Preliminary Ecological Appraisal

Goldthorpe Unit D

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Field Investigations and Data

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by Wildscapes CIC and Sheffield and Rotherham Wildlife Trust for inaccuracies in the data supplied by any other party.

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The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed within this document are our true and professional bona fide opinions.

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Summary

Purpose of the report

1. This report presents a Preliminary Ecological Appraisal of the land surrounding the A635 at Billingley Green, Goldthorpe, Barnsley. The planned development includes the widening of the road present and creation of a roundabout to allow access to a planned development site. The survey area includes existing roads and paths, roadside grassland, hedgerows and arable fields to the north and south. Carr Dike crosses the site from towards the east.

2. The report identifies the main ecological characteristics of the site and, using both field survey and desk survey data, makes a preliminary assessment of the habitats and species of interest present. The report includes an assessment of potential ecological impacts of development on this site, along with advice on ways to avoid, minimise or mitigate potential impacts. Recommendations for further surveys and for enhancement of the site are made where appropriate.

3. Updates made to the report since Version 01 was produced in 2019 are written in green text.

Methodology

4. A desk survey was undertaken on data obtained from Barnsley Biological Record Centre (received from the Sheffield ecology unit) and Rotherham Biological Records Centre, obtained in 2018 for the desk study of the Goldthorpe Road Improvement scheme which is approximately 1km to the east of the site. This reuse of data was advised by Barnsley Metropolitan Borough Council. Data was also collected using the MAGIC website. A field survey was undertaken on 11th and 12th April 2019 where the following habitats and species were assessed:

    - Habitats – using Phase 1 methodology
    - Invasive Species – using Phase 1 methodology
    - Bats – habitat suitability assessment
    - Amphibians – habitat suitability following NARRS
    - Reptiles – habitat suitability following NARRS
    - Badgers – presence/absence assessment
    - Birds – habitat suitability assessment
    - Other species as required

5. Since Version 01 of this PEA was produced, the location of the proposed roundabout has shifted to the east. An additional field survey was undertaken on 14th October 2021 in order to update the assessments listed above. The MAGIC website has been re-checked and reference made to reports produced for the planned Goldthorpe Masterplan area, which cover land to the south of the proposed roundabout.

Conclusions

6. The habitats present consist of improved grassland, poor semi-improved roadside grassland verges and farmland edge grassland strips, and arable farmland, bordered by hedgerows, dry stone walls and post and wire fences.

7. The LPA will need to consult with Natural England as the site falls within an SSSI impact risk zone which lists transport projects as a trigger for consultation.

8. No evidence of the use of the site by protected species was found. The eDNA samples returned a negative result for great crested newts. The water vole surveys recorded no evidence of water voles in the nearby stream. These results are considered to still be accurate in 2021.

9. There is a reasonable likelihood that common amphibians (frogs, toads and smooth newts), grass snakes and hedgehogs are present within the vegetated habitats on site. However due to the extent and quality of the habitats present being small and low, it is considered likely that no significant populations of these species are present. However, it is possible that the grassland verges, woodland plantation and hedgerows are used by these species for foraging and commuting. Likewise, the habitats onsite offer suitability for nesting birds.

10. As such, reasonable avoidance and protection measures should be used to protect common amphibians, reptiles and terrestrial mammals during site clearance and construction periods. Likewise the construction and site clearance should avoid the main bird nesting period (March to August, inclusive) or a pre-works nesting bird check should be undertaken.

11. The loss of woodland and poor semi-improved grassland verges should be compensated for post development by habitat creation around the roundabout or within the local area (up to 1km).

1 Introduction

12. The survey and report were carried out by Paul Liptrot BSc(Hons) MCIEEM with assistance from Adele Harrison MSc and Julie Riley BA(Hons) MA ACIEEM.

13. The report was commissioned by Suzanne Brough on behalf of Barnsley Metropolitan Borough Council.

14. The site is referred to as the land surrounding the A635 at Billingley Green, Goldthorpe, Barnsley. The site includes existing roads and paths, roadside grassland, hedgerows and arable fields to the north and south. Carr Dike crosses the site towards the east.

15. The planned development includes the widening of the road present and creation of a roundabout to allow access to a planned development site.

