long-eared bats recorded along H21 associated with the WwTW works.
- 7.4.116 On 29th May 2013, a total of 61 registrations of Common Pipistrelle were recorded across the Site, with the majority recorded foraging along hedgerows H16, H15 and H47. A bat detector was left overnight at the junction of hedgerows H3 and H4, which recorded a total of four registrations of Common Pipistrelle. A second bat detector was left overnight at the junction of hedgerows H15 and H16 and a total of 40 registrations of Common Pipistrelle were recorded on this detector.
- 7.4.117 On 1st July 2013, a total of 13 registrations of Common Pipistrelle were recorded within the Site, with the majority of activity recorded along hedgerows H13, H11, and H9 in the west of the Site and along hedgerow H35 in the central south of the Site. Detectors were left out overnight at the southern end of hedgerow H11 and at the southern end of hedgerow H26. A total of 62 registrations of Common Pipistrelle and a single registration of a brown long-eared bat were recorded by the detector left at the southern end of H11. A total of 11 registrations of Common Pipistrelle were recorded by the detector left at southern end of H26.
- 7.4.118 On 12th August 2013, a total of 144 registrations of Common Pipistrelle bats were recorded within the Site, with the majority recorded along hedgerows H15 and H47 through the centre of the Site, and at the eastern end of hedgerow H38. Bat detectors were left overnight on the eastern side of pond P1 and at the southern end of hedgerow H47. A total of four registrations of Common Pipistrelle were recorded by the detector left on the eastern end of pond P1, while a total of 112 registrations of

Common Pipistrelle were recorded by the detector left at the southern end of hedgerow H47.

- 7.4.119 On 24th September 2013, a total of 44 registrations of Common Pipistrelle bats were recorded throughout the Site, as well as a single registration of a noctule bat (recorded in F14). The majority of the bat activity was recorded along H16 and H29/H30, with less activity recorded along H3, H13 and H9/H11. A detector was left out overnight along H2, with only a single registration of a Common Pipistrelle bat recorded being recorded.
- 7.4.120 On 2nd July 2015, a total of 435 Common Pipistrelle registration were recorded within the Site as well as 1 registration of Nathusius' Pipistrelle *Pipistrellus nathusii* and one registration of both a Soprano Pipistrelle and Leisler's *Nyctalus leisleri*.
- 7.4.121 On 22nd July 2015, a total of 760 Common Pipistrelle registrations were recorded within the Site as well as 14 registrations of Brown Long-eared and 1 registration of Soprano Pipistrelle.
- 7.4.122 On 13th October 2015, a total of 40 Common Pipistrelle registrations were recorded within the Site.
- 7.4.123 On 9th May 2019, a total of 43 registrations of Common Pipistrelle bats were recorded, the vast majority of which were associated with the offsite trees associated with the border between the Site and the WwTW works. 1 registration of *Myotis sp.* was also recorded at the eastern end of hedgerow H19.
- 7.4.124 On 15th July 2019, a total of 76 registrations of Common Pipistrelle were recorded throughout the Site with the majority concentrated in the western half of the Site. 5 registrations of Nathusius' Pipistrelle were also recorded across the Site, as well as 5 registrations of Noctule recorded along hedgerow H17, 2 registrations of Leisler's recorded along hedgerow H8 and H31 and 2 registrations of Soprano Pipistrelle recorded along hedgerow H53.
- 7.4.125 On 5th September 2019, a total of 125 registration of Common Pipistrelle were recorded throughout the Site with high concentration along hedgerows H13 and H21. 9 registrations of *Myotis sp.* were also recorded along hedgerows H13, H17, H21 and H29, as well as 3 Noctule registrations along hedgerows H17, H22 and H6 and 2 registrations of Leisler's in the corner of hedgerows H7 and H10 and along H50.
- 7.4.126 In summary, the vast majority of activity recorded within the Site during these surveys was recorded from Common Pipistrelle *Pipistrellus pipistrellus* bats, with lower levels of activity from Soprano Pipistrelle, Nathusius' Pipistrelle, Noctule, Leisler's and Brown Long-eared bats.

Automated Surveys

- 7.4.127 A total of three automated bat detectors were left out for a minimum of five consecutive nights in May, July and September 2019. The locations

where the automated detectors were placed can be seen on **Figures 7.4 - 7.6**, while the weather conditions for these surveys can be seen at Annex 7.2.

7.4.128 **May 2019.** Three detectors were left out for a period of five consecutive nights between 9th and 13th May 2019, at location 1 within hedgerow H17, at location 2 within hedgerow H51 and location 3 within hedgerow H12. The locations of these detectors can be seen on **Figure 7.4**.

7.4.129 At Location 1 (see **Figure 7.4**), low levels of bat activity were recorded. The majority of activity was recorded from Common Pipistrelle, with two registrations from Soprano Pipistrelle and one registration from Noctule over the five nights. The results of this survey can be seen in Table 7.1.

Table 7.1 Automated bat survey results May 2019 – Location 1.

Species	Number of registrations - Location 1				
	09.05.19	10.05.19	11.05.19	12.05.19	13.05.19
Common Pipistrelle	0	18	32	1355	525
Soprano Pipistrelle	0	0	0	2	0
Noctule	0	0	0	1	0

7.4.130 At location 2 (see **Figure 7.4**) very low levels of bat activity were recorded. The majority of activity was recorded from Common Pipistrelle, with single registrations from both a Nathusius' Pipistrelle and a Noctule over the five nights. The results of this survey can be seen in Table 7.2.

Table 7.2 Automated bat survey results May 2019 – Location 2.

Species	Number of registrations - Location 2				
	09.05.19	10.05.19	11.05.19	12.05.19	13.05.19
Common Pipistrelle	0	7	14	16	14
Nathusius' Pipistrelle	0	0	0	1	0
Noctule	0	0	0	1	0

7.4.131 At location 3 (see **Figure 7.4**) generally very low levels of bat activity were recorded. The majority of activity was recorded from Common Pipistrelle, with two registrations from Leisler's over the five nights. The results of this survey can be seen in Table 7.3.

Table 7.3 Automated bat survey results May 2019 – Location 3.

Species	Number of registrations - Location 3				
	09.05.19	10.05.19	11.05.19	12.05.19	13.05.19
Common Pipistrelle	0	2	3	10	8
Leisler's	0	0	0	0	2

7.4.132 **July 2019.** Three detectors were left out for a period of five consecutive nights between 11th and 15th July 2019, at location 1 within hedgerow H26, at location 2 within hedgerow H34 and at location 3 within hedgerow H23. The locations of these detectors can be seen on **Figure 7.5**.

- 7.4.133 At Location 1 (see **Figure 7.5**), low levels of bat activity were recorded. The majority of activity was recorded from Common Pipistrelle, with very low levels of activity from Nathusius' Pipistrelle, Noctule and Leisler's over the five nights. The results of this survey can be seen in Table 7.4.

Table 7.4 Automated bat survey results July 2020 – Location 1.

Species	Number of registrations - Location 1				
	11.07.19	12.07.19	13.07.19	14.07.19	15.07.19
Common Pipistrelle	11	32	30	68	73
Nathusius' Pipistrelle	0	2	2	4	6
Noctule	0	2	2	0	1
Leisler's	0	0	3	0	0

- 7.4.134 At Location 2 (see **Figure 7.5**), low levels of bat activity were recorded. The majority of activity was recorded from Common Pipistrelle, *Myotis* sp. and *Nyctalus* sp., with very low levels of activity from Nathusius' Pipistrelle, Noctule and Leisler's and two registration of *Myotis* sp. and one registration for both a Soprano Pipistrelle and Brown Long-eared recorded over the five nights. The results of this survey can be seen in Table 7.5.

Table 7.5 Automated bat survey results July 2020 – Location 2.

Species	Number of registrations - Location 2				
	11.07.19	12.07.19	13.07.19	14.07.19	15.07.19
Common Pipistrelle	7	12	18	22	76
Soprano Pipistrelle	0	0	0	0	1
Nathusius' Pipistrelle	0	0	1	0	10
Noctule	0	0	3	0	2
Leisler's	0	0	10	0	9
<i>Myotis</i> sp.	0	0	0	1	1
Brown Long-eared	0	0	0	0	1

- 7.4.135 At Location 3 (see **Figure 7.5**), low levels of bat activity were recorded. The majority of activity was recorded from Common Pipistrelle. Two registrations from both Nathusius' Pipistrelle and Noctule and one registration from a Soprano Pipistrelle, Leisler's and Brown Long-eared were also recorded over the five nights. The results of this survey can be seen in Table 7.6.

Table 7.6 Automated bat survey results July 2020 – Location 3.

Species	Number of registrations - Location 3				
	11.07.19	12.07.19	13.07.19	14.07.19	15.07.19
Common Pipistrelle	14	25	50	145	180
Soprano Pipistrelle	0	0	0	1	0
Nathusius' Pipistrelle	0	0	1	0	1
Noctule	1	0	1	0	1
Leisler's	0	0	0	0	1
Brown Long-eared	0	1	1	0	0

7.4.136 **September 2019.** Two detectors were left out for a period of five consecutive nights between 5th and 9th September 2019, at location 1 within hedgerow H28 and at location 2 hedgerow H21. The locations of these detectors can be seen on **Figure 7.6**.

7.4.137 At location 1 (see **Figure 7.6**), generally very low levels of bat activity were recorded. The majority of activity was recorded from Common Pipistrelle, with four registrations from Noctule, three registrations from both Nathusius' Pipistrelle and *Myotis sp.* and a single registration from a Soprano Pipistrelle over the five nights. The results of this survey can be seen in Table 7.7.

Table 7.7 Automated bat survey results September 2019 – Location 1.

Species	Number of registrations - Location 1				
	05.09.19	06.09.19	07.09.19	08.09.19	09.09.19
Common Pipistrelle	0	4	27	21	26
Soprano Pipistrelle	0	0	0	0	1
Nathusius' Pipistrelle	0	0	1	1	1
Noctule	0	1	1	0	2
<i>Myotis sp.</i>	0	2	0	0	1

7.4.138 At location 2 (see **Figure 7.6**), generally low levels of bat activity were recorded. The majority of activity was recorded from Common Pipistrelle, with low levels of activity from *Myotis sp.*, very low activity from Noctule and two registrations from Leisler's over the five nights. The results of this survey can be seen in Table 7.8.

Table 7.8 Automated bat survey results August 2020 – Location 2.

Species	Number of registrations - Location 2				
	05.09.19	06.09.19	07.09.19	08.09.19	09.09.19
Common Pipistrelle	35	10	35	39	24
Noctule	2	1	2	2	4
Leisler's	0	0	1	1	0
<i>Myotis sp.</i>	0	1	5	4	14

- 7.4.139 **Overall Summary.** Overall, the vast majority of activity recorded on the automated detectors was from Common Pipistrelle bats, with low or occasional activity recorded from Soprano Pipistrelle, *Myotis sp.*, Nathusius' Pipistrelle, Noctule, Leisler's and Brown Long-eared.
- 7.4.140 From the results of the activity and automated survey results, it can be seen that low bat activity was present throughout the Site mainly comprising common (and, in the main, relatively more light tolerant) species. The surveys show that the bat activity is generally associated with the hedgerows especially the hedgerows in the west of the Site and hedgerow H21 including the area to the south associated with the WwTW works.
- 7.4.141 **Background Records.** The LRERC returned a number of records of bat roosts from within the Site. The closest record was for a roost of Common Pipistrelle, located within a grid square that includes the Site in 2015. The next closest roost was a record of an unspecified Pipistrelle *Pipistrellus* sp. species located approximately 1m northwest of the Site in 2016. The closest records for bats returned by the LRERC were a record of Common Pipistrelle returned from a grid square that includes the Site in 2015. The next closest records returned were a record of Brown Long-eared Bat located approximately 45m northwest of the Site in 2007, a record of Serotine located approximately 0.52km northeast in 2010, a record of Noctule located approximately 0.66km northeast in 2019 and records of a Daubenton's and a Soprano Pipistrelle both located 0.86km east in 2016.

Water Vole

- 7.4.142 Surveys for Water Vole were carried out during in May 2010. No evidence of Water Vole was recorded along the Earl Shilton Brook (S1).
- 7.4.143 Surveys in June 2021 and September 2021 recorded evidence of Water Vole burrows, feeding stations and latrines. The results of these surveys are shown on **Figure 7.3**. A sample of droppings was collected and sent for DNA analysis which confirmed the droppings to have derived from Water Vole.
- 7.4.144 With a total of four latrines recorded within the 300m section of the stream, and in line with the Water Vole Mitigation Guidelines²⁰ (paragraph 3.3.16), this would represent an average of 1.33 latrines per 100m and as such is categorised as a **low population of Water Voles**. This approach to estimating population density has been used previously in granted Water Vole mitigation licences.
- 7.4.145 **Background Records.** The closest record returned from the LRERC for Water Vole was a record located approximately 0.94km southwest of the Site in 2001. This was the only record returned.

²⁰ Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016) The Water Vole Mitigation Handbook (Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. Mammal Society, London.

Otter

- 7.4.146 Surveys for Otter were carried out in tandem with the Water Vole surveys in May 2010, June 2021 and September 2021. No evidence of Otter was recorded along the stream S1, and it is considered this stream has limited suitable habitat for Otter, other than as a 'corridor' for dispersal.
- 7.4.147 **Background Records.** The closest record returned from the LRERC for Otter was a record located approximately 0.87km south of the Site in 2002. This was the only record returned.

Other Mammals

- 7.4.148 A Brown Rat *Rattus norvegicus* was recorded along S1 and Rabbits *Oryctolagus cuniculus* were recorded across the Site, with evidence of warrens recorded associated with a number of hedgerows. A Fox *Vulpes vulpes* was recorded within fields F3 and F4 on one occasion.
- 7.4.149 No other evidence of mammals was recorded within the Site, although it is considered that a variety of common mammal species would use the hedgerows, semi-improved and species-rich semi-improved grassland habitats.
- 7.4.150 **Background Records.** The LRERC returned no records of any notable mammals from within the Site. The closest record of a Hedgehog *Erinaceus europaeus* (a Priority Species) was returned from approximately 85m southwest of the Site in 2013.
- 7.4.151 It is considered that the hedgerows, woodland and grassland margins within the Site offer some potentially suitable opportunities for Hedgehog. Given the habitats present in the wider area, it is not considered that this species would be reliant on habitats present within the Site.

Birds

- 7.4.152 Breeding bird surveys were conducted on three visits in May, June and July 2010.
- 7.4.153 20 species of bird were recorded within the Site during the survey in May, including the Red List species Song Thrush *Turdus philomelos* and House Sparrow *Passer domesticus*. Cuckoo *Cuculus canorus* was heard during the surveys but it is considered this species was calling from off-site. During the May 2010 bat survey, a Barn Owl, a Schedule 1 and Local BAP species, was recorded flying within F3 in the Site.
- 7.4.154 During the June survey, 22 bird species were recorded within the Site, including the Red List species Skylark *Alauda arvensis*, House Sparrow, Song Thrush, Linnet *Linaria cannabina* and Starling *Sturnus vulgaris*.
- 7.4.155 During the July survey, 19 bird species were recorded within the Site, including the Red List species Yellowhammer *Emberiza citrinella*, Skylark

and Linnet. During this survey it was noted Song Thrush were no longer singing within the Site.

- 7.4.156 Other species recorded within the Site, in addition to those cited above, include Chaffinch *Fringilla coelebs*, Dunnock *Prunella modularis*, Robin *Erithacus rubecula*, Greenfinch *Chloris chloris*, Wren *Troglodytes troglodytes*, Woodpigeon *Columba palumbus*, Chiffchaff *Phylloscopus collybita*, Long-Tailed Tit *Aegithalos caudatus*, Great Tit *Parus major*, Blue Tit *Cyanistes caeruleus*, Moorhen *Gallinula chloropus*, Kestrel *Falco tinnunculus*, Whitethroat *Sylvia communis*, Magpie *Pica pica*, Blackcap *Sylvia atricapilla*, Goldfinch *Carduelis carduelis*, Carrion Crow *Corvus corone*, Pheasant *Phasianus colchicus* and Willow Warbler *Phylloscopus trochilus*. Blackbird *Turdus merula* were confirmed breeding within the Site as they were recorded carrying food.
- 7.4.157 Of the Red List and Schedule 1 species recorded within the Site Song Thrush were recorded probably breeding within the Site as a number of Song Thrush were observed holding territory and calling from song posts. There was a maximum of 11 Song Thrush calling within the Site on any one survey. It is considered the Site therefore supports at least 11 breeding pairs of Song Thrush. Given the habitats present within the Site it is considered that Linnet, Starling and Yellowhammer are possibly breeding within the Site. House Sparrow were recorded at the northern and western boundaries of the Site, associated with the existing housing, although given the habitats present within the Site it is considered House Sparrow are possibly breeding within the Site. A Barn Owl was recorded foraging within the Site, but given the lack of suitable breeding opportunities within the Site, it is not considered this species utilises the Site for breeding. Individual Skylark were recorded within fields F15 and F17 during the surveys, although no evidence of territorial behaviour or breeding was recorded within the Site.
- 7.4.158 Of the other species recorded within the Site Great Tit, Blue Tit and Long-Tailed Tit were observed in small groups, and given the habitats present it is considered that these species probably utilise the Site for breeding. The remaining species are considered to possibly be breeding within the Site. In light of the 2010 breeding bird survey results, as well as the arable habitats present within the Site, no updated surveys were deemed necessary and indeed were not requested by the Leicestershire County Council Ecology Team Leader.
- 7.4.159 No trees or buildings within the Site are considered to offer nesting opportunities for Barn Owl and usage of habitats within the Site by this species is likely to be restricted to foraging.
- 7.4.160 It is considered the hedgerows, trees and scrub offer suitable opportunities for nesting and foraging birds, while the rough grassland margins and species-rich semi-improved grassland offer some limited nesting opportunities for ground nesting birds, as well as foraging opportunities for a range of birds. In addition, the amenity grassland and semi-improved grassland within the Site offer suitable opportunities for foraging birds.

- 7.4.161 **Background Records.** Information received from the LRERC returned no records of any notable species from within the Site. The nearest records returned were a record of the Red Listed and Priority Species Skylark and Yellowhammer located within a grid square that includes the Site in 2016, a record of the Schedule 1 Species Kingfisher *Alcedo atthis* located within a grid square that includes the Site in 2016, a record of the Priority Species Reed Bunting *Emberiza schoeniclus* located within a grid square that includes the Site in 2014 and a record of the Red Listed and Priority Species Linnet located within a grid square that includes the Site in 2017.