16. The approximate central grid reference for the site is SE443040 . Figure 1 shows the location of the site.

17. The report includes an assessment of potential ecological impacts of development on the site (installation of new roundabout), along with ways to avoid, minimise or mitigate potential impacts. Recommendations for further surveys and for enhancement of the site are made where appropriate.

1.1 Nature of the proposals

18. Wildscapes has been provided with background information detailing the proposed project, such as that shown within Table 1-1 Pre-existing information.

Table 1-1 Pre-existing information

TYPE	ITEM TITLE / REFERENCE	DATE ISSUED / PUBLISHED	AUTHOR
Plan	A635 Barnsley Road D1 Access (A635) HD/A635.69.1/D1/01RevA	Oct 18	BMBC
Plan	Proposed Roundabout A635 Goldthorpe: General Arrangement : 3465.100-SK-001 RevE	01/07/2021	Fore Consulting
Document	Goldthorpe Masterplan Framework Version 2.0	September 2021	BMBC & Edward Architecture
Report	Goldthorpe ES10 Preliminary Ecological Appraisal	17/06/2020	Middleton Bell Ecology
Report	Barnsley LDP Additional South Yorkshire: Hedgerows Assessment	September 2021	Wessex Archaeology
Briefing Note	Goldthorpe ES10 – Bird Survey and Defra Metric Briefing Note v3	2021	Middleton Bell Ecology

1.2 Survey Validity

19. Survey data is generally only considered valid if it is from the current or previous active season. In some cases, surveys up to three years old may be considered acceptable by consultees if the habitats have not significantly changed in the intervening period.

20. The survey information in Version 1 of this report was considered to be valid for up to 2 years from its publication date. Trevor Mayne, Barnsley Biodiversity Officer was consulted regarding an update visit and agreed that it was unlikely habitats would have changed significantly since the original survey, and that a walkover check for protected species would be sufficient to update the report.

2 Planning policy and legislation

21. This legal information is a summary and intended for general guidance only. It is recommended that the original documentation is referred to for detailed and definitive information. Web addresses are located in the References and Bibliography section of this report.

2.1 The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2020

22. The Conservation of Habitats and Species Regulations 2017 (as amended) transpose Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (Habitats Directive) into English law, making it an offence to deliberately capture, kill or disturb wild animals listed under Schedule 2 of the Regulations. It is also an offence to damage or destroy a breeding site or resting place of such an animal (even if the animal is absent at the time). This has recently been amended by the Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations 2020 which continue the same provision for European protected species, licensing requirements, and protected areas after the United 'Kingdom's exit from the European Union.

2.2 Wildlife & Countryside Act 1981

23. The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act (CRoW) 2000 and the Natural Environment and Rural Communities Act (NERC) 2006 (which also places a duty on authorities to have due regard for biodiversity and nature conservation) consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive), making it an offence to:

- Intentionally kill, injure or take any wild bird or their eggs or nests (with certain exceptions) and disturb any bird species listed under Schedule 1 to the Act, or its dependent young while it is nesting;
- Intentionally kill, injure or take any wild animal listed under Schedule 5 to the Act; intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act; intentionally or recklessly disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection;
- Pick or uproot any wild plant listed under Schedule 8 of the Act.

2.3 National Planning Policy Framework

24. The National Planning Policy Framework (NPPF) outlines government planning policies and how they should be applied to local authorities (Ministry of Housing, Communities & Local Government, 2018). The framework places an emphasis on sustainable development, encouraging the re-use of land that has previously been developed over using land that has a higher environmental value and by minimising impacts on biodiversity. The NPPF states that developments should aim to conserve or enhance biodiversity and encourages opportunities to incorporate biodiversity in and around developments.

2.4 Section 41 Habitats and Species (NERC Act 2006)

25. Section 41 (S41) of the NERC Act 2006 requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The S41 list is

used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40.

2.5 Local Planning Policy

2.5.1 Barnsley Local Biodiversity Action Plan

26. Barnsley Local Biodiversity Action Plan (2009 – 2012) is under review with an update underway in 2018. Barnsley Biodiversity Trust priorities for habitats largely echo the national priority habitats; those relevant to this report (taken from the Barnsley Biodiversity Action Plan website) include:

27. **Woodlands:** including deciduous woodlands and wet woodland. There are 3637ha of woodland in Barnsley, with five local priority habitat types that include mixed deciduous and broadleaf woodland, and wet woodland.

28. **Hedgerows**: the UK BAP priority habitat (2007), includes all hedgerows with 80% or more of at least one native woody species of tree or shrub, with the best being ancient &/or 'species rich' that is with at least four different native tree or shrub species.

29. **Arable field margins:** this priority habitat consists of field margins designed to benefit key farmland species in arable areas. In-field measures like skylark plots and beetle banks are included in the Local Priority Habitat.

30. **Neutral grassland or lowland meadow:** this is found on richer shale and alluvial soils in lowland pastures and meadows in the Barnsley area. This species-rich grassland may be found in recreational sites, churchyards, roadside verges etc. All **unimproved** and **semi-improved grassland** is important for biodiversity in Barnsley.

31. **Floodplain grazing marsh:** this is wet neutral grassland found in some river floodplains in Barnsley. The combination of grassland and wetland margins or ditches promotes biodiversity.

32. **Lowland fen**: this priority habitat is particularly scarce in Barnsley and remnants amounting to 8ha may be found in the Dearne valley; there are small areas of remnant lowland fen with underlying peat at Gypsy Marsh, Adwick Washlands and Carlton Marsh.

33. The 2009 plan identified Bluebell *Hyacinthoides non-scripta* as the sole local priority plant species. The revised species list for plants has not yet been published on the Barnsley Biodiversity Action Plan website.

2.5.2 Goldthorpe Masterplan Framework

34. Published in September 2021, this framework has been produced under Barnsley's Local Plan Policy ES10 and covers 72.9ha of land directly south of the A635, including part of the proposed roundabout. Relevant ecological requirements for the site within the Masterplan are as follows:

    a. Protect and enhance biodiversity value on the nearby Old Moor RSPB reserve and ensure that the development avoids impacts or incorporates effective mitigation measures.

    b. Provide a contribution towards improvements to biodiversity within the Dearne Valley Green Heart Nature Improvement Area.

    c. Include the creation of a habitat corridor (at least 8m in width) along Carr Dike and a sustainable drainage scheme to ensure that rainwater falling on the site is still able to drain into the Dike aiming to improve water quality.

d. Retain the existing woodland and hedgerows on the site periphery.

e. Retain the section of hedgerow remaining in the north-west corner of the site.

f. Safeguard the setting of the Billingley Conservation Area; give consideration to Carr Dike and the connecting unnamed ordinary watercourse which run through the site.

35. Relevant Local Plan policies that need to be adhered to are as follows:

a. Policy GI1: Green Infrastructure

b. Policy BIO1: Biodiversity and Geodiversity

c. Policy GB1: Protection of Green Belt [land to the north of the A road lies within the Green Belt]

d. Trees and Hedgerows supplemental policy

2.6 Nature Improvement Areas (NIAs)

36. Nature Improvement Areas (NIA) were established to create joined up and resilient ecological networks at a landscape scale. They are run by partnerships of local authorities, local communities and landowners, the private sector and conservation organisations with funding provided by the Department for the Environment, Food and Rural Affairs (Defra) and Natural England. Twelve NIAs were announced in 2012.

37. The Dearne Valley Green Heart Nature Improvement Area is one of the twelve NIAs selected in 2012. The aim of the Dearne Valley Green Heart Partnership for the Nature Improvement Area is to help restore and enhance the ecological networks of the river, its floodplain, and its link to habitats on surrounding slopes and hills.

38. Policy BIO1 provides specific detail about the Dearne Valley NIA. The proposed roundabout and the Masterplan site both lie fully within the NIA.

3 Methodology

3.1 Desk study

39. Ecological records and non-statutory designated wildlife site information obtained for the 2018 survey investigation undertaken for the Goldthorpe Road Improvement Scheme (Wildscapes, 2018) was utilised for this investigation following advice from Barnsley Metropolitan Borough Council. This includes data from Barnsley Biological Record Centre (supplied by Sheffield Biological Record Centre) and Rotherham Biological Records Centre.

40. The data was filtered in GIS to only include records within 2km of the survey site central grid reference.

3.1.1 Statutory designated wildlife sites

41. Information regarding statutory designated wildlife sites within the local area was requested from the organisations within Table 3-1.