Reptiles

- 7.4.162 Specific surveys for reptiles were carried out within all suitable reptile habitat within the Site between July and August 2010 and between June and August 2019.
- 7.4.163 No reptiles were recorded during these surveys.
- 7.4.164 **Previous Surveys.** Surveys for reptiles were previously undertaken by Ecology Solutions in 2009 within the area of the Site that lies to the northeast of Mill Lane. No reptiles were recorded during these surveys.

- 7.4.165 **Background Records.** Information received from the LRERC returned no records of any notable species from within the Site. The nearest record for Grass Snake was returned 0.9km east of the Site in 1967, and there were no more recent records returned. The most recent information received from the LRERC returned no records for any reptiles.

- 7.4.166 Given that no reptiles were recorded within the Site during any surveys, no further regard is given to this group within the remainder of this report.

Great Crested Newts

- 7.4.167 There are two ponds (P1 and P2) within the centre of the Site, an off-site pond (P3) adjacent to the northern boundary of the wider study area and a further offsite located to the east of the Site (P4) which were all surveyed for the presence of Great Crested Newts.
- 7.4.168 Ponds P1-P3 were subject to full aquatic surveys between May and June 2010, between May and June 2012 and between March and May 2016. The results of these surveys is set out below.

Table 7.9 Full aquatic survey results May – June 2010.

Date	Pond No.	Great Crested Newt		Smooth Newt	
		Male	Female	Male	Female
05/05/2010	P1	1	0	24	27
	P2	0	0	0	0
	P3	0	0	6	6
12/05/2010	P1	0	0	0	0
	P2	0	0	0	0
	P3	0	0	4	6
19/05/2010	P1	0	0	0	0
	P2	0	0	0	0
	P3	0	0	0	3
25/05/2010	P1	0	0	0	0
	P2	0	0	0	0
	P3	0	0	0	0
08/06/2010	P1	0	0	0	0
15/06/2010	P1	0	0	0	0

7.4.169 During the 2010 full aquatic surveys, A small population of Great Crested Newts was recorded within pond P1, with a maximum of one individual male recorded on one occasion. A medium population of Smooth Newts *Lissotriton vulgaris* was also recorded within this pond.

7.4.170 A small population of Smooth Newts was recorded within pond P3, adjacent to the northern boundary of the Site. This pond also contained a large number of Common Frog *Rana temporaria* tadpoles. Pond P3 is drainage pond associated with the new residential development adjacent to the north of the Site. The pond is connected to a drainage ditch and is steep-sided in nature. The suitable terrestrial habitat surrounding this pond is limited to the grassland covering the steep bank and hedgerow H20, although the grassland surrounding this pond is maintained with a short sward length.

Table 7.10 Full aquatic survey results May – June 2012.

Date	Pond No.	Great Crested Newt		Smooth Newt	
		Male	Female	Male	Female
04/05/2012	P1	0	0	0	0
	P2	0	0	0	0
	P3	0	0	0	0
10/05/2012	P1	0	0	2	0
	P2	0	0	0	0
	P3	0	0	0	1
17/05/2012	P1	0	0	7	8
	P2	0	0	0	0
	P3	0	0	0	0
24/05/2012	P1	2	0	20	15
	P2	0	0	0	0
	P3	0	0	0	0
30/05/2012	P1	0	0	26	1
	P2	0	0	0	0
	P3	0	0	0	0
07/06/2012	P1	0	0	11	2
	P2	0	0	0	0
	P3	0	0	0	0

- 7.4.171 During the 2012 surveys, a total of two male Great Crested Newts were recorded within P1 on one survey night, while a medium population of Smooth Newts were also recorded from this pond. A small population of Smooth Newts were also recorded within P3, with an individual female recorded on one occasion. As such, the 2012 results were consistent with the prior 2010 surveys.

Table 7.11 Full aquatic survey results March – May 2016.

Date	Pond No.	Great Crested Newt		Smooth Newt		Palmate Newt	
		Male	Female	Male	Female	Male	Female
30/03/2016	P1	0	0	0	0	0	0
	P2	0	0	0	0	0	0
	P3	0	0	0	0	0	0
05/04/2016	P1	1	1	9	10	0	4
	P2	0	0	0	0	0	0
	P3	0	0	0	0	0	0
12/04/2016	P1	0	0	1	1	0	0
	P2	0	0	0	0	0	0
	P3	0	0	0	0	0	0
18/04/2016	P1	0	0	14	9	0	3
	P2	0	0	0	0	0	0
	P3	0	0	0	0	0	0
03/05/2016	P1	0	0	12	19	0	0
	P2	0	0	0	0	0	0
	P3	0	0	0	0	0	0
11/05/2016	P1	2	0	6	8	0	0
	P2	0	0	0	0	0	0
	P3	0	0	0	0	0	0

- 7.4.172 During the 2016 surveys, a low population of Great Crested Newts was again recorded within P1 during two of the six surveys (consistent with the findings from 2010 and 2012). In addition, a medium population of Smooth Newts was recorded in P1, as well as a low population of Palmate Newts *Lissotriton helveticus*.
- 7.4.173 In April 2019, ponds P1-P4 were subject to eDNA surveys. However, ponds P1-P3 were recorded as being dry so only pond P4 was surveyed. Pond P4 was returned as negative for the presence of Great Crested Newts.
- 7.4.174 In April 2021, ponds P1-P3 were subject to eDNA surveys. Ponds P2 and P3 were recorded as being dry and as such, only pond P1 was surveyed. Pond P1 was returned as negative for the presence of Great Crested Newts.
- 7.4.175 **Previous Surveys.** Surveys conducted by FPCR in 2004 at Breach Lane south of the Site, recorded a medium population of Great Crested Newts within pond P1, with a maximum count of 15 individuals on any one survey.
- 7.4.176 **Background Records.** The LRERC returned a number of records of Great Crested Newt from within the search area. The closest record for

Great Crested Newt was returned from within the Site (P1) in 2012, which correlates with the findings of the 2012 survey. The next closest record was a record from approximately 0.63km northwest of the Site in 2018.

- 7.4.177 It is considered that the small population recorded during the 2010 surveys carried out by Ecology Solutions is a relict population of that recorded in 2004, which has declined as the pond has become less suitable over time.
- 7.4.178 The most recent surveys indicate that pond P1 has deteriorated further in its condition and holds limited levels of levels of water, thereby reducing its potential to support Great Crested Newts. Indeed, the most recent survey in April 2021 did not record any evidence of Great Crested Newts within P1.

Invertebrates

- 7.4.179 Given the habitats present it is likely an assemblage of common invertebrate species would be present within the Site. However, there is no evidence to suggest that any rare or notable species would be present.
- 7.4.180 It is considered that the Site is likely to support a range of common invertebrate species, although given the intensive agricultural usage there is no evidence to suggest that any notable invertebrates would likely be present.
- 7.4.181 **Background Records.** The LRERC returned records for Small Square-spot *Diarsia rubi*, White Ermine *Spilosoma lubricipeda*, Buff Ermine *Spilosoma lutea* and Pale Eggar *Trichiura crataegi* located within a grid square that includes the Site in 2016. The records also state that these species were found in a garden which means that the records likely come from one of the gardens associated with the residential dwellings in close proximity to the Site.
- 7.4.182 The larval foodplants of Small Square-spot and White Ermine include a wide range of herbaceous species, the larval foodplants of the White Ermine include Common Nettle, Honeysuckle *Lonicera periclymenum*, Hop *Humulus lupulus* and Birch *Betula* species and the larval foodplants of Pale Eggar include Birch species, Blackthorn and Hawthorn. As such, it is considered that habitats present within the Site offer some opportunities for these species, although it is not considered this species would be reliant upon the habitats present within the Site.

Other Species

- 7.4.183 Given the habitats present and records from the local area, there is no evidence from site surveys or desk studies to suggest that any other protected or notable species would be present within the Site or wider study area or affected by the proposed development.

7.5 ECOLOGICAL EVALUATION & IDENTIFICATION OF KEY IMPACTS (PRE AND POST MITIGATION)

- 7.5.1 This section identifies all potentially significant likely impacts, both during construction and during operation (beneficial and adverse), such that mitigation can be identified where necessary to negate such impacts, and enhancements put forward, where appropriate.

Impacts on Designated Sites

- 7.5.2 A number of designated sites are present within the vicinity of the Site. These are shown on **Figure 7.1**.

Statutory Sites

- 7.5.3 There are no statutory designated nature conservation sites within or adjacent to the Site or wider study area.
- 7.5.4 The Site is well separated from Burbage Common LNR by existing urban development and open countryside, as well as major and minor roads. The Site is also well separated from Croft Hill SSSI by extensive agricultural land, as well as and major and minor roads and there is no Impact Risk Zone (IRZ) associated within this SSSI.
- 7.5.5 The Site lies within one SSSI impact risk zone, which highlights potential impacts from “*any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water such as a beck or stream*”. This potential impact corresponds to Narborough Bog SSSI, located approximately 6.8km east of the Site.
- 7.5.6 All foul water will be discharged into foul sewers and an appropriate SuDS scheme has been designed. As such, it is considered that the proposed development will pose no significant harm to the Narborough Bog SSSI and the proposed drainage strategy conforms to requirements stated by Natural England. As also set out within **Chapter 15: Water Environment** of the ES and the Drainage Strategy, there will be no impacts from any contaminated surface run-off during the construction or operational stages, subject to appropriate mitigation.
- 7.5.7 **Impacts:** Given the proposed drainage strategy, the proposed development will not have a direct or indirect impact on Croft Hill SSSI or Narborough Bog SSSI or any other statutory designated site.
- 7.5.8 **Mitigation and Enhancements:** No ecological mitigation required.

Non-Statutory Sites

- 7.5.9 There are no non-statutory designated nature conservation sites within or directly adjacent to the Site or wider study area.
- 7.5.10 Normanton Wood Hedgerow Potential Local Wildlife Site (pLWS) is separated from the Site by the A47 road, while Hay Meadow LWS is well-

separated from the Site by open agricultural land and the A47 road. As such, no likely adverse effects are anticipated at the operational stage particularly given the inclusion of public open space within the Site itself.

- 7.5.11 **Impacts:** The Proposed Development may lead to increased levels of pollution from dust upon Normanton Wood Hedgerow pLWS during the construction phase albeit this potential impact has a very low likelihood to be of significance given the separation from the Site by the existing A47 road. The Proposed Development will not have a direct or indirect impact on Hay Meadow LWS or any other non-statutory designated sites of nature conservation interest.

- 7.5.12 **Mitigation and Enhancements:** An increased level of dust may arise from construction traffic movements and earthworks. Deposition of this dust on the surrounding vegetation may lead to temporary declines in hedgerow flora of the pLWS. Measures to mitigate dust emissions will be implemented during the construction phase (see **Chapter 6: Air Quality** for further information). Any potential effects would be easily minimised through use of standard mitigation techniques such that residual effects are of negligible significance. Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate any ditches that lie within close proximity to the pLWS. Even with these measures in place, there remains a slight risk that the pLWS might be affected by very occasional dust-soiling impacts. Any effects will be temporary and relatively short lived, and will only arise during dry weather with the wind blowing towards the receptor, at a time when dust is being generated. The overall impacts during the construction phase with mitigation measures in place are judged to be of negligible significance.

Impacts on Habitats

- 7.5.13 The majority of the Site is considered to be of low intrinsic ecological value, and any losses to the Proposed Development of the arable, rough grassland margins and amenity grassland are considered to be of negligible ecological significance. The species-rich semi-improved grassland, hedgerows and trees are considered to be of relatively greater ecological value in the context of the Site. Where losses occur, they will be offset through the creation of habitats of equal or greater value, included within areas of open green space within the site (and planted with species of known value to wildlife) and/or off-site through an offsetting scheme (or financial contributions towards such a scheme).

Arable

- 7.5.14 The arable fields are of negligible ecological value in terms of species content. This habitat will be lost to the Proposed Development or converted to other habitat types within proposed open spaces.
- 7.5.15 **Impacts:** Loss of this habitat to the Proposed Development / conversion of areas into open space.

*Prior to mitigation, impacts are **adverse at the site level** and are of **negligible-minor significance**.*

7.5.16 **Mitigation and Enhancements.** The areas of arable land that are to be converted to open space will be sown with a native species-rich wildflower grassland mixture (such as Emorsgate's Standard General Purpose Meadow Mixture EM2) and be subject to a suitable management regime to increase its floristic diversity accordingly. In addition, new native tree planting is to occur within these areas of new wildflower grassland.

7.5.17 The planting of new native hedgerows and trees as part of the Proposed Development will also serve to enhance the floristic diversity of the Site.

7.5.18 New attenuation basins are to be created as part of the Proposed Development, which will be planted with new native aquatic and marginal vegetation where wet, and with a species-rich grassland seed mixture tolerant of wet / damp condition (such as Emorsgate's Meadow Mixture for Wetlands EM8) where dry.

*Post mitigation and enhancements, effects are **beneficial at the site level** and are of **minor-moderate significance**.*

Semi-improved Grassland

7.5.19 The species-rich semi-improved grassland within the Site is considered to be of some greater ecological value, given the relatively diverse species content with some indicator species present. The species-poor semi-improved grassland fields are considered to be of relatively low ecological value, comprising only common and widespread species.

7.5.20 **Impacts:** Losses of this habitat to the Proposed Development / conversion of areas into open space.

*Prior to mitigation, impacts are **adverse at the county level** and are of **moderate significance**.*

7.5.21 **Mitigation and Enhancements.** Retained areas of semi-improved grassland will be enhanced through the oversowing of a species-rich wildflower seed mixture and new areas will be created on existing habitats of lower value (e.g. arable – see previous). Enhanced/newly created wildflower grasslands will be subject to an appropriate management regime to enhance its floristic diversity. Where appropriate, off-site measures via an offsetting scheme (or financial contributions to such schemes) would address any potential residual effects arising from losses of this habitat.

*Post mitigation, effects are **neutral at the county level**.*

Rough Grassland Margins

- 7.5.22 The rough grassland margins within the Site are of limited ecological value, comprising only common and widespread species. This habitat offers suitable habitat for Water Vole along the stream (S1), some limited foraging opportunities for birds and Badgers and potentially limited terrestrial habitat for Great Crested Newts (see below).
- 7.5.23 Areas of rough grassland margins are to be lost to the Proposed Development, while some areas of rough grassland to be retained and enhanced within areas of open space.
- 7.5.24 **Impacts:** Loss of parts of this habitat to the Proposed Development.
- Prior to mitigation, impacts are **adverse** at the **site level** and are of **negligible-minor significance**.*
- 7.5.25 **Mitigation and Enhancements.** The grassland surrounding the attenuation features will be sown with a native wildflower grassland seed mixture (such as Emorsgate's Tussock Mixture EM10 / or Emorsgate's Meadow Mixture for Wetlands EM8) and will be subject to a suitable management regime that will increase the floristic diversity of the Site.
- 7.5.26 As mentioned above with regard to 'Arable' a number of enhancement measures are proposed including the oversowing of field margins with a species-rich wildflower grassland mixture, new native tree planting and creation of new attenuation features together with the implementation of a suitable management regime to maximise wildlife benefits (e.g. inclusion of areas of longer grassland akin to field margins). All of these measures will more than offset any loss to existing field margins.
- Post mitigation and enhancements, effects are **beneficial** at the **site level** and are of **minor-moderate significance**.*

Amenity Grassland

- 7.5.27 The amenity grassland within the Site is of limited ecological value, comprising only common and widespread species, and managed as a very short sward. This habitat offers some limited foraging opportunities for birds and Badgers.
- 7.5.28 **Impacts:** This habitat is to be retained as part of the Proposed Development.
- Prior to mitigation, impacts are **neutral** at the **site level** and are of **no significance**.*
- 7.5.29 **Mitigation and Enhancements.** No mitigation measures are necessary but as an enhancement, areas of new amenity grassland will be sown with a flowering lawn mixture (such as Emorsgate's EL1 or similar), and subject to a suitable management regime, to increase the floristic diversity of the Site accordingly.

*Post mitigation and enhancements, effects are **beneficial** at the **site level** and are of **negligible-minor significance**.*

Hedgerows and Trees

- 7.5.30 The hedgerows and trees within the Site are also of relatively greater ecological value in the context of the Site, in particular the species-rich hedgerows and those that potentially qualify as ‘important’ under the Hedgerow Regulations 1997. The hedgerows and trees offer suitable nesting opportunities for birds, foraging and navigational opportunities for bats, and potentially suitable terrestrial habitat for Great Crested Newts (see below).
- 7.5.31 Those hedgerows that potentially qualify as ‘important’ include: H1, H2, H5, H8, H15, H16, H28, H34 and H57, while those hedgerows that are considered as species-rich include: H3, H7, H9, H10, H12, H13, H17, H18, H20, H21, H22, H26, H29, H30, H31, H35, H37, H38, H39, H42, H44 and H47.
- 7.5.32 Losses are proposed to trees within F6, while minor losses are proposed to hedgerows (H1, H2, H3, H6, H7, H8, H10, H12, H14, H16, H17, H18, H21, H25, H26, H27, H29, H30, H34, H35, H42, H43, H44, H47, H49, H54, H55, H57) in order to facilitate the Proposed Development. The majority of hedgerows and trees are to be retained and safeguarded within the Proposed Development.
- 7.5.33 Hedgerows are a Priority Habitat.
- 7.5.34 **Impacts:** Minor losses to hedgerows and trees. Temporary effects: potential damage to retained sections of hedgerow during the construction phase, and dust deposition (and potentially other pollution) to retained hedgerows during the construction phase.

*Prior to mitigation, impacts are **adverse** at the **local level** and are of **minor-moderate significance**.*

- 7.5.35 **Mitigation and Enhancements.** In general, the retained hedgerows will be well buffered from any built form by wide green corridors / open space within the Proposed Development. However, measures will be put in place to ensure that retained sections of hedgerows are safeguarded from direct impacts during the construction phase. It is recommended that all retained hedgerows/trees within the site be fenced at canopy height (as required) according to the current British Standards before construction work commences, to protect roots from compaction. Fences should remain in place until construction work is complete within the vicinity of these trees/hedgerows.
- 7.5.36 In addition, retained hedgerows will be bolster planted with native species and subject to a more favourable management regime to increase species diversity and improve their structure.

7.5.37 An increased level of dust may arise from the movement of construction traffic and earthworks. Deposition of this dust on the surrounding vegetation may lead to temporary declines in flora associated with hedgerows and trees. Measures to mitigate dust emissions will be implemented during the construction phase (see **Chapter 6: Air Quality** for further information). Any potential effects would be easily minimised through use of standard mitigation techniques such that residual effects are of negligible significance. Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate the ditches or stream. Even with these measures in place, there remains a slight risk that the hedgerow and trees might be affected by very occasional dust-soiling impacts. Any effects will be temporary and relatively short lived, and will only arise during dry weather with the wind blowing towards the receptor, at a time when dust is being generated. The overall impacts during the construction phase with mitigation measures in place are judged to be of negligible significance. Further detail on dust and air quality is included in **Chapter 6: Air Quality** of the ES.

7.5.38 New hedgerow planting of a length / area greater than that lost will be included within the Proposed Development. The new hedgerow planting will be based around native species of local provenance. New trees will also be included within the landscape proposals, which will be based around native species of local provenance. The planting of new hedgerows and trees will more than mitigate for the loss of hedgerows to the development proposals.

*Post mitigation and enhancements, effects are **beneficial** at the **local level** and are of **minor-moderate significance**.*

Scrub

7.5.39 The scrub is of relatively low ecological value in terms of its species content, but this habitat does offer some foraging and nesting opportunities for birds, navigational opportunities for bats and potential terrestrial habitat (shelter/hibernation opportunities) for Great Crested Newts.

7.5.40 **Impacts:** Loss of parts of this habitat to the Proposed Development.

*Prior to mitigation, impacts are **adverse** at the **site level** and are of **negligible-minor significance**.*

7.5.41 **Mitigation and Enhancements.** The planting of new native hedgerows, trees and scrub as part of the Proposed Development will offset losses to this habitat.

*Post mitigation and enhancements, effects are **neutral** at the **site level**.*

Stream and Ditches

- 7.5.42 **Site usage.** A stream (Earl Shilton Brook) runs through the centre/eastern half of the Site, while there are a number of wet and dry ditches also present within the Site. These watercourses are of greater ecological value in the context of the Site, and offer suitable opportunities for Water Vole (Brook only), foraging and navigational opportunities for bats and foraging and nesting opportunities for birds (see below).
- 7.5.43 The stream and ditches are to be retained and safeguarded within the Proposed Development, although new internal roads are to cross the stream in three locations.
- 7.5.44 Potential run-off into the watercourses during the construction and operational phases of the Proposed Development could potentially have a detrimental effect upon the aquatic habitats of these watercourses / ditches (see **Chapter 15: Water Environment** of the ES and the Drainage Strategy for further details).
- 7.5.45 Watercourses are a Priority Habitat.
- 7.5.46 **Impacts:** Minor losses to bankside vegetation to facilitate the construction of bridges across the watercourse to link new internal roads. Potential pollution from contaminated run-off during the construction and operational stages, could potentially have a detrimental impact on the riparian habitats.
- Prior to mitigation, impacts are **adverse** at the **local level** and are of **moderate significance**.*
- 7.5.47 **Mitigation and Enhancements.** Any new roads crossing over the retained section of the stream will use clear-span bridges wherever possible, or use culverts designed to maintain wildlife corridor functions and minimise impacts on bankside vegetation.
- 7.5.48 Where appropriate, as an enhancement, the banks of the stream will be sown with a native species-rich seed mixture tolerant of wet conditions (such as Emorsgate's Pond Edge mixture EP1), and the vegetation along the banks will be allowed to grow long and tussocky.
- 7.5.49 The stream will also be enhanced through planting of appropriate native wetland species and oversowing of the areas of open space adjacent to the stream with a species-rich native wildlife seed mixture (such as Emorsgate's Meadow Mixture for Wetlands EM8) and subject to a suitable management regime to increase its floristic diversity accordingly.
- 7.5.50 Implementation of best practice methods and effective engineering solutions will be employed to ensure that contaminated run-off is prevented from entering the stream or any wet ditches, as well as the new attenuation features, during both the construction and operational phases (as also set out within **Chapter 15: Water Environment** of the ES and the Drainage Strategy).

*Post mitigation and enhancements, effects are **beneficial** at the **local level** and are of **minor significance**.*

Ponds

- 7.5.51 **Site usage.** Two ponds (P1 & P2) are present within the Site that have deteriorated over the years. P1 holds limited levels of water and recent surveys found P2 to no longer exist.
- 7.5.52 P1 is to be retained and safeguarded within the Proposed Development.
- 7.5.53 Potential run-off into the watercourse during the construction and operational phases of the Proposed Development could potentially have a detrimental effect upon the aquatic habitat (see **Chapter 15: Water Environment** of the ES and the Drainage Strategy for further details).
- 7.5.54 **Impacts:** Potential pollution from contaminated run-off during the construction and operational stages, could potentially have a detrimental impact on the habitat.

*Prior to mitigation, impacts are **adverse** at the **local level** and are of **moderate significance**.*

- 7.5.55 **Mitigation and Enhancements.** The clearance of scrub around P1 will allow more light to reach the pond, thereby providing enhanced habitat post-development.
- 7.5.56 Implementation of best practice methods and effective engineering solutions will be employed to ensure that contaminated run-off is prevented from entering the pond and new attenuation features, during both the construction and operational phases.

*Post mitigation and enhancements, effects are **beneficial** at the **local level** and are of **minor significance**.*

Japanese Knotweed

- 7.5.57 Japanese Knotweed was recorded in 2010 and 2013 along the western boundary of the Site, however the updated 2019 and 2021 surveys did not record evidence of this species. However, given the invasive nature of this species and complexity of eradication a precautionary watching brief should be implemented for any ground works in the locations where Japanese Knotweed has previously been recorded to establish whether further action will be required prior and during works to either eradicate the Japanese Knotweed or ensure that it is safely contained and unable to spread.
- 7.5.58 Japanese Knotweed is a species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). Section 14(2) of the Wildlife and Countryside Act 1981 states that:

"If any person plants or otherwise causes to grow in the wild any plant which is included in Part 2 of Schedule 9, he shall be guilty of an offence."

- 7.5.59 Subsequent sections of the Wildlife and Countryside Act further elaborate on what may constitute an offence in this regard, setting out the circumstances in which responsible persons (i.e. the landowner) would not be guilty of an offence. For convenience these circumstances are set out below:
- Section 14(3) – ‘... the accused took all reasonable steps and exercised all due diligence to avoid committing the offence.’
 - Section 14(4) – ‘Where the defence ... involves an allegation that the commission of the offence was due to the act or default of another person ...’ and in which information can be provided to identify or assist in the identification of the other person.
- 7.5.60 The wording of Section 14 does not pose an explicit obligation to manage Schedule 9 species not introduced onto your land by your own actions. However, the law is not entirely clear as to the phrase “cause to grow”. It may be argued that a landowner who knowingly allows a Schedule 9 species that he did not introduce to accumulate on his land and create a problem as it spreads to other areas of the wild, and who makes a conscious decision to do nothing about it, is ‘causing to grow’. However, it is our understanding that this interpretation has not been tested and DEFRA does not offer a firm view on this situation.
- 7.5.61 Section 34(1) of the Environmental Protection Act imposes a duty of care on persons who produce, import, dispose of, or treat controlled wastes. Japanese Knotweed is classed as ‘controlled waste’ and as such must be disposed of safely at a licensed landfill site.
- 7.5.62 The ‘duty’ requires such persons to ensure that there is no unauthorised or harmful deposit, treatment or disposal of the waste, to prevent the escape of the waste from their control or that of any other person, and on the transfer of the waste to ensure that the transfer is only to an authorised person or to a person for authorised transport purposes. The movement of Japanese Knotweed off-site of controlled waste must be covered by a waste transfer notes.
- 7.5.63 The spread of Japanese Knotweed is facilitated through vegetative means, either by rhizome (root) fragments, or crown and stem segments. Therefore, the risk of spreading Japanese Knotweed is particularly high when associated with the movement of soil. Land management such as the cutting and flailing of vegetation can also increase the risk of contamination spread.
- 7.5.64 **Impacts:** Potential spread of Japanese Knotweed during the construction phases.

*Prior to mitigation, effects are considered to be **adverse at site level and of minor significance**.*

- 7.5.65 **Mitigation:** As stated above, a precautionary watching brief will be put in place during construction/ground works in the location where this species was previously recorded. In general terms, if required, there are a number of options available for Japanese Knotweed control and removal, which are described below, although depending on the works required in the location of the Japanese Knotweed, a number of methods could be utilised.
- 7.5.66 Japanese Knotweed can be left *in situ* and treated with Glyphosate based herbicides in order to control it. The herbicide can be applied during the growing season, either through the spraying of the leaves or the injection of the stems (depending on the size of the stands which require treatment).
- 7.5.67 Herbicidal control is generally considered to be the most effective means of managing Japanese Knotweed on a site, both in terms of efficiency and cost, although this methodology may take a number of growing seasons before control is established.
- 7.5.68 An alternative option for controlling Japanese Knotweed within a site involves the mechanical removal of all plants and rhizomes from an affected part of a site, and deep burial of all material in a suitable on-site location. All plant arisings and potentially contaminated spoil would need to be removed from its current location, transported to a suitable location within the Site (where no development is proposed), and then buried at a depth of at least 5 metres. Buried material would then need to be covered with a suitable root barrier membrane layer and capped with topsoil.
- 7.5.69 This can be an effective method of on-site control, provided that complete excavation of the area affected by Japanese Knotweed can be ensured (often requiring a sizable excavation zone). However, it is important to note that there is inherently more risk associated with moving Japanese Knotweed within a site than dealing with it *in situ*, and the cost of undertaking removal and on-site removal would be significantly greater than herbicide treatment.
- 7.5.70 The third main method of control involves mechanical removal of all plants and contaminated arisings, and disposal off-site as 'controlled waste' at a suitable landfill site. This option is generally considered as the last resort, given the inherent risk of spreading Japanese Knotweed and, from a commercial point of view, the very significant cost implications associated with this method compared to on-site Japanese Knotweed control methods.
- 7.5.71 In the event that Japanese Knotweed is encountered, this will be removed by a specialist contractor prior to any works within this area.

*Post mitigation, (if Japanese Knotweed were identified during the precautionary watching brief) effects are considered to be **beneficial** at the **site** level and of **minor significance**.*

Other Habitats

7.5.72 The hardstanding and buildings are of negligible ecological value.

7.5.73 **Impacts:** No significant impacts.

7.5.74 **Mitigation and Enhancements:** No mitigation required.

Impacts on Fauna

7.5.75 Surveys for a number of protected species have been undertaken intermittently over a period of more than 10 years and the results have been utilised to inform this impact assessment. It is considered that overall, enhancements are likely to be realised with regard to protected species, and suitable mitigation has been put forward where protected species are to be affected by the development proposals.

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Legislation. All bats are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and included on Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended) (“the Habitats Regulations”). These include provisions making it an offence to:

- Deliberately kill, injure or take (capture) bats;
- Deliberately disturb bats in such a way as to be likely to significantly affect:-
 - (i) the ability of any significant group of bats to survive, breed or rear or nurture their young; or to hibernate; or
 - (ii) to affect significantly the local distribution or abundance of the species concerned;
- Damage or destroy any breeding or resting place used by bats;
- Intentionally or recklessly obstruct access to any place used by bats for shelter or protection (even if bats are not in residence).

7.5.94 While the legislation is deemed to apply even when bats are not in residence, Natural England guidance²² suggests that certain activities such as re-roofing can be completed outside sensitive periods when bats are not in residence provided these do not damage or destroy the roost.

7.5.95 The words ‘deliberately’ and ‘intentionally’ include actions where a court can infer that the defendant knew ‘the action taken would almost

²² Mitchell-Jones, A.J. (2004) Bat Mitigation Guidelines English Nature, Peterborough

inevitably result in an offence, even if that was not the primary purpose of the act.

- 7.5.96 The offence of damaging (making it worse for the bat) or destroying a breeding site or resting place is an absolute offence. Such actions do not have to be deliberate for an offence to be committed.
- 7.5.97 Licences can be granted for development purposes by an 'appropriate authority' under Regulation 55 (e) of the Habitats Regulations. In England, the 'appropriate authority' is Natural England (the government's statutory advisors on nature conservation). European Protected Species licences permit activities that would otherwise be considered an offence.
- 7.5.98 In accordance with the Habitats Regulations the licensing authority (Natural England) must apply the three derogation tests as part of the process of considering a licence application. These tests are that:
1. The activity to be licensed must be for imperative reasons of overriding public interest or for public health and safety;
 2. There must be no satisfactory alternative; and
 3. The favourable conservation status of the species concerned must be maintained.
- 7.5.99 Licences can usually only be granted if the development is in receipt of full planning permission (and relevant conditions, if any, discharged).
- 7.5.100 Seven species of bat are Priority Species, these are *Barbastella barbastellus*, Bechstein's *Myotis bechsteinii*, Noctule, Soprano Pipistrelle, Brown Long-eared, Greater Horseshoe *Rhinolophus ferrumequinum*, and Lesser Horseshoe *Rhinolophus hipposideros*.
- 7.5.101 **Site Usage.** No buildings within the Site are considered to offer potential to support roosting bats. A total of 12 trees (T1-T12) were identified within the Site as having potential to support roosting bats. All trees with bat potential are to be retained and safeguarded as part of the Proposed Development.
- 7.5.102 From the results of the activity and automated survey results, it can be seen that low bat activity was present throughout the Site comprising common species. The surveys show that the bat activity is generally associated with the hedgerows especially the hedgerows in the west of the Site and hedgerow H21 including the area to the south associated with the WwTW works.
- 7.5.103 The vast majority of activity recorded on the automated detectors was from Common Pipistrelle bats, with low or occasional activity recorded from Soprano Pipistrelle, *Myotis sp.*, Nathusius' Pipistrelle, Noctule, Leisler's and Brown Long-eared.
- 7.5.104 The vast majority of the hedgerow network is to be retained and set within green corridors within the Proposed Development, with minor losses to facilitate the Proposed Development.

- 7.5.105 **Impacts:** Losses to trees within F6 and minor losses hedgerows, that offer suitable foraging and commuting opportunities for bats; potential disturbance from lighting on foraging and commuting routes during the construction and operational phases (albeit the majority of activity is by bat species that are relatively more tolerant of lighting).

*Prior to mitigation, effects will be **adverse** at the **European level** and of **minor-moderate significance**.*

- 7.5.106 **Mitigation and Enhancements.** The losses of the hedgerows and trees will be offset by new tree and hedgerow planting of a length / area greater than that lost is to be included within the Proposed. Where roads intersect the green corridors, sensitive lighting and new planting will be carried out to help bats navigate across the new roads.

- 7.5.107 In addition, large areas of open space will be created within the Site, which will be sown / oversown with a native species-rich wildflower seed mixture, which will provide an invertebrate food source for foraging bats. The areas of open space will also be subject to new native tree and hedgerow planting, and new attenuation features created, which will diversify habitats present and provide enhanced foraging opportunities for bats.

- 7.5.108 During the operational phase, although there is likely to be an increase in lighting within the Site, 'dark' corridors will be maintained using a sympathetic lighting regime, e.g. involving the use of directional, low-powered, warm white spectrum LED lighting to minimise light spillage. 'Dark' corridors will be maintained along existing and new hedgerows to maintain suitable navigational and foraging opportunities for bats. Where lighting is necessary during construction, any potential light spillage will be reduced by directing light below the horizontal plane, preferably at an angle less than 70 degrees away from features that offer suitable foraging opportunities for bats, e.g. the hedgerows and trees.

- 7.5.109 In the event that losses are proposed to any trees identified as having potential to support roosting bats, these would be subject to further surveys. If any bats or evidence of bats is recorded, a Natural England European Protected Species licence may be required prior to any felling works commencing and appropriate mitigation would need to be provided. This would be based around bat boxes (hollow and crevice types) that mimic tree roost features.

- 7.5.110 As an enhancement, new bat boxes will also be provided throughout the Site on retained mature trees, which will provide additional roosting opportunities for bats.

*Post mitigation and enhancements, effects are **beneficial** at the **European level** and are of **minor-moderate significance**.*

Other Mammals

7.5.111 **Site Usage.** A Brown Rat was recorded along S1 and Rabbits were recorded across the Site, with evidence of warrens recorded associated with a number of hedgerows. A Fox was recorded within fields F3 and F4 on one occasion.

7.5.112 **Impacts:** Loss of suitable foraging habitat for a range of mammals.

*Prior to mitigation, effects will be **adverse** at the **site level** and of **negligible significance**.*

7.5.113 **Mitigation.** The planting of new native trees and hedgerows, and the creation of new species-rich wildflower grassland, will maintain foraging and shelter opportunities for a range of mammals.

*Post mitigation, effects are at the **site level** and are of **no significance** (i.e. **neutral**).*

Water Vole

7.5.114 **Legislation.** In England Water Voles are listed on Schedule 5 of the Wildlife and Countryside Act 1981, receiving full protection since 2008.

7.5.115 The Wildlife and Countryside Act 1981 (as amended), lists the following offences:

- 7.5.116
- Intentionally killing, taking or injuring a Water Vole (Section 9(1));
 - Possessing or controlling any live or dead Water Vole, or any part or derivative (Section 9(2));
 - Intentionally or recklessly damaging or destroying a Water Vole's place of shelter or protection (Section 9(4)(a));
 - Intentionally or recklessly disturbing a Water Vole whilst it is occupying a structure or place which it uses for shelter or protection (Section 9(4)(b));
 - Intentionally or recklessly obstructing access to a Water Vole's place of shelter or protection (Section 9(4)(c));
 - Selling, offering for sale, or possessing or transporting for the purposes of sale, any live or dead Water vole, or any part or derivative, or advertising any of these for buying or selling (Section 9(5)).

7.5.117 The Water Vole Mitigation Handbook²³ states:

"It is generally agreed that a place of shelter or protection used by water voles includes a network of active burrows and/or any nests that have been constructed within the burrow system or above ground amongst dense vegetation."