42. The information and designations included within the search were National Nature Reserves (NNR), Local Nature Reserves (LNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Sites of Special Scientific Interest (SSSI), Ramsar Sites, Ancient Woodland and Granted European Protected Species Licences.

Table 3-1.Organisations consulted with regard to designated wildlife sites

DATE CONSULTED	ORGANISATION	RECORDS REQUESTED
14/05/2019 & 20/10/2021	Multi-Agency Geographic Information for the Countryside (MAGIC)	Local Nature Reserves, National Nature Reserves, Ancient woodland, Sites of Special Scientific Interest, Areas of Outstanding Natural Beauty, Special Areas of Conservation, Special Protection Areas or Ramsar sites within a 2km radius of the site

43. In addition to the above resources, online mapping sources including Google Maps were used to view both satellite imagery and maps of the site and surrounding land.

44. The biological records returned within the data search were filtered to exclude records more than 10 years old. Plant and invertebrate records were also filtered to include only species on either the S41 priority species list (JNCC, 2018) or the IUCN Red data list, excluding species classified as of 'Least Concern'. Mammals, reptiles and amphibians were filtered to include S41 species and species included in the Habitat Directive and Wildlife and Countryside Act 1981. Birds were filtered to include species on the UK Birds of Conservation Concern (BTO, 2018).

3.2 Field survey

45. The Preliminary Ecological Appraisal field survey was undertaken in 2019. An update survey was undertaken in 2021. The survey dates and personnel can be found in Table 3-2.

Table 3-2: Dates and Personnel

DATE	SURVEY TYPE	SURVEYOR & QUALIFICATIONS
11/04/19, 12/04/19	Preliminary Ecological Appraisal	Paul Liptrot BSc (Hons), GradCIEEM, Senior Ecologist. Class Licence level 4 Reference CL20 - 2018-37087-CLS-CLS.
14/10/2021	Walkover survey	Paul Liptrot BSc (Hons), MCIEEM, Principal Ecologist. Class Licence level 4 Reference CL20 - 2018-37087-CLS-CLS. Julie Riley BA (Hons) MA ACIEEM, Senior Ecologist.

3.2.1 Weather Conditions

Table 3-3 Weather conditions at the time of survey

SURVEY	DATE	TEMPERATURE (°C)	WIND (BEAUFORT)	NOTES
Preliminary Ecological Appraisal	11/04/19	10	2	No rain
	12/04/19	8	1	No rain
Walkover survey	14/10/2021	14	4	No rain

3.2.2 Habitats

Flora - Phase 1 Habitat Survey

46. A habitat survey was undertaken on the site in accordance with the standard Phase 1 Habitat Survey methodology (JNCC, 2010).

47. Nomenclature follows (Stace, 2010) for vascular plant species and uses the DAFOR scale for relative abundance (D = dominant, A = abundant, F = frequent, O = occasional and R = rare/infrequent).

48. The information collected during the survey was approximately mapped using ground-truthing, OS Master Map data, satellite images and GIS software (QGIS, 2021). The update survey mapped additional areas following the same protocol. Please refer to Appendix A, Figure 1 and Figure 2 for a location plan and Phase 1 Survey map.

3.2.3 Hedgerow Regulations (1997) Assessment

49. The hedgerows were assessed using the criteria set out in the Hedgerow Regulations 1997. A standard procedure for local hedgerow surveys in the UK was followed as defined by the Defra (2007) "Hedgerow Survey Handbook". All 'essential assessment elements' were recorded in addition to relevant 'optional assessment elements'.

50. Each hedgerow was measured in GIS. The numbers of woody species and ground flora species within each section were recorded.

51. Hedgerows that are connected to habitats such as ponds, broad-leaved woodland and other hedgerows create wildlife corridors, linking habitats in the wider landscape. Each hedgerow was assessed to see if it was connected to any of these habitats. The following point system was utilised:

- Connected to another hedgerow = 1 point
- Connected to a broad-leaved woodland (over 0.25 hectares) = 2 points
- Connected to a pond = 2 points

52. Other data collated about each hedgerow included:

- Hedgerow height and width
- Percentage of gap
- Hedgerow type (shrubby hedgerow with trees, line of trees and shrubby hedgerow)
- Shape (trimmed & dense, intensively managed, untrimmed, tall & leggy, untrimmed with outgrowths, recently coppiced and recently laid)
- Adjacent land use
- Adjacent to bridleway, footpath or road
- Nutrient enrichment (percentage of nettle, cleavers and docks)
- Hedgerow standard trees present

53. To determine if the hedgerow can be classified as important under the Hedgerow Regulations 1997, each hedgerow was also assessed to see if any associated features were also present, these can be found in Table 3-4 Associated Features.