²³ Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

- 7.5.118 The trapping and displacement of Water Voles needs to be carried out under a licence issued by Natural England and in England there is no provision for licensing development activities under the Wildlife and Countryside Act. On that basis, such works need to be carried out under a conservation licence, which requires the applicant to demonstrate a conservation benefit for Water Voles. The conservation benefit can be achieved by delivering a net gain in the amount of habitat available to the Water Vole population, enhancing the quality of the habitat or significantly improving the linkages between Water Vole colonies.
- 7.5.119 In the past, activities aimed to displace Water Voles from a development footprint (in England) were routinely undertaken without a licence, with developers relying on the 'incidental result' defence. Natural England's current stance is that displacement activities are not covered by the 'incidental result' defence, and therefore should be licensed.
- 7.5.120 In England, displacement operations can be carried out under a Class Licence as long as they conform to the licence conditions. The Water Vole Mitigation Handbook highlights the following conditions within the Class Licence:
- Only to be used for displacement over a continuous length of bank not exceeding 50m (for watercourses this equates to 50m on each bank);
 - Only to be used during the period 15th February to 15th April inclusive (with some exceptions, as set out in Appendix 1);
 - The scheme must have planning consent (for schemes requiring such consent);
- 7.5.121 Where Displacement operations which do not conform to the conditions set out in the Class Licence the activities may still be permissible in certain circumstances under a site-specific licence issued for the purpose of conservation (and must deliver a conservation benefit for Water Voles.
- 7.5.122 Water Voles are also a Priority Species.
- 7.5.123 **Site Usage.** A low population of Water Vole was identified within S1. The stream and adjacent rough grassland banks offer suitable habitat for this species.
- 7.5.124 **Impacts:** Potential loss of bankside vegetation. Potential impacts to burrows from construction of three bridges. Potential disturbance during construction and potential for restricted movement along watercourse from bridge structures post-development.
- Prior to mitigation, effects will be **adverse** at the **county level** and of **minor-moderate significance**.*
- 7.5.125 **Mitigation.** The banks of the stream will be sown with a native species-rich seed mixture and the vegetation along the banks will be allowed to grow long and tussocky. The stream will also be enhanced through planting of appropriate native wetland species and oversowing of the

areas of open space adjacent to the stream with a species-rich native wildlife seed mixture. Such measures will provide enhanced opportunities for this species post-development.

- 7.5.126 Further surveys will be undertaken prior to construction by an ecologist for the presence of Water Voles, to try and locate the bridges away from any Water Vole burrows (and thus ensure no Water Vole burrows are impacted by the construction of the bridges over S1). If this is not possible a Natural England licence would need to be applied for and appropriate mitigation would be implemented. The bridges will be designed to ensure that wildlife movement will be maintained along the stream post-development.

*Post mitigation and enhancements, effects are **beneficial** at the county level and are of **minor significance***

Birds

- 7.5.127 **Legislation.** Section 1 of the Wildlife & Countryside Act is concerned with the protection of wild birds. With certain exceptions all wild birds and their eggs are protected from intentional killing, injuring and taking; and their nests, whilst being built or in use, cannot be taken, damaged or destroyed.
- 7.5.128 Schedule 1 of the Wildlife & Countryside Act 1981 is a list of the nationally rarer and uncommon breeding birds for which all offences carry special (i.e. greater) penalties. These species also enjoy additional protection whilst breeding, as it is also an offence to disturb adults or their dependant young when at the nest.
- 7.5.129 **Site Usage.** Red Listed and Priority Species recorded within the Site Song Thrush, House Sparrow, Skylark, Linnet, Yellowhammer and Starling, while the Schedule 1 Barn Owl was recorded within the Site in 2010 (but has not been recorded since).
- 7.5.130 It is considered the hedgerows, trees and scrub offer suitable opportunities for nesting and foraging birds, while the rough grassland margins and species-rich semi-improved grassland offer some limited nesting opportunities for ground nesting birds, as well as foraging opportunities for a range of birds. In addition, the amenity grassland, semi-improved grassland within the Site offer suitable opportunities for foraging birds.
- 7.5.131 It is considered that the unmanaged semi-improved grassland and rough grassland margins offer foraging opportunities for Barn Owl.
- 7.5.132 **Impacts:** Loss of suitable foraging and nesting habitat for bird species (including displacement of ground nesting species to surrounding countryside). Potential for killing and injury of birds and / or damage or destruction of nests during clearance of vegetation.

*Prior to mitigation, impacts are **adverse** at the **site-local level** and of **minor significance**.*

- 7.5.133 **Mitigation and Enhancements.** The provision of new native trees and hedgerows throughout the areas of open space will provide suitable new nesting opportunities for a range of bird species, while the creation of new areas of wildflower grassland and attenuation features will provide new and enhanced foraging opportunities for bird species, including Barn Owl. The wildflower grassland within areas of open space will also provide some suitable nesting opportunities for ground-nesting species.
- 7.5.134 In order to safeguard any nesting bird species within the Site, the clearance of any hedgerows and trees will be undertaken outside of the bird breeding season (March-July inclusive). Should this not be possible potential nesting habitat is subject to a check survey immediately prior to its removal by an experienced ecologist. Should any nesting birds be identified then the nest should be fully safeguarded *in situ* and subject to a disturbance buffer of at least 5 metres and only removed once it has been confirmed any fledglings have left the nest.
- 7.5.135 As an enhancement, new bird nest boxes will be provided on suitable retained trees / new buildings within the Site, within the retained areas of open space and on new buildings. These will provide new nesting opportunities for a range of birds. Using nest boxes of varying designs would maximise the species complement attracted to the Site and, where possible, could be tailored to provide opportunities for Red Listed / Priority Species, e.g. Starling or House Sparrow, that are known from the local area.

*Post mitigation and enhancements, effects are **beneficial** at the **site-local level** and are of **minor significance**.*

Great Crested Newt

- 7.5.136 **Legislation.** The legislative protection afforded to Great Crested Newts and the licensing provisions associated are the same as outlined above with regard to bats.
- 7.5.137 Great Crested Newts are also a Priority Species.
- 7.5.138 **Site Usage.** The most recent surveys indicate that pond P2 is no longer present, while pond P1 has deteriorated further in its condition and holds limited levels of levels of water, thereby reducing its potential to support Great Crested Newts. Indeed, the most recent survey in April 2021 did not record any evidence of Great Crested Newts within P1. In addition, the most recent surveys of the offsite ponds (P3 and P4) did not identify the presence of Great Crested Newts.
- 7.5.139 Suitable terrestrial habitat for amphibians (i.e. scrub and grassland) within the vicinity of P1 is to be retained and enhanced as part of the Proposed Development. In addition, the creation of new SuDS features within the

Site will provide enhanced aquatic habitat for this species post-development.

7.5.140 **Impacts:** Areas of grassland and scrub are to be lost within 250m of pond P1. Very low potential for killing or injury during clearance works.

7.5.141 Although it is known that Great Crested Newts can disperse up to 500m through suitable terrestrial habitat from their breeding pond, it is widely accepted that they tend to utilise suitable terrestrial habitat within a much closer distance. Activity is usually concentrated within 100m of breeding ponds and key habitat is located within 50m (termed by Natural England as core habitat).

7.5.142 Indeed, English Nature Research Report Number 576²⁴ states:

“The most comprehensive mitigation, in relation to avoiding disturbance, killing or injury is appropriate within 50m of a breeding pond. It will also almost always be necessary to actively capture newts 50-100m away. However, at distances greater than 100m, there should be careful consideration as to whether attempts to capture newts are necessary or the most effective option to avoid incidental mortality. At distances greater than 200-250m, capture operations will hardly ever be appropriate.”

7.5.143 It is considered that the scrub, trees, hedgerows, unmanaged semi-improved grassland and rough grassland margins within 250m of pond P1 offers suitable terrestrial habitat for Great Crested Newts, while the arable land offers sub-optimal/unsuitable intermediate terrestrial habitat (for dispersal only).

7.5.144 Within the wider 500m radius from P1, the hedgerows, trees, unmanaged semi-improved grassland, scrub and rough grassland margins are considered to offer suitable distant terrestrial habitat for this species, while the arable land offers sub-optimal/unsuitable distant terrestrial habitat.

*Prior to mitigation, impacts are **adverse** at the **European level** and are of **negligible-minor significance**.*

7.5.145 **Mitigation and Enhancements.** Given the most recent survey results, it appears that Great Crested Newts are no longer utilising P1. As such, it is considered that impacts to Great Crested Newts are unlikely. It is not considered that a licence would be necessary as part of the proposed development and implementation of Reasonable Avoidance Measures (RAMs) during construction would avoid any potential impacts to Great Crested Newts.

7.5.146 Removal of habitat present within 250m of P1 will be carried out under a RAMs method statement to ensure Great Crested Newts are not impacted. If necessary, the habitat to be cleared will be subject to a thorough fingertip search by a suitably qualified ecologist prior to removal,

²⁴ Cresswell, W. and Whitworth, R. 2004. *English Nature*. An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt *Triturus cristatus*.

to ensure Great Crested Newts are not present. If a Great Crested Newt is recorded during the search, all works will stop within suitable habitat and a protected species licence will be obtained from Natural England, before works can continue. There is also the option for District Licensing to be pursued at the Site if required/preferred.

7.5.147 The creation of new areas of wildflower grassland within 250m of P1 will provide new suitable terrestrial habitat for Great Crested Newts. New attenuation features are to be sown with a native wildflower seed mixture tolerant of wet / damp conditions, which will provide new and enhanced terrestrial habitat for Great Crested Newts.

7.5.148 The creation of log piles / hibernacula within the Site, associated with the new attenuation features, will also provide new suitable new hibernation opportunities for amphibians.

*Post mitigation and enhancements, effects are **beneficial** at the **European level** and are of **minor significance**.*

Invertebrates

7.5.149 **Site Usage.** Given the habitats present it is likely an assemblage of common invertebrate species would be present within the Site but the intensive agricultural usage is likely to preclude the presence of notable species.

7.5.150 **Impacts:** Loss of suitable habitat for common invertebrates; potential pollution of the ditches from contaminated run-off during the construction and operational phases.

*Prior to mitigation, impacts are **adverse** at the **site level** and of **minor significance**.*

7.5.151 **Mitigation and Enhancements.** The planting of new native trees, hedgerows and the creation of new areas of species-rich grassland, within the Site, as well as the creation of new attenuation features, will provide enhanced habitat for a range of invertebrates.

7.5.152 The creation of log piles within areas of open space would benefit a range of saproxylic species (as well as providing refuge for reptiles and amphibians). The implementation of other measures recommended above would also likely provide knock-on benefits for invertebrates, e.g. through tree planting and use of planting of wildlife benefit.

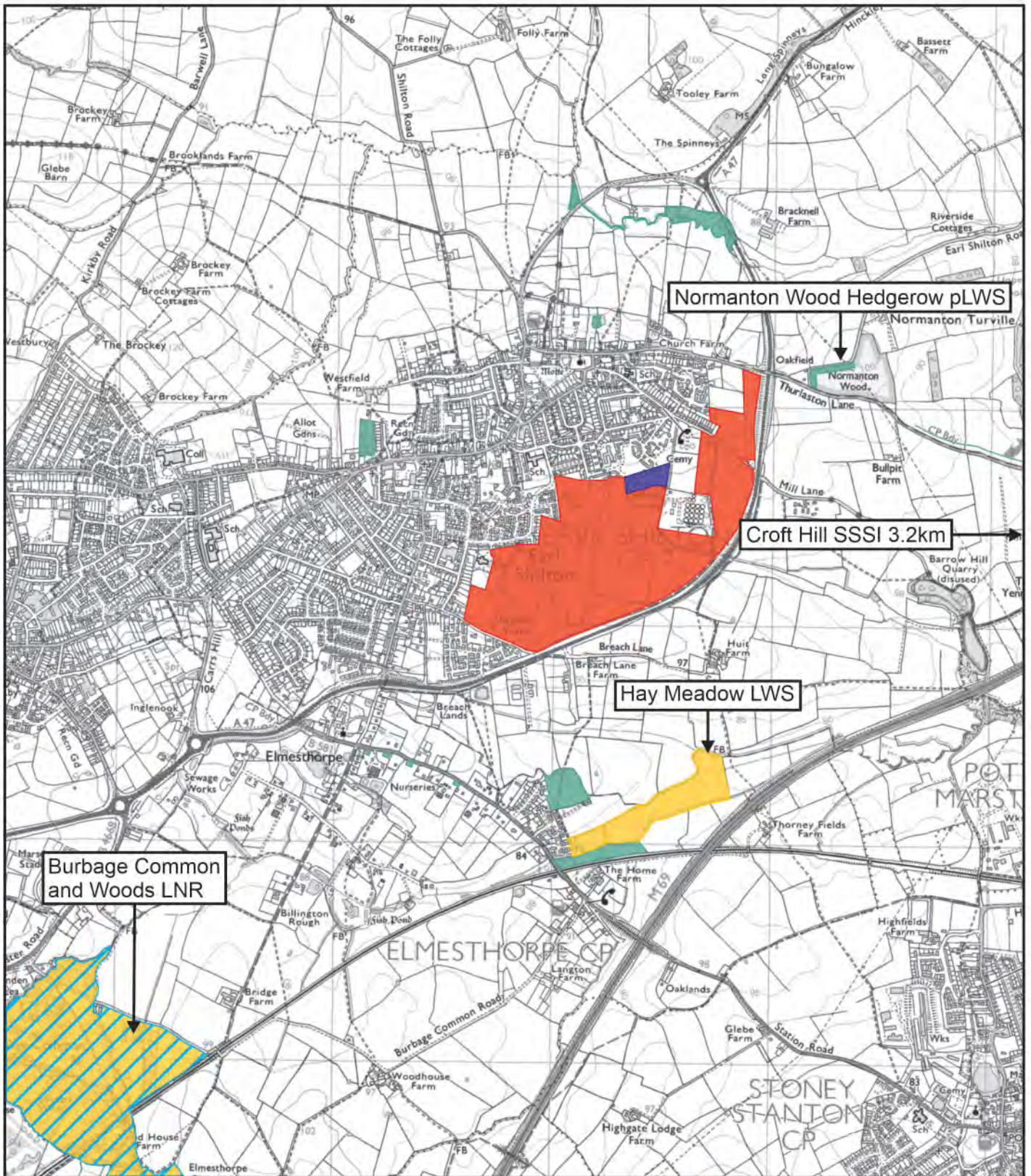
7.5.153 Implementation of best practice methods and effective engineering solutions will ensure that contaminated run-off is prevented from entering the ditches during the construction or operational phases of development (see previous).

*Post mitigation and enhancements, effects are **beneficial** at the **site level** and are of **minor-moderate significance**.*

FIGURES

FIGURE 7.1

Site Location and Ecological Designations



KEY:

- SITE LOCATION
- WIDER STUDY AREA
- LOCAL NATURE RESERVE (LNR)
- LOCAL WILDLIFE SITE (LWS)
- POTENTIAL/CANDIDATE/HISTORIC LOCAL WILDLIFE SITE (pLWS)



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4955: LAND AT WEAVERS FIELDS,
EARL SHILTON, LEICESTERSHIRE

FIGURE 7.1: SITE LOCATION AND
ECOLOGICAL DESIGNATIONS

Rev: A
Oct 2021

FIGURE 7.2
Ecological Features

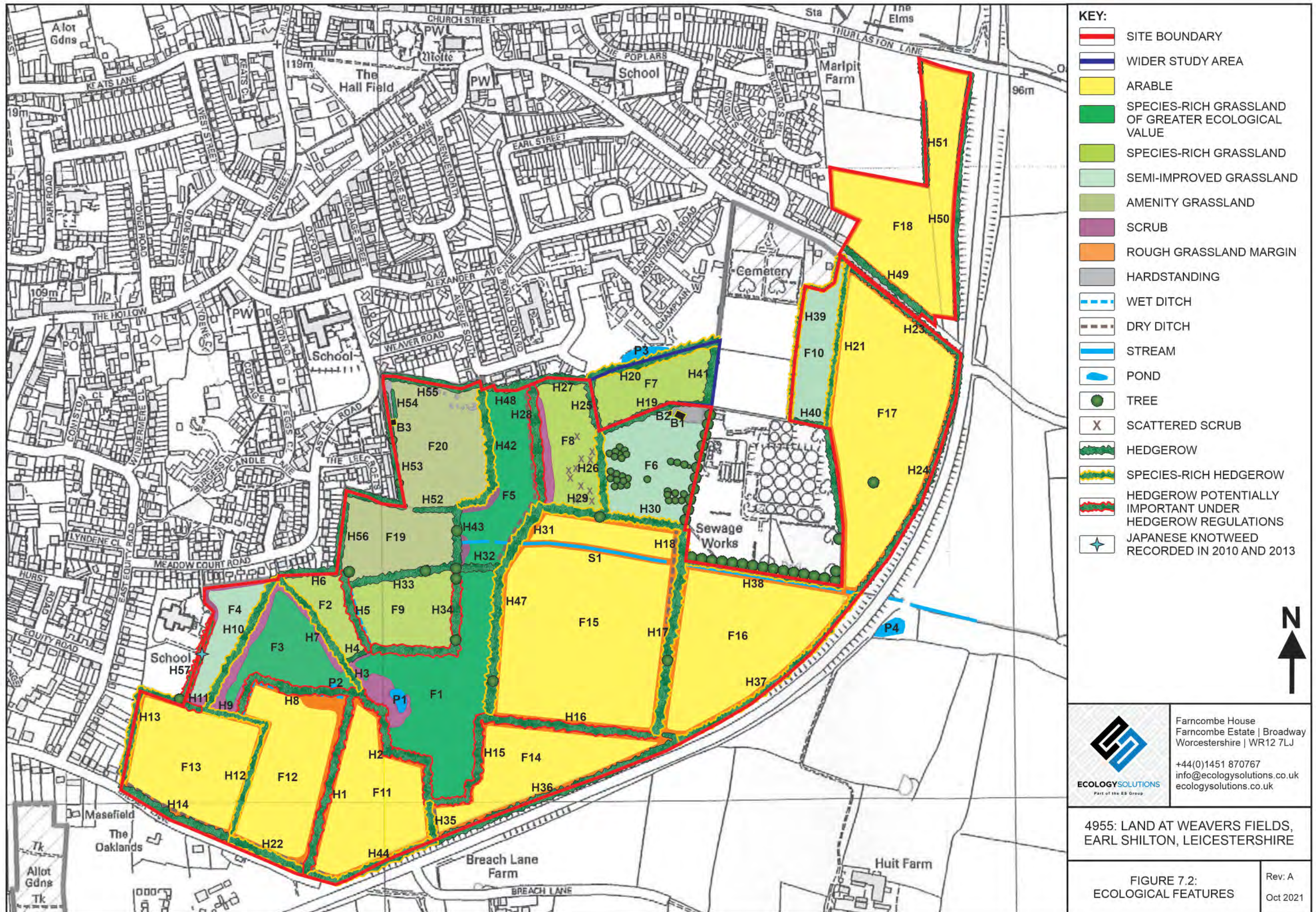


FIGURE 7.3
Protected Species

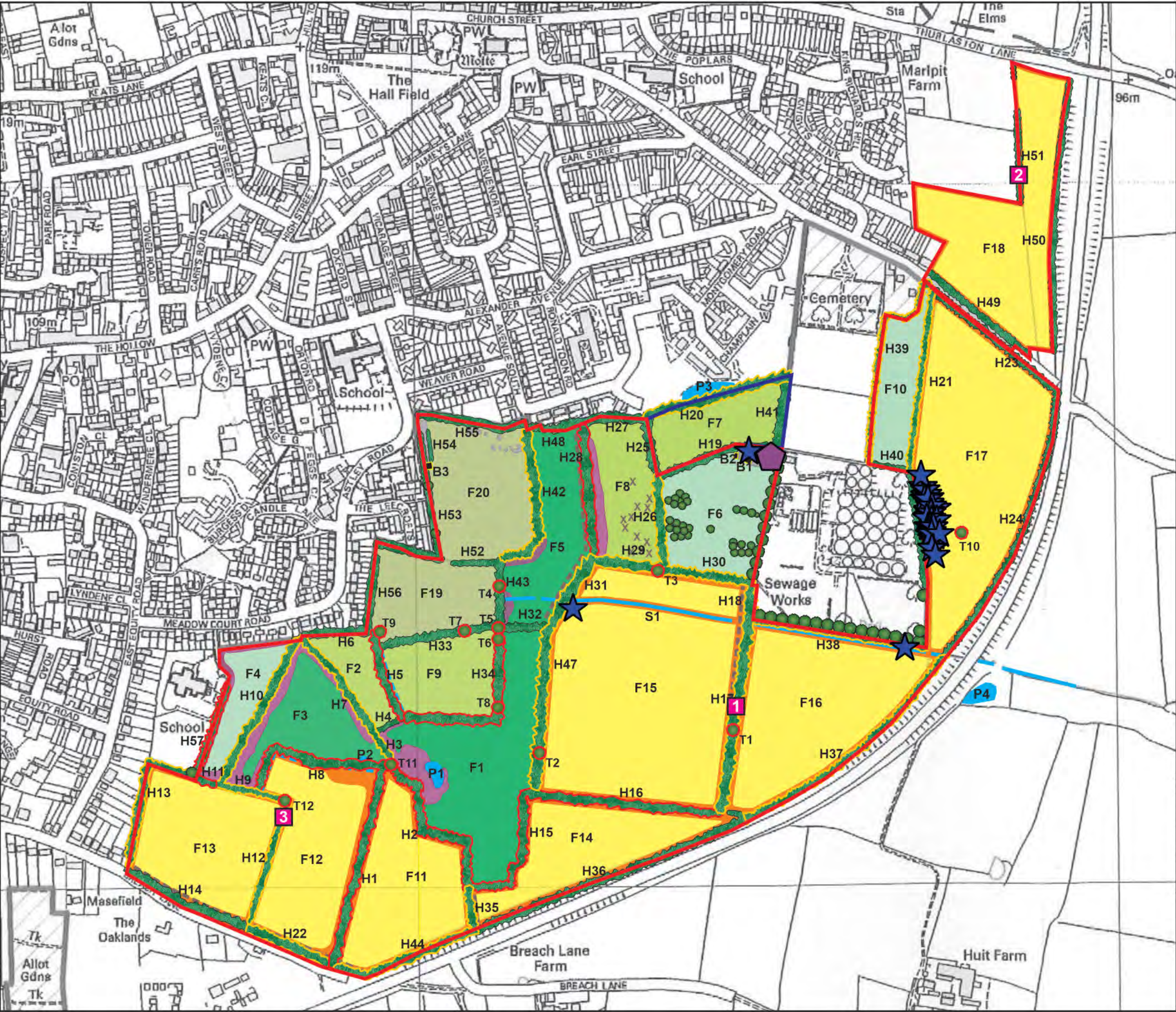


FIGURE 7.3:
PROTECTED SPECIES
(NON-CONFIDENTIAL VERSION)

Rev: A
Oct 2021

FIGURE 7.4

May 2019 Bat Activity Survey



KEY:

- SITE BOUNDARY
- WIDER STUDY AREA
- TREE WITH POTENTIAL TO SUPPORT ROOSTING BATS
- 1 AUTOMATED DETECTOR LOCATION
- ★ COMMON PIPISTRELLE REGISTRATION
- MYOTIS SP. REGISTRATION



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FIGURE 7.4:
MAY 2019 BAT ACTIVITY
SURVEY RESULTS

Rev: A
Oct 2021

FIGURE 7.5

July 2019 Bat Activity Survey

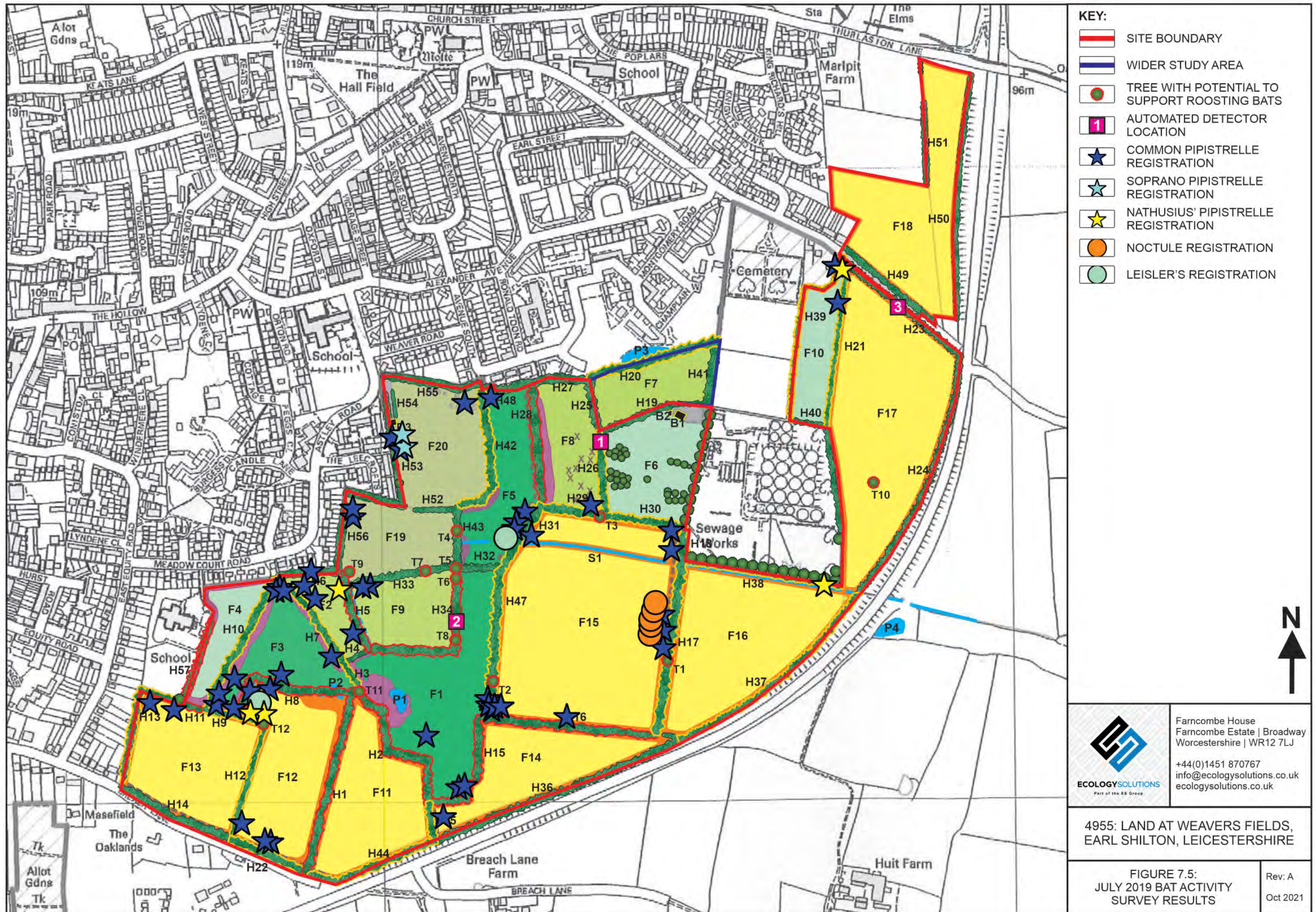
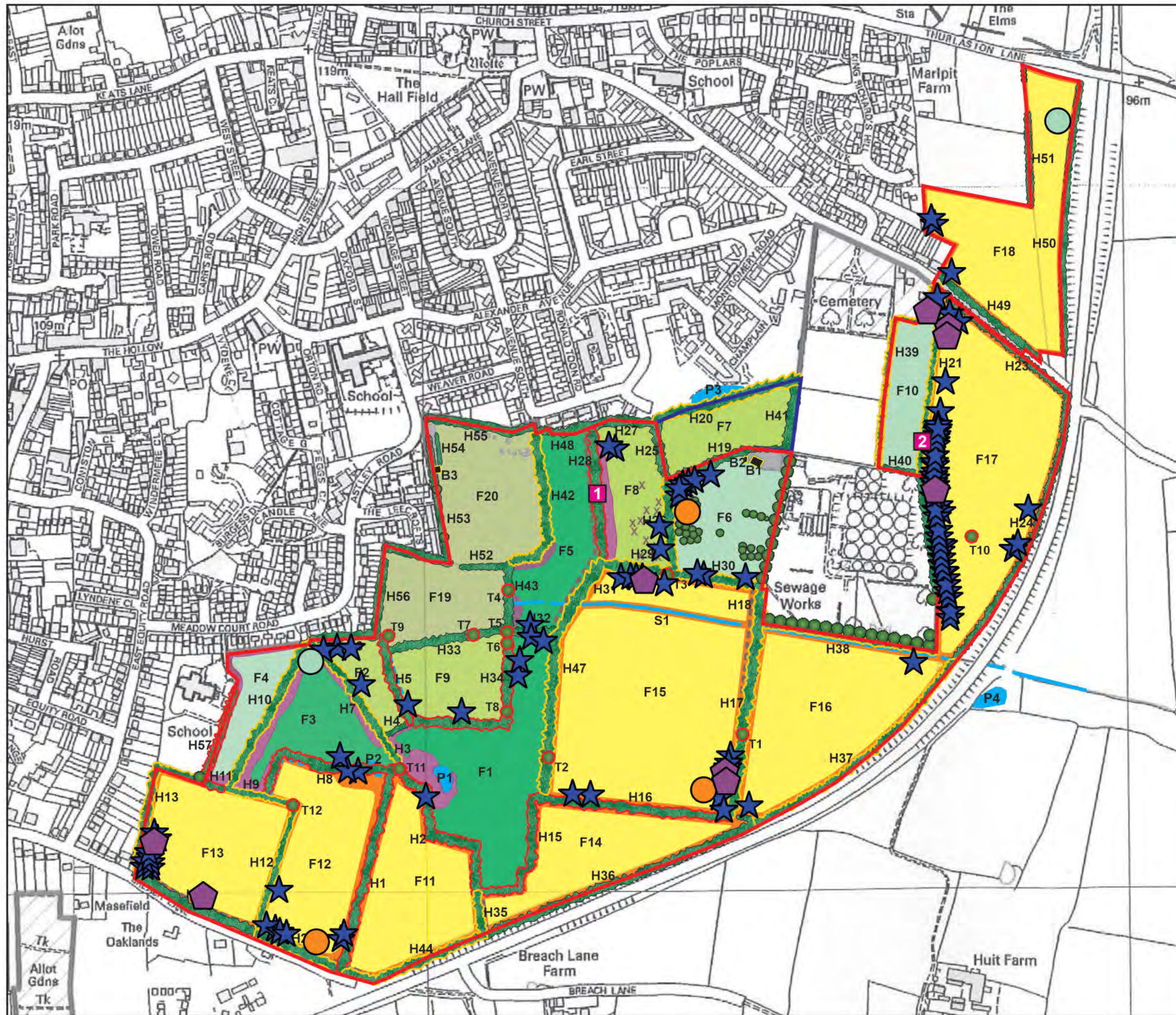


FIGURE 7.6

September 2019 Bat Activity Survey



- KEY:**
- SITE BOUNDARY
 - WIDER STUDY AREA
 - TREE WITH POTENTIAL TO SUPPORT ROOSTING BATS
 - 1 AUTOMATED DETECTOR LOCATION
 - COMMON PIPISTRELLE REGISTRATION
 - MYOTIS SP. REGISTRATION
 - NOCTULE REGISTRATION
 - LEISLER'S REGISTRATION

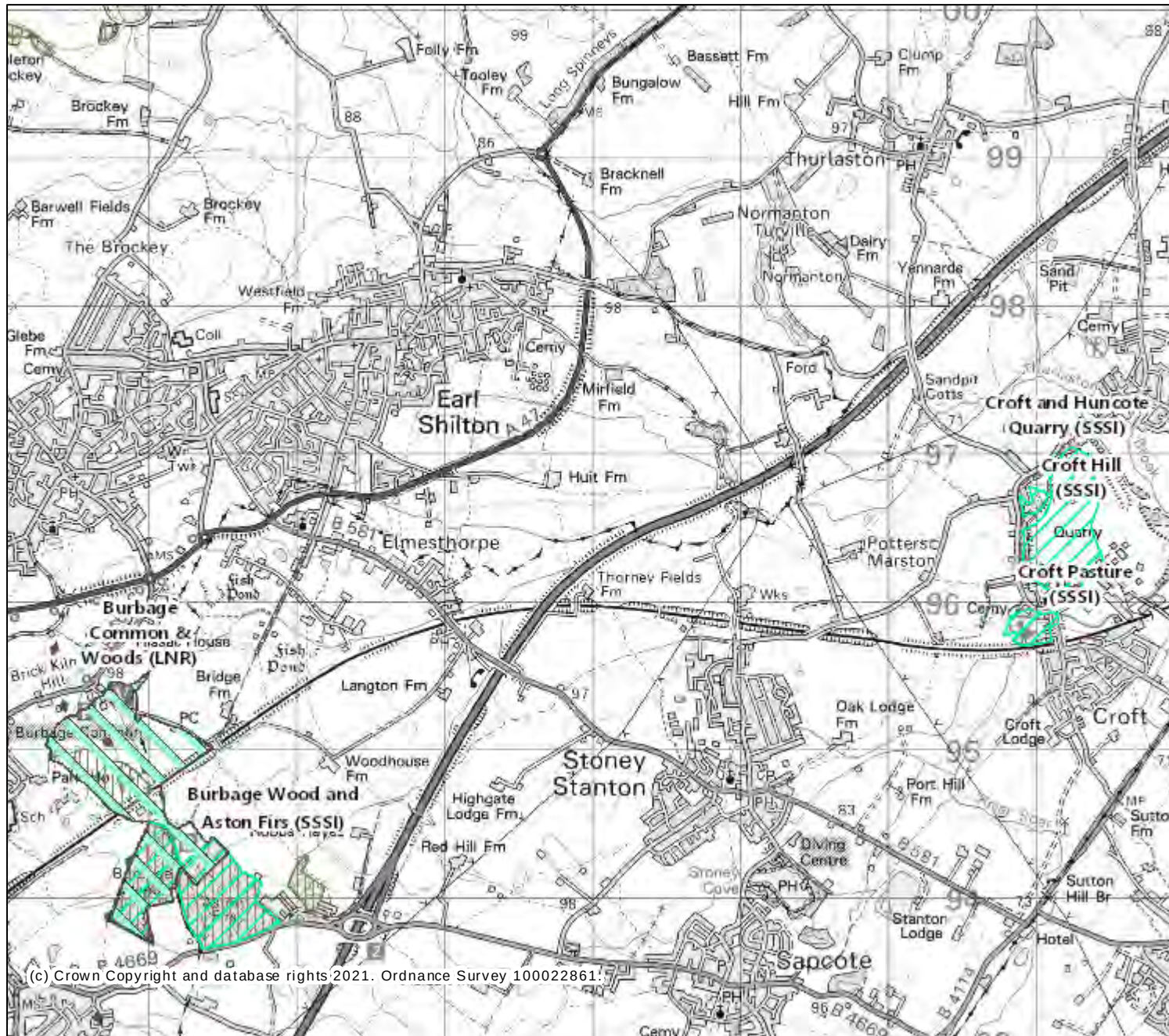


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	4955: LAND AT WEAVERS FIELDS, EARL SHILTON, LEICESTERSHIRE
FIGURE 7.6: SEPTEMBER 2019 BAT ACTIVITY SURVEY RESULTS	Rev: A Oct 2021

ANNEXES

ANNEX 7.1

Information downloaded from Multi-Agency
Geographic Information for the Countryside (MAGIC)



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Legend

-  Local Nature Reserves (England)
-  National Nature Reserves (England)
-  Ramsar Sites (England)
-  Proposed Ramsar Sites (England)
-  Sites of Special Scientific Interest (England)
-  Special Areas of Conservation (England)
-  Possible Special Areas of Conservation (England)
-  Special Protection Areas (England)
-  Potential Special Protection Areas (England)

Ancient Woodland (England)

-  Ancient and Semi-Natural Woodland
-  Ancient Replanted Woodland

Projection = OSGB36

xmin = 436800

ymin = 291000

xmax = 459200

ymax = 302000



Map produced by MAGiC on 1 October, 2021.