Table 3-4 Associated Features

ID	FEATURE
i)	Presence of hedge-bank or wall for at least half of the total length
ii)	Presence of a ditch for at least half of total length
iii)	Presence of parallel hedge within 15 metres
iv)	Total gap length less than 10% of total hedgerow length
v)	1 Standard tree* in hedgerow less than 50 metres in length
vi)	2 Standard trees* in hedgerow between 50 metres and 100 metres in length
vii)	2 standard trees* in hedgerow between 50 metres and 100 metres in length
viii)	3 woodland species (see appendix) within 1 metre of hedgerow edge
ix)	4 points worth of connections
** Standard trees require a minimum trunk diameter of 20cm in a single trunk and 15cm if multiple stems are present*	

Criteria for Designation as an Important Hedgerow

54. If a hedgerow meets any one or more of the criteria listed in Table 3-5, it indicates that it is an 'important hedgerow' under the Hedgerow Regulations.

Table 3-5 Criteria for an Important Hedgerow

CODE	CRITERIA
A	Marker for pre-1850 parish/township boundary.
B	Marker for pre-1600 estate or manor boundary.
C	Marker for "field system", Pre-Enclosure Act.
D	Scheduled Ancient Monument or Archaeological site.
E	Presence of protected or endangered species (e.g. badger sett).

F	7** woody species (See Appendix 4).
G	6** woody species (including black poplar (*Populus nigra*), large-leaved lime (*Tilia platyphyllos*), small-leaved lime (*Tilia cordata*) or wild service tree (*Sorbus.torminalis*).
H	6** woody species + 3 Associated Features.
I	5** woody species + 4 Associated Features.
J	Adjacent to a public right of way (excludes adopted highways) and has 4** woody species + 2 Associated Features (excluding iii & ix).
***The Wildlife and Countryside Act 1981 (as amended) Part 2 Criteria, Wildlife and Landscape 7.(2) Where the hedgerow in question is situated wholly or partly in the county (as constituted on 1st April 1997) of the City of Kingston upon Hull, Cumbria, Darlington, Durham, East Riding of Yorkshire, Hartlepool, Lancashire, Middlesbrough, North East Lincolnshire, North Lincolnshire, Northumberland, North Yorkshire, Redcar and Cleveland, Stockton-on-Tees, Tyne and Wear, West Yorkshire or York (14), the number of woody species stated in paragraphs (a) to (d) of sub-paragraph (1) is to be treated as reduced by one.*	

Survey Limitations

55. Some species of early flowering spring plants listed as 'woodland species' in Schedule 2 of the Regulations may not have been visible at the time of year that the surveys took place. See Appendix 3 Schedule 2 Woodland Species for list of species.

56. No protected, notable or invasive species were recorded within the hedgerows at the time of the surveys. However, this criterion can be assessed through reviewing the findings of detailed protected species surveys carried out at the site by including surveys for great crested newts and roosting bats.

57. The survey includes assessment for the importance of hedgerows under criteria E to J only (wildlife and landscape) and excludes assessment of the hedgerows under criteria A to D (archaeology and history) which is beyond the remit of this study.

3.2.4 Protected and Notable Species Assessment

58. The habitats on site were assessed for their suitability to support any legally protected or notable species including invasive species that may present constraints to the proposed development.

59. Any incidental sightings and evidence of species such as footprints, latrines, feeding remains and nests were noted.

Bats – Habitat Suitability Assessment

60. All bat surveys for the site were carried out in line with the latest guidance provided within Bat survey for Professional Ecologists: Good Practice Guidelines (Collins, 2016), Bat Mitigation Guidelines (Mitchell-Jones, Bat Mitigation guidelines, 2004) and Bat Tree Habitat Key (Andrews, 2016). Surveys were carried out on the 15th April 2019 by Paul Liptrot Bat Class Licence level 4 Reference CL20 - 2018-37087-CLS-CLS.

61. As well as utilising standard Phase 1 Survey methodology, an assessment of the potential suitability of the habitats within the site and surrounding area for bats was undertaken, as part of the initial site risk assessment and Preliminary Ecological Appraisal. This included an assessment using the criteria set out in the Bat Conservation Trust Survey Guidelines, as shown in Table 3-6.

Table 3-6 BCT Guidelines for Assessing the Value of Habitats for Bats

Feature	Value
Evidence indicating that a structure/feature is used by bats, such as: • Bats seen roosting or emerging/entering a structure/ feature; • Field signs such as droppings, feeding remains or carcasses found; and/or • Bats heard calling or 'chattering' within a roost.	Confirmed Roost
• Site is close to known roosts • Site is connected with the wider landscape by strong linear features that would be used by commuting bats e.g. river/stream valleys or hedgerows • Habitat of high quality for foraging bats e.g. broadleaved woodland, tree-lined watercourses, parkland • Buildings, trees or other structures e.g. mines, caves, tunnels, ice houses and cellars, with features of particular significance for roosting bats • Site is connected with the wider landscape by linear features that could be used by commuting bats e.g. lines of trees and scrub or linked back gardens • Habitat could be used by foraging bats e.g. trees, scrub, grassland or water • Several potential roosts in the buildings, trees or other structures • Isolated site not connected by prominent linear features (but if suitable foraging habitat is adjacent it may be valuable if it is all that is available • Isolated habitat that could be used by foraging bats e.g. a lone tree or patch of scrub, but not parkland • Small number of potential roosts generally of lower conservation importance e.g. probably not maternity roosts or hibernacula • No features that could be used by roosting bats for foraging, roosting or commuting.	High Value Habitat Low Value Habitat

3.2.5 Water voles

Habitat Suitability Assessment

62. The habitats on site were assessed for suitability to support water voles according to subjective criteria. These results were then used to categorise habitat according to suitability for this species. The following habitat factors were taken into consideration:

- Water quality
- Stable/long-term water levels
- Channel dimensions
- Bank type and material
- Vegetation for cover and food sources
- Shading
- Predation and competition
- Habitat management

63. The ditches, marsh areas within primary impact area (with 250m) of site have been classified as follows:

- Evidence of water vole present
- Suitable for water vole but no evidence found during the survey period; and
- Dry/not suitable

64. Ditches classified as dry/not suitable lacked one or more crucial habitat quality or were dry at the time of survey. This category does not necessarily indicate ditches that are never used by water voles, they may be used at other times if they contain water.

Presence/Absence Surveys

65. Survey for evidence of water vole followed standard methods adapted from Strachan & Moorhouse (2011). All suitable habitat was systematically and thoroughly searched for signs of the species where access was possible. April - September is a suitable time of the year to survey for water voles as they are active above ground, and latrines are maintained from February through to November by territorial individuals (Strachan & Moorhouse, 2011).

66. Surveys involved an intensive search of the bank side and water-edge habitat, searching for water vole field signs including:

- burrows
- feeding platforms and evidence of feeding
- food remains
- latrines
- footprints

3.2.6 Great Crested Newts

Environmental DNA Sampling eDNA

67. Environmental DNA sampling kits were provided by Fera Science Ltd. Sampling was carried out by Jon Goodrick (GCN Class 2 Licence holder) and Adele Harrison. The samples were taken on 18th April 2019 and collected in accordance with the methods detailed in Biggs et. al. (2014) at Waterbody 1 and 2 (W01 and W02). One sample kit was used per separate water body unless a water body exceeded 1 hectare in area, in which case two sample kits were used. Waterbodies which exceeded 2 hectares were sampled with three sample kits. The sample kits were refrigerated until the analysis was carried out by Fera Science Ltd in accordance with Biggs et al. (2014). Please refer laboratory report provided by Fera Science Ltd in Appendix D.

3.3 Survey Schedule

SURVEY	DATES	SURVEYORS
Preliminary Ecological Appraisals	11th and 12th April 2019	Paul Liptrot
Water Vole Presence/Absence survey	9th May 2019	Paul Liptrot and Adele Harrison

Water Vole Presence/Absence survey	16th July 2019	Paul Liptrot and Paul Jarman
Environmental DNA (eDNA)	18th April 2019	Jon Goodrick and Adele Harrison
Walkover survey checking for water vole signs	14th October 2021	Paul Liptrot and Julie Riley

4 Baseline Ecological Conditions

68. In this section, the baseline ecological conditions for the site are outlined.

69. The biological records returned from the data search will be discussed within each corresponding species group. A full list of records obtained can be provided upon request.