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ANNEX 7.2

Bat Survey Weather Conditions

ANNEX 7.2 - BAT SURVEY WEATHER CONDITIONS

Date	Weather Conditions	Sunset Temp. (°C)	Minimum night Temp. (°C)	Sunset Wind Speed (mph)
JUNE 2010				
15.06.10	Scattered clouds	13	8	7
JULY 2010				
22.07.10	Passing clouds	14	12	9
SEPTEMBER 2010				
09.09.10	Passing clouds	19	18	7
MAY 2013				
29.05.13	Partly cloudy, light rain showers	12	11	10
JULY 2013				
01.07.13	Passing clouds	13	10	5
AUGUST 2013				
12.08.13	Clear	15	10	15
SEPTEMBER 2013				
24.09.13	Clear	16	13	5
JULY 2015				
02.07.15	Clear	15	11	10
22.07.15	Passing clouds	12	11	6
OCTOBER 2015				
13.10.15	Passing clouds	10	5	6
MAY 2019				
09.05.19	Mostly cloudy, light rain showers	7	6	5
10.05.19	Passing clouds and fog	7	6	5
11.05.19	Clear	9	2	7
12.05.19	Clear	13	7	7
13.05.19	Clear	14	7	7
JULY 2019				
11.07.19	Passing clouds, occasional light rain showers	18	14	10
12.07.19	Clear	17	13	15
13.07.19	Passing clouds	17	13	8
14.07.19	Clear	15	11	7
15.07.19	Clear	19	14	7
SEPTEMBER 2019				
05.09.19	Clear	14	11	13
06.09.19	Passing clouds	12	10	12
07.09.19	Clear	13	4	8
08.09.19	Passing clouds	15	11	5
09.09.19	Passing clouds	13	10	7



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e c o l o g y s o l u t i o n s f o r p l a n n e r s a n d d e v e l o p e r s

Appendix 9A

Gazetteer of Heritage Assets

Scheduled Monuments

NHLE Ref	Name	Location (Easting and Northing)	
1005076	Elmesthorpe church, ruined nave and west tower	446022	296491
1010302	Earl Shilton motte and bailey castle	447038	298197

Listed Buildings

NHLE Ref	Name	Grade	Location (Easting and Northing)	
1074232	The Red Lion Public House	II	446610	297784
1361298	Hill Top House	II	446862	298134
1074239	Milestone at NGR SP 4790 9935	II	447901	299345
1180304	War Memorial	II	446376	297745
1295021	73, High Street	II	446802	297880
1180239	Top House	II	446844	298257
1361064	Ice House Approximately 20 Metres to North of Normanton	II	449243	298326
1307251	The Wentworth Arms and Adjoining Stables	II	447103	295778
1074693	Church of St Mary	II	446035	296490
1074259	Church of St Simon and St Jude	II*	447116	298198
1177879	Wortley Cottages	II	446966	296013
1074694	Home Farmhouse and Adjoining Outbuilding	II	447199	295847
1180230	71, High Street	II	446814	297897
1188001	Garden Wall and Gazebo Approximately 200 Metres East of Tooley Park Cottages	II	447964	300056

Conservation Areas

Name	Easting	Northing
Earl Shilton	446032	297584
Barwell Arthur Street	444591	297028

HER records within a 1 mile study area

MonUID Ref	Name	Monument Type	Period	Location (Easting and Northing)	
MLE10221	Three Tuns, 104, High Street	Public House	Late Post-medieval to Modern	446769	297862
MLE10230	Medieval remains south of Breach Lane	Ridge And Furrow; Field Boundary	Medieval	446643	296926
MLE10233	Post-medieval remains south of Breach Lane	Plough Marks; Post Hole; Trackway; Field Boundary	Post-medieval	446643	296926
MLE10637	School, 41-43, High Street	Well; School	Late Post-medieval to Modern	446889	297970
MLE11899	Church of St. Mary, Elmesthorpe Lane (North Side)	Church	Early Medieval to Modern	446028	296487
MLE11902	Wortley Cottages, 1 - 6 (Inc.), Station Road (North-East Side)	Terrace	Late Post-medieval to Modern	446961	296027
MLE12985	Church of St. Simon & St. Jude, Almey's Lane (South Side), Earl Shilton	Church	Early Medieval to Modern	447117	298199
MLE12986	Hill Top House, 7, High Street (East Side), Earl Shilton	House	Late Post-medieval to Modern	446858	298135
MLE12987	71 High Street (East Side)	House; Framework Knitters Workshop	Late Post-medieval to Modern	446818	297898
MLE12988	73 High Street (East Side)	House	Late Post-medieval to Modern	446800	297876

MonUID Ref	Name	Monument Type	Period	Location (Easting and Northing)	
MLE12989	The Red Lion Public House, 164, High Street (West Side), Earl Shilton	Public House	Late Post-medieval to Modern	446609	297786
MLE12990	Top House, Hill Top (West Side), Earl Shilton	House	Late Post-medieval to Modern	446843	298253
MLE12991	Former Frameshop & Stable, 206, High Street (North Side), Earl Shilton	Stable; Framework Knitters Workshop	Late Post-medieval to Modern	446578	297795
MLE12992	War Memorial, Wood Street (South Side), Earl Shilton	War Memorial	Modern	446375	297744
MLE15929	Iron Age site north-east of Bracknell Farm	Site	Iron Age	448147	299045
MLE15931	Roman site south of Bungalow Farm	Site	Roman	448240	299153
MLE16734	Iron Age site north of Mill Lane, Earl Shilton	Site; Post Hole; Pit; Gully; Boundary Ditch	Late Bronze Age to Early Roman	447957	297941
MLE16848	Various features south of Breach Lane	Feature?; Post Hole	Unknown	446880	296708
MLE16995	Beechrome, Candle Lane	House; Ornamental Garden	Modern	446745	297590
MLE17049	Iron Age enclosure at 123, Mill Lane	Rectilinear Enclosure	Iron Age	447738	297872
MLE17181	Earl Shilton Baptist Church, Mill Lane	General Baptist Chapel	Late Post-medieval to Modern	447195	298154
MLE17182	Congregational Chapel, High Street	Congregational Chapel	Late Post-medieval to Modern	446763	297799
MLE17636	Normanton Park	Park	Post-medieval	449193	298676
MLE17739	Anglo-Saxon remains west of Church Farm	Gully	Early Anglo Saxon to Middle Anglo Saxon	445863	296619
MLE17740	Roman remains north of Church Farm	Ditch	Early Roman	446149	296724
MLE17759	Prehistoric flint from the A47 between Thurlaston Lane and Mill Lane	Site?	Early Mesolithic to Late Bronze Age	447957	297948

MonUID Ref	Name	Monument Type	Period	Location (Easting and Northing)	
MLE17881	100, Wood Street	Framework Knitters Cottage	Late Post-medieval to Modern	446214	297741
MLE17882	9-19, Hinckley Road	Framework Knitters Cottage; Workshop	Late Post-medieval to Modern	446042	297626
MLE17883	Shoe factory, Churchill Works, Highfield Street	Shoe Factory	Modern	446111	297355
MLE17887	Shoe factory, 49, Church Street	Shoe Factory	Late Post-medieval to Modern	447022	298260
MLE17888	Shoe factory, 2, Keats Lane	Shoe Factory	Late Post-medieval to Modern	446821	298209
MLE17889	Shoe factory, 12, Keats Lane	Shoe Factory	Modern	446760	298218
MLE17890	Shoe factory, 27, Keats Lane	Shoe Factory	Modern	446761	298159
MLE17891	Hosiery factory, 40, High Street	Hosiery Factory	Modern	446822	298051
MLE17892	Shoe factory, 5, West Street	Shoe Factory	Modern	446736	297989
MLE17893	Site of shoe factory, Orton Place	Shoe Factory	World War I to Modern	446848	297876
MLE17894	Site of shoe factory, Cotton Mews	Shoe Factory	Late Post-medieval to Modern	446517	297320
MLE17895	Site of shoe factory, New Street	Shoe Factory	Modern	446223	297267
MLE17896	Site of shoe/hosiery factory, Rossendale Road	Shoe Factory; Hosiery Factory	Modern	446005	297402
MLE17897	Site of shoe factory, New Road	Shoe Factory; Hosiery Factory	Modern	446052	297487
MLE17898	Shoe factory, 6, New Street	Shoe Factory	Modern	446023	297524
MLE17899	Eatoughs Ltd shoe factory, New Street	Shoe Factory	World War I to Modern	445989	297547
MLE17900	Shoe factory, 1-5, New Street	Shoe Factory	Late Post-medieval to Modern	446036	297577
MLE17901	Shoe factory, Rossendale Road	Shoe Factory	Modern	445943	297517

MonUID Ref	Name	Monument Type	Period	Location (Easting and Northing)	
MLE17902	Site of shoe factory, Hinckley Road	Shoe Factory	Late Post-medieval to Modern	445841	297559
MLE17958	Iron Age/Roman field system, south of Thurlaston Lane	Field System?	Early Iron Age to Late Roman	447787	298062
MLE19847	Network of ditches, land north of Clickers Way	Ditch; Boundary Ditch?; Ditch	Early Medieval to Late Post-medieval	446028	296771
MLE20592	Possible Roman ditch south of Mill Lane	Ditch	Early Iron Age to Late Roman	447791	297763
MLE20593	Possible trackway north-east of Sewage Works	Trackway?	Iron Age	447741	297646
MLE20594	Possible enclosure north of Clickers Way	Enclosure?	Iron Age	447112	296966
MLE20595	Ring ditch north-east of Breach Lane	Ring Ditch?	Late Prehistoric	446928	296947
MLE20794	Neolithic/Bronze Age site south-east of Townlands C of E Primary School	Site; Pit	Early Neolithic to Early Bronze Age	446964	297022
MLE20891	Elmesthorpe Farm/Church Farm	Farmstead	Late Post-medieval to Modern	446022	296554
MLE21071	J Lucas, 30, High Street	Warehouse	Modern	446828	298077
MLE21072	Site of A J Norton's shoe factory, Keats Close	Shoe Factory	Modern	446787	298139
MLE21073	Site of Ladkin Bros, Vicarage Street	Shoe Factory	Modern	446943	297899
MLE21450	Old Gravel Pit, 99, Elmesthorpe Lane	Gravel Pit	Late Post-medieval	445812	296612
MLE21451	Brickworks west of Allotments	Brickworks	Modern	446364	296822
MLE21452	Gasworks, Station Road	Gas Works	Late Post-medieval to Modern	446396	297491
MLE21452	Gasworks, Station Road	Gas Works	Late Post-medieval to Modern	446396	297491
MLE21479	Co-operative Village Hall, 115, High Street	Village Hall; Shop	Late Post-medieval to Modern	446649	297768

MonUID Ref	Name	Monument Type	Period	Location (Easting and Northing)	
MLE21480	"The Mansion", 121-123, High Street	House	Late Post-medieval to Modern	446581	297754
MLE21481	The King William Public House, 1, The Hollow	Public House	Late Post-medieval to Modern	446518	297750
MLE21482	Midland Bank, 22, Wood Street	Bank (Financial)	Late Post-medieval to Modern	446408	297774
MLE21699	St Simon and St Jude's Church burial ground, Almey's Lane	Churchyard	Late Medieval to Modern	447116	298200
MLE21700	Baptist Chapel burial ground, Mill Lane	Baptist Burial Ground	Late Post-medieval to Modern	447200	298132
MLE21805	West Field Farm, Keats Lane	Farmstead; Farmhouse; Threshing Barn	Late Post-medieval to Modern	446139	298059
MLE22002	Huit Farm, Breach Lane	Farmstead	Late Post-medieval to Modern	447736	296839
MLE22061	C20th Heath Lane Sand Pit	Sand Pit	Modern	445687	297597
MLE22071	Bronze Age/Iron Age site including Bronze Age burial, west of Mirfield Farm	Ditch; Cremation Burial; Gully; Pit	Bronze Age to Late Iron Age	447853	297562
MLE22102	Dog & Gun, 72, Keats Lane	Public House	Modern	446580	298154
MLE22664	Leicester Forest Area D	Forest	Early Medieval to Early Post-medieval	451657	301779
MLE22665	Brokensale Park, Bracknell Farm	Park	Medieval	447968	298927
MLE23192	Weaver's Close Primary School, Alexander Avenue, Earl Shilton	Primary School	Modern	446924	297762
MLE23432	Barrow Hill Quarry	Quarry	Late Post-medieval to Modern	448887	296894
MLE24345	Elmesthorpe Land Settlement, Station Road/Billington Road East	Model Settlement	Modern	446295	296123
MLE24473	(Former) Prospect House, Prospect Way, Earl Shilton	Farmhouse; Farmstead; Pump	Late Post-medieval to Modern	446393	297973

MonUID Ref	Name	Monument Type	Period	Location (Easting and Northing)	
MLE25385	Normanton House Farm, Thurlaston	Farmstead	Late Post-medieval to Modern	448457	298484
MLE25584	Site of Primitive Methodist Chapel, Wood Street (Cloisters)	Primitive Methodist Chapel; Primitive Methodist Chapel	Late Post-medieval to Modern	446165	297681
MLE2849	Earl Shilton Castle	Motte And Bailey	Medieval	447084	298198
MLE2856	Dam north of Church Farm	Dam	Post-medieval	445891	296941
MLE2861	Site of a timber framed house, Hilltop	Box Frame House	Early Post-medieval to Modern	446845	298229
MLE2863	Possible Roman villa site, west of Barrow Hill Quarry	Villa?	Roman	448516	297365
MLE3006	Tooley Park	Deer Park	Early Medieval to Late Post-medieval	448161	300219
MLE3072	Park pale, Tooley Park (Long Spinneys)	Park Pale	Medieval	447825	299199
MLE341	Medieval moated lodge site north of Bracknells Barn	Moat; Lodge	Medieval	448011	299034
MLE346	Ring ditch cropmarks west of Normanton Turville	Ring Ditch	Bronze Age	448890	298197
MLE347	Possible pit alignment west of Normanton Turville	Pit Alignment?	Bronze Age to Late Iron Age	448878	298181
MLE351	Undated banks north of Bracknells Barn	Bank (Earthwork)	Unknown	448118	299051
MLE67	Possible enclosure west of Wortley Cottages	Sub-rectangular Enclosure	Unknown	446456	296008
MLE69	Fishponds north of Church Farm	Fishpond	Post-medieval	446012	296673
MLE70	Elmesthorpe deserted medieval village	Deserted Settlement	Early Medieval to Early Post-medieval	445939	296409
MLE71	Fishpond north-east of Church Farm	Fishpond	Early Medieval to Late Post-medieval	446137	296772
MLE75	Pond south of Church Farm	Fishpond	Medieval	445936	296365
MLE76	Pond south-west of Church Farm	Pond	Post-medieval	445877	296540

MonUID Ref	Name	Monument Type	Period	Location (Easting and Northing)	
MLE77	Pond north-east of Church Farm	Pond	Post-medieval	446159	296632
MLE9535	Historic settlement core of Earl Shilton	Village; Watermill; Windmill	Early Medieval to Late Post-medieval	446809	298057
MLE9771	Early Bronze Age round barrows, A47 between Thurlaston Lane and Mill Lane	Findspot; Round Barrow	Early Neolithic to Early Bronze Age	447956	297963
MLE9771	Early Bronze Age round barrows, A47 between Thurlaston Lane and Mill Lane	Findspot; Round Barrow	Early Neolithic to Early Bronze Age	447956	297963
MLE9772	Medieval windmill mound south of Thurlaston Lane	Windmill	Medieval	447859	297918
MLE10231	Worked flint found south of Breach Lane	Findspot	Early Mesolithic to Early Bronze Age	446586	296887
MLE10232	Roman pottery from south of Breach Lane	Findspot	Roman	446566	296940
MLE10242	Roman brooch from north-west of Breach Lane Farm	Findspot	Early Roman	447122	296899
MLE10243	Medieval coin from north-west of Breach Lane Farm	Findspot	Early Medieval	447105	296929
MLE10248	Coins from east of the allotment gardens	Findspot	Early Medieval to Late Post-medieval	447125	298549
MLE10311	Possible Roman mosaic found south of Elvesthorpe crossroads	Mosaic	Roman	446164	296393
MLE15864	Roman pottery from east of the Poplars, Earl Shilton	Findspot	Late Roman	447468	298187
MLE16977	Elvesthorpe Hall	Manor House	Early Post-medieval	446018	296525
MLE17742	Prehistoric flint from north-west of Church Farm	Findspot	Early Neolithic to Early Bronze Age	445935	296643
MLE17761	Saxon pottery from A47 between Thurlaston Lane and Mill Lane	Findspot	Early Anglo Saxon	447984	297996
MLE22070	Possible prehistoric pit east of Townlands School	Pit	Late Prehistoric	446807	297255
MLE23858	Medieval graveyard, Church of St Mary, Elvesthorpe	Inhumation Cemetery	Medieval	446047	296483

MonUID Ref	Name	Monument Type	Period	Location (Easting and Northing)	
MLE2850	Union Mill, post-medieval windmill	Tower Mill	Late Post-medieval to Modern	448756	297183
MLE2851	Coopers Mill, post-medieval windmill	Post Mill	Late Post-medieval	445778	297366
MLE2852	Windmill south of Westfield Farm	Windmill	Post-medieval	446240	297972
MLE2862	Possible medieval pound, Pinfold Close	Pound	Medieval	447148	298150
MLE6182	Anglo-Saxon sword pommel from Huitt Farm	Findspot	Early Anglo Saxon	447469	296399
MLE6349	Bronze Age palstave from north of Huit Farm	Findspot	Middle Bronze Age	447648	297151
MLE6790	Medieval mortar from the Old Vicarage	Findspot	Medieval	446949	298052
MLE7237	Neolithic mace head from Wood Street	Findspot	Late Neolithic	446155	297694
MLE78	Approximate site of medieval windmill, Old House Close	Windmill	Medieval	446560	296136
MLE7937	Roman pottery from The Poplars	Findspot	Roman	447333	298204
MLE8983	Medieval and post-medieval finds, west of Normanton Park	Findspot	Early Medieval to Early Post-medieval	448846	298152
MLE9235	Neolithic axe from north-west of Barrow Hill Quarry	Findspot	Neolithic	448628	297497
MLE9768	Possible Bronze Age blade from north of Breach Lane Farm	Findspot	Bronze Age to Late Iron Age	447192	296916
MLE9783	Roman site, Huit Farm	Site	Roman	447649	296801
MLE20657	Turnpike Road, Leicester to Nuneaton	Toll Road	Late Post-medieval	448872	298672
MLE17758	Early/mid Iron Age pit alignments, A47 between Thurlaston Lane and Mill Lane	Pit Alignment	Early Iron Age to Middle Iron Age	447969	297928
MLE20596	Possible ditch south of the Sewage Works	Ditch?	Unknown	447550	297330

Appendix 9B

Photographs of Site Survey (9 March 2021)

Graphic 9.1 Views within Barwell Conservation Area across demolished building



Graphic 9.2 Key view in Barwell Conservation Area



Graphic 9.3 Key view in Barwell Conservation Area



Graphic 9.4 Key view in Earl Shilton Conservation Area towards 1-5 New Street (formerly A Abbott Ltd)



Graphic 9.5 Key view in Earl Shilton Conservation Area towards the Caprice Building



Graphic 9.6 View looking north towards Earl Shilton Motte and Bailey



Graphic 9.7 View looking east towards the Church of St Simon and St Jude from the motte and bailey.



Graphic 9.8 View looking south towards the Church of St Simon and St Jude from Church Lane



Graphic 9.9 View looking north-east towards Church of St Simon and St Jude, and Earl Shilton Motte and Bailey from the Queen Elizabeth II Hall Field



Graphic 9.10 View looking west towards the St Simon and St Jude church spire, adjacent to Site along Thurlaston Lane



Graphic 9.11 View looking north towards Church of St Simon and St Jude



Graphic 9.12 View looking north-east towards Elmesthorpe Church in its church yard.



Graphic 9.13 View looking north towards St Simon and St Jude Church spire from the sports field on the Site



Graphic 9.14 View looking north towards St Simon and St Jude Church spire from the south of the western public right of way (PRoW; T90)



Graphic 9.15 View looking north towards St Simon and St Jude Church spire from the centre of the western PRoW (T90)



Appendix 10A

LVIA Methodology

Overview

The LVIA has been undertaken in accordance with best practice guidance and the methodology as set out here, which is based on the *Guidelines for Landscape and Visual Impact Assessment, Third Edition*¹ (hereafter referred to as *GLVIA3*).

The assessment of the significance of landscape and visual effects is, according to *GLVIA3* "an evidence-based process combined with professional judgement."¹ All assessments and judgements must be transparent and capable of being understood by others. Levels of landscape and visual effects are determined by consideration of the nature or 'sensitivity' of each receptor or group of receptors and the nature of the effect or 'magnitude of change' that would result from the proposed development.

The assessments reported in the LVIA represent the culmination of an iterative design and assessment process and therefore relate to the remaining residual effects that could not otherwise be mitigated or 'designed out'.

Landscape effects

Landscape effects are defined by the Landscape Institute in *GLVIA3*¹, paragraphs 5.1 and 5.2 as follows:

"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. ... The area of landscape that should be covered in assessing landscape effects should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner."

Landscape effects are defined as changes to landscape elements, characteristics, character and qualities of the landscape as a result of development.

The potential landscape effects that would occur during the construction and operational (and decommissioning) periods, may therefore include, but are not restricted to, the following:

- Changes to landscape elements: the addition of new elements or the removal of existing elements such as vegetation and buildings and other characteristic elements of the existing local landscape;
- Changes to landscape qualities: degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of defined landscape character types or areas or contribute to the landscape value; and
- Changes to landscape character: landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the cumulative addition of new features, the magnitude of which is sufficient to alter the overall landscape character of a particular area.

The type of effect is also considered and may be direct or indirect, temporary or permanent (reversible) and positive, neutral or negative. Development may have a direct (physical) effect on the landscape as well as an indirect effect which would be perceived from the wider landscape outside the immediate site area and its associated landscape character.

¹ Landscape Institute and the Institute of Environmental Management and Assessment, (2013). *Guidelines for Landscape and Visual Impact Assessment*. 3rd edition. London. Routledge.

Evaluating landscape sensitivity to change

The sensitivity of a landscape receptor e.g. a Landscape Character Area, to a particular proposed development is determined by the susceptibility of that landscape receptor and its value. The methodology describes landscape sensitivity as high, medium or low and is assessed by considering the landscape receptor's landscape value and landscape capacity or susceptibility to the changes identified as the result of a particular proposed development.

Further guidance on the evaluation of landscape sensitivity and the criteria for assessing value and susceptibility is set out in paragraphs 5.39 – 5.47 of GLVIA3¹ and is summarised below.

Landscape value

GLVIA3¹ defines landscape value as:

"The relative value that is attached to different landscapes by society."

A consistent approach has been applied to determining the landscape value of the individual landscape character receptors considered in the landscape assessment. This utilises a range of factors to help understand the value of each landscape receptor, as follows:

- Landscape designations: whether an area of landscape is recognised by statute (i.e. National Parks), is a heritage coast, a locally designated landscape or is undesignated;
- Landscape quality/condition: a measure of the physical state of the landscape (i.e. the intactness of the landscape and the condition of individual elements);
- Rarity: the presence of rare elements or features in the landscape or the presence of a rare landscape character type;
- Conservation interests: the presence of features of wildlife or historical and cultural interest which add value to the landscape;
- Recreational value: evidence that the landscape is valued for recreational activity where experience of the landscape is important;
- Perceptual aspects: a landscape may be valued for its perceptual qualities, notably tranquillity; and
- Associations: some landscapes are associated with particular people, such as artists or writers, or events in history.

Table 10A.1 draws from the advice provided in GLVIA3¹ and the *Technical Guidance Note 02/21 Assessing landscape value outside national designations*² and provides further guidance and examples of landscape value.

² Landscape Institute (2021). *Technical Guidance Note 02/21 Assessing landscape value outside national designations*. (online). Available at: <https://www.landscapeinstitute.org/news/new-guidance-assessing-landscape-value-outside-national-designations/>

Table 10A.1 Assessing landscape value

Landscape Value Criteria	Landscape value category:			
	High	Medium	Low	
Designations:	Internationally or nationally designated landscape. Management plans aim for conservation.	Locally designated landscape or 'ordinary' landscapes and features. Management plans aim for conservation and enhancement.	Non-designated landscape with detracting, derelict or industrial features. Management plans aim for enhancement, restoration or regeneration.	
Landscape quality, condition and intactness:	A landscape/features recognised to be of high landscape quality and in excellent or good condition with a 'strong' intact/unified and distinctive character. Constant/mature landscape with strong time depth.	A landscape/features that are of a reasonable or medium quality and condition with an intact and recognisable character. Constant or improving state.	A landscape/features that are in a poor condition with a fragmented or indistinct landscape character. The landscape may be in a declining state.	
Scenic quality:	A landscape of high aesthetic appeal supported by recognised tourist/visitor literature. There are few or no detracting features.	A landscape of moderate or 'ordinary' aesthetic appeal. There may be some minor detracting features.	A landscape of limited or no aesthetic appeal with many or large-scale detracting features, may be abandoned or partially derelict.	
Rarity and representativeness:	A landscape or features that are rare and valued in a national or regional context that is supported by designation.	A landscape or features that are uncommon but, not particularly valued or supported through designation.	A landscape or features that are common and not rare	
Conservation interest and associations:	A landscape with rich and diverse cultural, historic, nature conservation value and recognised literary or artistic associations	A landscape with some cultural or nature conservation features and interest	A landscape with few or no cultural or nature conservation features and interest.	
Recreation value:	High recreational/tourist value indicated through land use (parks/sports facilities etc.) and the density/hierarchy of recreational routes.	A landscape of moderate recreational value, as indicated by land use and density/hierarchy of recreational routes.	A landscape of limited recreational value, where an appreciation of the landscape has a limited contribution to the public's recreational experience	
Perceptual aspects:	Highest levels of tranquillity. Strong perceptions of 'wildness' or naturalness and dark skies.			Developed landscapes which are the antithesis of tranquillity 'wildness' or naturalness. Light intrusion occurs.

Value of landscape elements

In line with paragraphs 5.30 and 5.33 of *GLVIA3*¹, the value of landscape elements has been considered under three criteria as follows:

- Rarity: The presence of rare elements or features in the landscape often (although not always) supported through designation;
- Condition: a measure of the physical state of the landscape element or feature; and

- Role: the contribution the landscape element makes to the visual amenity and scenic quality, as well as the landscape character at a county or local level (reflected as key characteristics within an LCT).

It is the combination of the three criteria listed above that leads to the judgement of an overall landscape value which may be either Low, Medium or High.

Landscape susceptibility to change

GLVIA3¹ defines landscape susceptibility to change as follows:

"This means the ability of the landscape receptor to accommodate the proposed development without undue consequences for the maintenance of the baseline situation..."

GLVIA3¹ also emphasises that susceptibility to change is dependent on the types of development proposed. Paragraph 5.42 states:

"Some of these existing assessments may deal with what has been called 'intrinsic' or 'inherent' sensitivity, without reference to a specific type of development. These cannot reliably inform assessment of the susceptibility to change since they are carried out without reference to any particular type of development and therefore do not relate to the specific development proposed. Since landscape effects in LVIA are particular to both the specific landscape in question and the specific nature of the development, the assessment of susceptibility must be tailored to the project."

Table 10A.2 provides further guidance and examples of landscape susceptibility, which considers the capacity or ability of the landscape receptor, by virtue of its particular physical, visual or perceptual characteristics to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. Generally, landscapes with the highest susceptibility to the proposed change will have the least capacity to accommodate that proposed development. Conversely, landscapes with the lowest susceptibility to the proposed change are likely to have the greatest capacity to accommodate the proposed development.

Table 10A.2 Assessing susceptibility to a proposed development

Susceptibility criteria	Landscape susceptibility category		
	High	Medium	Low
Examples of physical elements/characteristics	Highly valued elements or combinations of characteristics such as of small-scale landscapes with strong topographical variation or distinctive landform and complex patterns, which are essentially intact and susceptible to development.	Elements or combinations of characteristics such as medium to large scale landscapes with more open, simple landform and patterns with some capacity for development.	Common/indistinct elements or combinations of characteristics such as large-scale and simple/uniform landscapes, where similar development is already part of the baseline character and there is capacity for development.
Examples of visual characteristics:	Susceptibility to alteration of regionally/locally valued or distinctive skylines, views, vistas and skylines with historic landmarks. Areas with a strong visual relationship with surrounding landscapes and limited visual intrusion. Dark skies and low levels of light intrusion.	A partially enclosed landscape offering some visual containment and filtering of views and moderate levels of intervisibility with visual landmarks and surrounding landscapes. A landscape where light intrusion and some movement and change are already present.	A heavily enclosed landscape which contains or strongly filters views with a corresponding limited visual relationship with surrounding landscapes. A landscape with an absence of visual landmarks and/or where development, change, movement, light intrusion

Susceptibility criteria	Landscape susceptibility category		
	High	Medium	Low
			and/or visual intrusion is already present.
Examples of perceptual characteristics:	Perceptions of tranquillity, remoteness or naturalness, with a strong sense of time depth and/or related special qualities that would be susceptible to development.	Perceptions of moderate tranquillity, remoteness or naturalness. Presence of some visual or audible signs of existing built development/ infrastructure giving rise to a landscape with some development capacity.	Landscapes lacking in tranquillity and/or remoteness, which are subject to land use change and high degrees of visual or audible signs of existing built development/ infrastructure with development capacity.

Susceptibility of landscape elements

The susceptibility of landscape elements is approached with reference to whether or not these elements can be 'replaced' as described in paragraph 5.30 of GLVIA3¹. By way of an example one may consider that a stone wall can be re-built relatively easily, in contrast a 500-year-old oak tree cannot be replaced without a similar growth period. The concept of 'replacement' is not a reflection of what might or might not happen as part of the development, rather it is a measure of susceptibility to change. Landscape elements that are difficult to replace or cannot be replaced are likely to be of higher susceptibility than those which can be easily replaced such as grassland.

Overall landscape sensitivity

The manner in which the value and susceptibility are combined to determine landscape sensitivity is a matter for informed professional judgement and the following matrix shown in **Table 10A.3** has been used as a guide to assist this process. In terms of landscape value, national and international landscape designations are generally accorded the highest assessment value.

Table 10A.3 Overall landscape sensitivity

Overall landscape sensitivity		Susceptibility		
		High	Medium	Low
Value	High	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

Magnitude of landscape change

The magnitude of landscape change or degree of change resulting from the proposed development is described as high, medium, low or very low, in accordance with GLVIA 3¹ paragraph 3.27 use of 'word scales'. In those instances where, due to mitigation, there would be no magnitude of landscape change, then this justification is also recorded in the landscape assessment. The magnitude of landscape change is described by reference to its size and scale, geographical extent and duration/reversibility in accordance with GLVIA3¹, paragraph 5.48-52 that can be summarised as follows.

- Size or Scale:

- ▶ The size or scale of landscape change is described via a simple word scale to describe the extent or proportion of loss or addition of landscape elements, the degree to which the perceptual characteristics of the landscape may be altered and whether the effect changes the key characteristics, critical to its distinctive character overall.
- Geographical Extent:
 - ▶ The geographical extent of the effect is distinct from the size and scale of effect. There may for example be a medium loss of landscape elements affecting a large geographical area, or a high level addition of a proposed development affecting a very localised area, both resulting in a high magnitude of landscape change. The geographical extent is described at a site level within the development site boundary, within the immediate setting of the site, at the scale of the landscape character type or area assessed or on a larger scale, affecting several landscape character types or areas.
- Duration and reversibility:
 - ▶ In accordance with GLVIA3¹, this is a separate, but linked consideration and the duration of an effect may be described as temporary (short term 0-5 years, medium term 5-10 years or long term 10-20 years) or permanent. The proposed development may also be considered in terms of whether the effects are reversible.

Examples and further guidance on the evaluation of the magnitude of landscape change are described in **Table 10A.4**.

Table 10A.4 Magnitude of landscape change

Magnitude of landscape change	Key determining criteria
High	A large scale change that may include the loss of key landscape elements/characteristics or the addition of new uncharacteristic features or elements that would alter the perceptual characteristics of the landscape. The size or scale of landscape change could create new landscape characteristics and may change the overall distinctive landscape quality and character, typically, but not always affecting a larger geographical extent.
Medium	A medium scale change that may include the loss of some key landscape characteristics or elements, or the addition of some new uncharacteristic features or elements that could alter the perceptual characteristics of the landscape. The size or scale of landscape change could create new landscape characteristics and may lead to a partial change in landscape character, typically, but not always affecting a more localised geographical extent.
Low	A small scale change that may include the loss of some landscape characteristics or elements of limited characterising influence, or the addition of some new features or elements of limited characterising influence. They may be a small partial change in landscape character, typically, but not always affecting a localised geographical extent.
Very Low	A very small scale change that may include the loss or addition of some landscape elements of limited characterising influence. The landscape characteristics and character would be unaffected.

The assessment also identifies areas where no landscape change is predicted. In these instances 'No Change' has been inserted into the magnitude of change column of the assessment tables and the resulting level of effect identified as 'None'. This commonly occurs where no intervisibility (presence of a line of sight between two locations) or other perceptual effects pathway exists between the landscape receptor and the proposed development.

Types of Landscape Effect

In accordance with the EIA Regulations the level of landscape effect is also described in terms of:

- whether the effect would be permanent or temporary (in relation to temporary effects the duration of the effect will be important);
- whether the effect would be direct or indirect (where direct effects are associated with loss or alteration of individual landscape elements or changes to the physical fabric of a landscape character unit and where indirect effects are associated with changes to surrounding landscape character via a visual or other perceptual effects pathway); and
- whether the effect is judged to be positive (beneficial), neutral or negative (adverse).

The factors influencing judgements of whether effects are positive, neutral or negative and a consideration of cumulative effects are provided below.

In describing the level of landscape effect the assessment text clearly and transparently sets out the professional judgements that have been made in determining sensitivity and how the value and susceptibility of the receptor has been assessed; and in determining magnitude and how the size and scale, geographical extent and duration of the effect has been taken into account.

Visual effects

Visual effects are concerned wholly with the effect of the proposed development on views, and visual amenity and are defined by the Landscape Institute in *GLVIA3*¹, paragraph 9.1 as follows:

"An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views."

Visual effects are identified for different receptors (people) who will experience the view at their place of residence, within their community, during recreational activities, at work, or when travelling through an area.

The level of visual effect (and whether this is significant) is determined through consideration of the 'sensitivity' of each visual receptor (or range of sensitivities for receptor groups) and the 'magnitude of change' that would be brought about by the construction and operation proposed development. Visual assessment unavoidably involves a combination of both quantitative and subjective assessment and wherever possible a consensus of professional opinion is sought through consultation and internal peer review.

Evaluating Visual Sensitivity to Change

In accordance with Paragraphs 6.31-6.37 of *GLVIA3*¹ the sensitivity of visual receptors takes account of the susceptibility of the receptor to visual change and the value of the baseline view available to them. The sensitivity of visual receptors is described as high, medium or low.

Visual sensitivity: susceptibility

The main factors influencing the susceptibility of a visual receptor to change are the occupation or activity of the receptor (people) at particular locations and the extent to which their attention or interest may therefore be focused on the available view.

The visual receptors most susceptible to change are likely to include:

- people at their place of residence;

- people engaged in outdoor recreation whose attention or interest is likely to be focussed on the landscape and on particular views;
- visitors to heritage assets or other attractions where views of the surroundings are likely to make an important contribution to their experience; and
- people in their community where views contribute to their experience (e.g. users of public open spaces).

People using the transport network are usually considered to be moderately susceptible to change unless travelling on recognised scenic routes.

Visual receptors likely to be less susceptible to change include:

- people engaged in outdoor recreation that does not depend upon appreciation of views; and
- people at their place of work where views are not an important contributor to the quality of working life.

Examples and further guidance on the evaluation of visual receptor susceptibility are described in **Table 10A.5**.

Table 10A.5 Visual receptor sensitivity

Visual receptor sensitivity	Key determining criteria
High	Receptors in this category typically include people that are: ▪ Residents of settlements or isolated dwellings (main living space used in daylight hours). ▪ Visitors to outdoor attractions. ▪ Recreational routes (national trails, long distance footpaths and PRoWs; Sustrans national cycle routes (NCR); open access land/beaches and recognised scenic driving routes). ▪ People generally, undertaking recreational activity where the main focus of the activity involves an appreciation of the landscape.
Medium	Receptors in this category would generally include people travelling through the landscape on road, rail or other transport routes and people undertaking activities where it is likely that their surroundings have some influence upon their enjoyment (e.g. angling and golf).
Low	Receptors in this category would generally include people for whom their surroundings are unlikely to be a primary concern or affect how they undertake their current activity. Receptors are likely to include people at their place of work, people travelling on main roads through built up areas, dual-carriageways or motorways or taking part in activities not involving an appreciation of the landscape (e.g. playing team sports).

Visual sensitivity: value

The factors influencing judgements regarding the value attached to views by receptors include:

- Any recognition of the value attached to a particular view in relation to heritage assets or through planning designations; and
- Any indications of value provided by guidebooks and tourist literature, the inclusion of specific viewpoints on OS maps, provision of car parking and/or provision of interpretation materials.

Examples and further guidance on the evaluation of value attached to views are described in **Table 10A.6**.

Table 10A.6 Value attached to views

Visual receptor sensitivity	Key determining criteria
High	Notable specific value attached for example in relation to heritage assets, references in literature/art and or promoted by planning designation. Likely inclusion of facilities at or near viewpoint e.g. parking places, sign boards and interpretative material. Likely to be of high scenic quality and located within or overlooking a designated landscape.
Medium	Some indicators of value are present e.g. views well known at a local level and/or may be part of wider visual amenity experienced along a locally promoted footpath route. Likely to be of moderate scenic quality.
Low	No indication of any value attached to view/s or visual amenity. Likely to be of low scenic quality.

Overall visual sensitivity

The manner in which the value and susceptibility are combined to determine visual sensitivity is a matter for informed professional judgement and the following matrix shown in **Table 10A.7** has been used as a guide to assist this process.

Table 10A.7 Overall visual sensitivity

Overall visual sensitivity		Susceptibility		
		High	Medium	Low
Value	High	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

Evaluating the magnitude of change to the view

The magnitude of visual change is described as high, medium, low, or very low which is in accordance with the guidance on the use of 'word scales' provided in Paragraph 3.27 of *GLVIA3*¹. In any instances where the proposed development would not be visible, due to screening, then this is also recorded as 'No Change' in the magnitude of change column of the assessment tables and the resulting level of visual effect identified as 'None'.