4.1 Data search

70. 1549 biological records from within the last 10 years were returned from Barnsley Biological Record Centre (supplied by Sheffield Ecology Unit) and Rotherham Biological Record Centre. The data search records are discussed as part of the species assessments below.

4.1.1 Designated sites

71. The Dearne Valley Wetlands SSSI was notified on 13/05/2021. This is a 652 hectare site made up of 22 units comprising large areas of open water and associated wetland and woodland habitat within the catchment of the River Dearne (see Appendix D). It is of special interest for its nationally important numbers and assemblages of breeding and non-breeding birds. The nearest unit is located just over 1km to the southwest of the proposed roundabout, and is linked to the site by the route of the Carr Dike. The site lies within the SSSI Impact Risk Zone.

72. 2 Local Wildlife Sites were returned within 2km of the survey site. Please refer to Table 4-1 below. The closet LWS, Bolton-on-Dearne Wetland is 1.4km to the south west. Both of these sites now form part of the new SSSI.

Table 4-1 Non-statutory Designated Sites

SITE ID	SITE NAME	GRID REFERENCE	AREA (HA)	DISTANCE (M)
39	Bolton-on-Dearne Wetland	SE 458031	2.5	1451
38	Old Moor and Wath Ings	SE 430023	81.8	1779

4.2 Species and Species Groups

4.2.1 Habitats

Poor semi-improved grassland – Compartment 01

Compartment 01.1

73. Poor semi-improved grassland is present along the southern road verge. The area is approximately 4m wide running adjacent to the hedgerow and woodland present. A c. 1m wide cutting strip is present immediately adjacent to the road, this incorporates 3-4 rows of planted daffodils.

74. There is a mixture of perennial herbs and grasses throughout this habitat. The central area has a greater level of herb to grass ratio with frequent Danish scurvygrass *Cochlearia danica*, creeping cinquefoil *Potentilla reptans*, and yarrow *Achillea millefolium* present but overall the compartment has 70:30 grass to herb ratio.

Compartment 01.2

75. The poor semi-improved grassland or rough grassland present to the west of Carr Dike at the south of the A635 is likely to have more of a tall ruderal structure later in the season.

76. Species present include frequent Yorkshire-fog *Holcus lanatus*, occasional sycamore *Acer pseudoplatanus*, common nettle *Urtica dioica*, hogweed *Heracleum sphondylium*, cleavers *Galium aparine*, lesser celandine *Ranunculus ficaria*, garlic mustard *Alliaria petiolata,* rosebay willow-herb *Chamerion angustifolium* and cow parsley *Anthriscus sylvestris*. Scattered Himalayan balsam *Impatiens glandulifera* is present along the banks of Carr Dike.

Compartment 01.3

77. Poor semi-improved (rough) grassland is present on the access track south of the A635 leading to the arable field.

78. Species present include occasional cock's-foot *Dactylis glomerata*, dove's-foot crane's-bill *Geranium molle*, perennial rye-grass *Lolium perenne*, yarrow and white clover *Trifolium repens*.

Compartment 01.4

79. A strip of poor semi-improved (rough) grassland ranging between 10 and 20 metres wide runs along the west bank of Carr Dike to the north of the A635.

80. False oat-grass *Arrhenatherum elatius* is abundant, with frequent creeping thistle *Cirsium arvense* and occasional ribwort plantain *Plantago lanceolata*, sow thistle *Sonchus* sp., hogweed, cock's-foot and small quantities of field rose *Rosa arvensis*, St John's wort *Hieracium* sp., smooth tare *Vicia tetrasperma*, creeping buttercup *Ranunculus repens*, mugwort *Artemesia vulgaris* and meadowsweet *Filipendula ulmaria*. Scattered Himalayan balsam is present along the banks of Carr Dike.

Broadleaved plantation woodland – Compartment 02

81. The broadleaved plantation woodland canopy includes species such as common ash *Fraxinus excelsior*, silver birch *Betula pendula*, hazel *Corylus avellana* and field maple *Acer campestre*.