The magnitude of visual change is assessed taking into account the composition of the visual baseline and is described by reference to the size and scale, geographical extent and duration/reversibility of the proposed development in accordance with *GLVIA3*¹ as follows:

- Size and Scale:
 - ▶ Scale of change: The scale of change in the view is determined by the loss or addition of features in the view and changes in the composition and extent of view affected. This can in part be described objectively by reference to the numbers and scale of new objects visible and the horizontal/vertical field of view that these new objects will occupy. Other descriptors such as 'dominant', 'prominent', 'noticeable' and 'negligible' can also be used to describe the scale of change.
 - ▶ Contrast: The degree of contrast or integration that will be generated by the introduction of any new features or changes in the view that will arise with the existing or remaining visual

elements and characteristics in terms of form, scale, mass, line, height, colour and texture. Developments which contrast or appear incongruous in terms of colour, scale and form are likely to be more visible and result in the generation of a higher magnitude of change.

- ▶ **Speed:** The speed at which the proposed development may be viewed will affect how long the view is experienced (continuously, intermittently, glimpsed or repeatedly and sequentially along a route) and the likelihood of the proposed development being noticed by people travelling in cars or trains compared to those who may be walking/riding/cycling and able to stop and 'take in' a view.
- ▶ **Screening:** The proposed development may be wholly or partly screened by landform, vegetation (including seasonal effects due to hedgerow management and seasonal variations in deciduous leaf cover) and/or buildings. Conversely visual receptors with open views, particularly from landscapes where such views are a key characteristic, are likely to be able to see a greater proportion of the proposed development.
- ▶ **Skyline/background:** Whether the proposed development would be viewed against the skyline or a background landscape may affect the level of contrast and magnitude, for example, skyline developments may be more noticeable, particularly where they affect open and uninterrupted horizons.
- **Geographical Extent:**
 - ▶ **Distance:** The separation distance from the proposed development can be measured objectively. Distance often provides a strong indicator of the magnitude of visual change, subject to any intervening screening of the proposed development by landform, vegetation, or buildings.
 - ▶ **Angle of view:** The angle of view may be considered in terms of whether the proposed development will be seen directly in front of a visual receptor or if it will be seen more obliquely. Road users are generally more aware of the views in their direction of travel, whilst train passengers are more aware of views perpendicular to their direction of travel. Elevated views are likely to reveal more of the proposed development, whereas low level views are more likely to be screened by intervening built form and vegetation.
 - ▶ **Geographical extent of area over which the changes would be visible.** This can be defined by the distance, area and the horizontal and vertical field of view affected.
- **Duration and reversibility:**
 - ▶ In accordance with GLVIA3¹ this is a separate, but linked consideration and the duration of any visual effect may be described as temporary (short term 0-5 years, medium term 5-10 years or long term 10-20 years) or permanent. The proposed development may also be considered in terms of whether the effects are reversible.

Further guidance on the evaluation of the magnitude of visual change is provided in **Table 10A.8**.

Table 10A.8 Magnitude of visual change

Magnitude of visual change	Key determining criteria
High	A large and prominent change to the view, appearing in the fore to middle ground and involving the loss/addition of a number of features, which is likely to have a strong degree of contrast and benefits from little or no screening. The view is likely to be experienced at static or low speed and is more likely to be continuously/sequentially visible from a route.

Magnitude of visual change	Key determining criteria
Medium	A moderate and prominent/noticeable change to the view, appearing in the middle ground and involving the loss/addition of features and a degree of contrast with the existing view. There may be some partial screening. The view is likely to be experienced at static or low to medium speed and is more likely to be intermittently or partially visible from a route.
Low	A noticeable or small change, affecting a limited part of the view that may be obliquely viewed or partly screened and/or appearing in the background of the view. This category may include rapidly changing views experienced from fast-moving road vehicles or trains.
Very Low	A small or negligible change to the view that may be obliquely viewed and mostly screened and/or appearing in the distant background or viewed at high speed over short periods and capable of being missed by the casual observer.

Types of Visual Effect

In accordance with the relevant EIA Regulations the level of visual effect is also described in terms of:

- whether the effect would be permanent or temporary (in relation to temporary effects the duration of the effect will be important);
- whether the effect is as a result of a change to:
 - ▶ an existing static view;
 - ▶ sequential views; or
 - ▶ wider visual amenity;
- whether the effect is a result of the introduction of new development or the loss of elements or features already present in the view; and
- whether the effect is judged to be positive (beneficial), neutral or negative (adverse).

The factors influencing judgements of whether effects are positive, neutral or negative and a consideration of cumulative effects are provided below.

In describing the level of visual effect the assessment text clearly and transparently sets out the professional judgements that have been made in determining visual sensitivity and how the value and susceptibility of each visual receptor has been assessed; and in determining magnitude of visual change how the size and scale, geographical extent and duration of the effect have been taken into account.

Evaluating Positive, Neutral and Negative Effects

Guidance provided by the in *GLVIA3*⁷ on the nature of effect (i.e. beneficial or adverse) states that "*in the LVIA, thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity*", but it does not provide guidance as to how that may be established in practice. The nature of effect is therefore one that requires interpretation and, where applied, this involves reasoned professional opinion.

The default evaluation for a new development is often negative. However, not all change, including high levels of change, is necessarily negative. The LVIA considers architectural and aesthetic factors such as the visual composition of the landscape and/or townscape in the receptor's view together with the proposed development. The proposed development may or may not be reasonably accommodated within the scale and character of the landscape as seen from the receptor location as follows:

- beneficial effects contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The development contributes to the landscape by virtue of good design or the introduction of new landscape planting. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components.
- Neutral effects occur where the development fits with the existing landscape character or visual amenity. The development neither contributes to or detracts from the landscape and visual resource and can be accommodated with neither beneficial or adverse effects, or where the effects are so limited that the change is hardly noticeable. A change to the landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation.
- Adverse effects are those that detract from the landscape character or quality of visual attributes experienced, through the introduction of elements that contrast, in a detrimental way, with the existing characteristics of the landscape and visual resource, or through the removal of elements that are key in its characterisation.

Cumulative Landscape and Visual Effects

The assessment of cumulative landscape or visual effects is essentially the same as for the assessment of the primary or 'stand-alone' landscape or visual effects, in that the level of effect is determined by assessing the sensitivity of the receptor and the magnitude of change, although the cumulative assessment considers the magnitude of change posed by multiple developments. Chapter 7 of GLVIA3¹ notes that this is an evolving area of practice, but provides the following definitions sourced from the most recent established guidance (*Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments*, Scottish Natural Heritage, 2012) in response to wind farm development as follows:

- Cumulative effects are defined as *"the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments taken together"*.

Types of cumulative landscape or visual effect can be further defined as follows:

- Coincidental effects experienced from a single location as follows:
 - ▶ Simultaneous or combined: where two or more developments may be viewed from a single fixed viewpoint simultaneously, within the viewer's field of view and without requiring them to turn their head;
 - ▶ Successive or repetitive: where two or more developments may be viewed from a single viewpoint successively as the viewer turns their head or swivels through 360°;
- Sequential: where a number of developments may be viewed sequentially or repeatedly at increased frequency, from a range of locations when travelling along a route within the Study Area.

Significance evaluation methodology

The level of landscape and visual effects will be determined with reference to landscape or visual sensitivity and the magnitude of landscape or visual change experienced. For each receptor the evaluation process will be informed by use of a matrix as shown in **Table 10A.9**, below.

Table 10A.9 Level of effect

Magnitude of change	Sensitivity of receptor		
	High	Medium	Low
High	Major (Significant)	Major (Significant)	Moderate (Potentially Significant)
Medium	Major (Significant)	Moderate (Potentially Significant)	Minor (Not Significant)
Low	Moderate (Potentially Significant)	Minor (Not Significant)	Negligible (Not Significant)
Very Low	Minor (Not Significant)	Negligible (Not Significant)	Negligible (Not Significant)

In line with the emphasis placed in *GLVIA3*¹ upon application of professional judgement, the adoption of an overly mechanistic approach through reliance upon a matrix as presented in **Table 10A.9** will be avoided. This will be achieved by the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor over and above the outline assessment provided by use of the matrix. Matrices for landscape and visual effects are provided as a summary in support of the narrative explanations. Wherever possible cross references will be made to baseline figures and/or to photomontage visualisations in order to support the rationale.

In accordance with the EIA Regulations, it is important to determine whether the predicted effects are likely to be 'significant'. Significant landscape and visual effects, in the assessor's opinion, resulting from the proposed development would be all those effects that result in a 'Major' or potentially a 'Moderate' level of effect and any exceptions would be clearly explained. In particular a more detailed rationale will be provided for ascribing whether an effect would be 'significant' or 'not significant' where the assessment concludes that the level of effect would be 'Moderate' and therefore 'potentially significant'.



Appendix 14A

Accident Data

Accident ID	Severity	Date and Time	Year	Number of Vehicles	Number of Casualties	Road Number	Weather Conditions	Road Surface	Light Conditions	Junction Detail	Involved Pedal Cycle	Pedestrian Casualty	Child Casualty	Pedal Cycle Casualty
2016331601498	Slight	2/9/2016, 9:28 AM	2016	3		1 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	T or staggered junction	0	0	0	0
2020332000874	Slight	6/11/2020, 6:01 PM	2020	2		1 U0	Fine without high winds	Dry	Darkness: street lights present and lit	T or staggered junction	0	0	0	0
2020332000073	Slight	22/1/2020, 4:30 PM	2020	2		1 A47	Fine without high winds	Dry	Darkness: no street lighting	Not at or within 20 metres of junction	0	0	0	0
2018331801194	Slight	13/6/2018, 5:15 AM	2018	2		1 A47	Fine without high winds	Dry	Darkness: street lighting unknown	T or staggered junction	0	0	0	0
2020332000955	Serious	9/12/2020, 4:21 PM	2020	2		1 A47	Other	Wet or Damp	Darkness: street lights present and lit	Roundabout	0	0	0	0
2018331800715	Slight	18/5/2018, 9:50 AM	2018	1		2 U0	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Using private drive or entrance	0	1	1	0
2018331802086	Slight	13/9/2018, 8:50 AM	2018	2		1 A47	Unknown	Dry	Daylight: regardless of presence of streetlights	Crossroads	0	0	0	0
2018331800465	Slight	8/5/2018, 9:15 AM	2018	1		1 B581	Unknown	Dry	Daylight: regardless of presence of streetlights	Crossroads	0	1	0	0
2017331701144	Slight	6/9/2017, 6:30 PM	2017	2		1 U0	Unknown	Dry	Daylight: regardless of presence of streetlights	Not at or within 20 metres of junction	1	0	1	1
2018331800828	Serious	16/8/2018, 3:00 PM	2018	1		1 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Using private drive or entrance	0	0	0	0
2020332000545	Slight	2/8/2020, 10:19 PM	2020	2		2 A47	Fine without high winds	Dry	Darkness: no street lighting	Not at or within 20 metres of junction	0	0	0	0
2018331801276	Serious	3/12/2018, 12:28 PM	2018	2		2 A47	Fine without high winds	Wet or Damp	Daylight: regardless of presence of streetlights	T or staggered junction	0	0	1	0
2016331600251	Slight	12/2/2016, 8:10 PM	2016	2		1 U0	Other	Wet or Damp	Darkness: street lights present and lit	T or staggered junction	0	0	0	0
2019331901263	Slight	12/12/2019, 6:20 PM	2019	2		2 A47	Fine without high winds	Dry	Darkness: street lights present and lit	T or staggered junction	0	0	0	0
2018331801047	Slight	8/9/2018, 11:10 AM	2018	2		1 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Roundabout	0	0	0	0
2016331600976	Slight	9/6/2016, 5:25 PM	2016	3		2 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	T or staggered junction	0	0	0	0
2017331701373	Slight	15/11/2017, 8:22 PM	2017	4		2 B582	Fine without high winds	Wet or Damp	Darkness: street lights present and lit	Crossroads	0	0	0	0
2019331900801	Slight	13/8/2019, 9:44 PM	2019	2		1 A47	Fine without high winds	Dry	Darkness: no street lighting	Not at or within 20 metres of junction	0	0	0	0
2018331801207	Fatal	17/11/2018, 10:50 PM	2018	2		1 U0	Raining without high winds	Wet or Damp	Darkness: street lights present and lit	Not at or within 20 metres of junction	0	0	0	0
2018331800024	Serious	9/1/2018, 12:27 AM	2018	1		1 B581	Fine without high winds	Wet or Damp	Darkness: street lights present and lit	Not at or within 20 metres of junction	0	0	0	0
2020332000250	Slight	19/5/2020, 3:20 PM	2020	1		1 U0	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Not at or within 20 metres of junction	0	0	0	0
2016331600627	Fatal	26/4/2016, 11:25 AM	2016	1		1 U0	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Using private drive or entrance	0	1	0	0
2019331900541	Slight	27/5/2019, 9:42 PM	2019	1		1 A47	Raining without high winds	Wet or Damp	Daylight: regardless of presence of streetlights	Roundabout	0	1	0	0
2018331802172	Slight	18/12/2018, 11:00 AM	2018	3		1 U0	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	T or staggered junction	0	0	0	0
2016331600794	Slight	16/5/2016, 10:12 AM	2016	2		1 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Roundabout	0	0	0	0
2018331801465	Slight	6/9/2018, 1:08 AM	2018	2		2 A47	Fine without high winds	Dry	Darkness: no street lighting	T or staggered junction	0	0	0	0
2018331800817	Serious	13/8/2018, 9:33 AM	2018	2		1 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	T or staggered junction	0	0	0	0
2020332000366	Serious	23/6/2020, 8:48 PM	2020	3		3 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	T or staggered junction	0	0	0	0
2018331801217	Slight	1/8/2018, 8:00 AM	2018	3		3 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Not at or within 20 metres of junction	0	0	0	0
2018331800213	Slight	11/3/2018, 4:18 PM	2018	2		5 U0	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Not at or within 20 metres of junction	0	0	1	0
2018331801373	Slight	2/12/2018, 9:48 PM	2018	2		1 A47	Raining without high winds	Wet or Damp	Darkness: street lights present and lit	T or staggered junction	0	0	0	0
2019331900731	Serious	23/7/2019, 12:06 PM	2019	2		3 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	T or staggered junction	0	0	0	0
2017331700552	Slight	10/5/2017, 10:56 PM	2017	2		1 U0	Fine without high winds	Dry	Darkness: street lights present and lit	T or staggered junction	0	0	0	0
2020332000199	Slight	21/4/2020, 7:54 PM	2020	2		2 B581	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Not at or within 20 metres of junction	0	0	0	0
2016331601069	Slight	26/6/2016, 11:00 AM	2016	2		4 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Crossroads	0	0	0	0
2018331800356	Slight	14/4/2018, 11:50 AM	2018	2		1 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Not at or within 20 metres of junction	0	0	0	0
2018331801174	Slight	2/9/2018, 7:32 PM	2018	1		1 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Roundabout	0	0	0	0
2020332000054	Slight	13/1/2020, 3:30 PM	2020	3		3 A47	Raining without high winds	Wet or Damp	Daylight: regardless of presence of streetlights	T or staggered junction	0	0	0	0
2019331900650	Slight	28/3/2019, 11:35 AM	2019	2		1 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	T or staggered junction	0	0	0	0
2018331800763	Serious	21/7/2018, 12:40 AM	2018	3		1 U0	Fine without high winds	Dry	Darkness: street lights present and lit	T or staggered junction	0	0	0	0
2020332000341	Serious	22/6/2020, 1:11 AM	2020	1		1 A47	Fine without high winds	Dry	Darkness: no street lighting	Not at or within 20 metres of junction	0	1	0	0
2020332000501	Slight	12/2/2020, 4:18 PM	2020	2		2 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	T or staggered junction	0	0	0	0
2018331801397	Slight	21/12/2018, 1:30 PM	2018	3		2 A47	Fine without high winds	Wet or Damp	Daylight: regardless of presence of streetlights	Using private drive or entrance	0	0	0	0
2017331700851	Slight	29/6/2017, 4:10 PM	2017	3		3 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Roundabout	0	0	1	0
2018331800428	Slight	22/4/2018, 2:20 PM	2018	2		1 B581	Unknown	Wet or Damp	Daylight: regardless of presence of streetlights	Not at or within 20 metres of junction	1	0	1	1
2016331601479	Serious	2/9/2016, 7:40 AM	2016	5		1 A47	Fine without high winds	Wet or Damp	Daylight: regardless of presence of streetlights	Using private drive or entrance	0	0	0	0
2020332000047	Slight	16/1/2020, 12:24 PM	2020	2		2 A47	Raining without high winds	Wet or Damp	Daylight: regardless of presence of streetlights	T or staggered junction	0	0	0	0
2017331700133	Slight	1/2/2017, 2:30 PM	2017	2		1 A47	Fine without high winds	Wet or Damp	Daylight: regardless of presence of streetlights	Not at or within 20 metres of junction	0	0	0	0
2018331800365	Slight	16/4/2018, 5:59 PM	2018	2		1 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Using private drive or entrance	0	0	0	0
2016331600381	Slight	26/2/2016, 10:55 AM	2016	2		1 B581	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Using private drive or entrance	0	0	0	0
2020332000477	Slight	6/3/2020, 6:37 AM	2020	3		2 A47	Fine without high winds	Wet or Damp	Daylight: regardless of presence of streetlights	Not at or within 20 metres of junction	0	0	0	0
2017331701725	Slight	16/12/2017, 4:15 PM	2017	2		4 A47	Fog or mist - if hazard	Frost or Ice	Darkness: street lights present and lit	Using private drive or entrance	0	0	0	0
2018331801461	Slight	29/12/2018, 7:35 AM	2018	2		2 A47	Other	Dry	Darkness: no street lighting	Not at or within 20 metres of junction	0	0	0	0
2020332000809	Serious	15/10/2020, 9:57 AM	2020	1		1 U0	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Not at or within 20 metres of junction	0	1	0	0
2018331800389	Slight	23/4/2018, 6:28 PM	2018	2		2 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Using private drive or entrance	0	0	0	0
2017331701154	Serious	19/9/2017, 7:08 PM	2017	2		1 U0	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Not at or within 20 metres of junction	0	0	0	0
2020332000017	Fatal	17/1/2020, 11:42 PM	2020	1		1 A47	Fine without high winds	Wet or Damp	Darkness: no street lighting	T or staggered junction	0	0	0	0
2018331800800	Serious	5/2/2018, 6:30 AM	2018	2		1 U0	Fine without high winds	Dry	Darkness: street lighting unknown	Mini roundabout	1	0	0	1
2016331601886	Serious	19/4/2016, 2:36 PM	2016	2		1 A47	Fine without high winds	Dry	Daylight: regardless of presence of streetlights	Not at or within 20 metres of junction	1	0	0	1

Data Source: Department for Transport data published by www.crashmap.co.uk