82. The woodland includes varying ground flora. To the west, there is little to no ground flora with the species present consisting of hogweed and Yorkshire fog. However, the habitat improves to the east with ground-ivy *Glechoma hederacea*, broad-leaved dock *Rumex obtusifolius* and cleavers also present. This is possibly due to a thinner canopy.

83. The woodland is estimated to be less than 20 years old.

Dense scrub – Compartment 03

84. Small areas of dense scrub are present along the edge of the carriageway to the south, and along sections of Carr Dike. The scrub generally comprises bramble, hawthorn and occasionally young willow *Salix* sp.

Arable – Compartment 04

85. The fields surrounding the A635 to the north and south include arable fields surrounded by hedgerows. The arable fields include wheat and oil seed rape. One triangular field to the east of Carr Dike (north of

the A635) is a young plantation of Christmas trees, which has been included as arable as the trees are a crop that will not reach maturity.

Improved grassland & Amenity grassland – Compartment 05

86. The field margin surrounding several of the arable fields includes improved grassland with a 90:10 grass to herb ratio. Species present include frequent Yorkshire-fog and locally frequent common nettle, occasional perennial rye-grass, cock's-foot and hogweed.

87. A large area of pasture grassland in the northeast of the survey site is also included as improved grassland, this area was not accessed but is likely to support a similar range of species.

88. Several species-poor strips of amenity grassland are present along the edges of the A635, these are kept mown and are comprised of similar improved grassland species.

Tall ruderal (with scattered scrub and bankside trees) – Compartment 06

89. This area includes locally dominant brambles *Rubus fruticosus agg.*, locally frequent rosebay willowherb *Chamerion angustifolium* and lesser celandine *Ranunculus ficaria*.

Broadleaved semi-natural woodland (wet woodland) – Compartment 07

90. This section runs along the east of Carr Dike, south of the A635. The species in this area include crack-willow *Salix fragilis* and dominant sycamore.

Hedgerows

91. All the data collated on each hedgerow is detailed the Appendices. Very few hedgerows are classified as being important solely on species richness. This is partly because the classification of a hedgerow can usually be sub-divided into 'historically important' (criteria A to D) or 'ecologically important', (criteria E to J) and occasionally both.

92. A total of 7 hedgerows and hedgerow units within Areas A and B were subject to survey during the hedgerow assessment in 2019. The return visit in 2021 identified a further 6 hedgerows within the altered footprint of the proposed roundabout. Middleton Bell's 2020 report was consulted regarding hedgerows located to the south of the A635 (H07, H08 and H13) and we concur with their assessments of the hedgerows' importance against the Regulations. Hedgerows H09.1, H09.2, H10 and H12 did not contain sufficient numbers of woody species to warrant further assessment against the Regulations. Hedgerow H11 was not fully accessed, but the portion that falls within the site survey area does not contain sufficient woody species to warrant further assessment against the Regulations.

93. The results of the assessment show that one of the hedgerows surveyed possesses the minimum number of woody species and associated features at the sample points to qualify as important hedgerows (Hedgerow H07).

94. Wessex Archaeology (2021) have carried out research to establish whether the hedgerows within the site meet the criteria A, B, C and D in Section 3.9 to qualify as important hedgerow under Part II Archaeology and History. Their report identifies that the hedgerows we have labelled H03, H08 and H11 are potentially important historic hedgerows.

Hedgerow– H01 & H01.1

95. Hedgerow 01 runs parallel to the A635 to the south in two separate sections. Species present include dominant hawthorn *Crataegus monogyna* and locally dominant common ivy *Hedera helix*. This is a largely defunct hedge that has been absorbed into the plantation woodland.

Hedgerow – H02

96. Hedgerow 02 is the eastern boundary of the arable field to the south of the A635 within the survey area. The dominant species present is hawthorn, with occasional ash and rarely occurring elder *Sambucus nigra* also present.

Hedgerow – H03

97. Hedgerow 03 is the southern boundary of the arable field to the south of the A635. Similarly to the other hedgerows on the site, the dominant species is hawthorn. Rarely occurring elder, sycamore, field maple *Acer campestre* and blackthorn *Prunus spinosa* are also present, particularly in the eastern half of this hedgerow.

Hedgerow – H04

98. Hedgerow 04 is the western boundary of the arable field to the south of the A635. The dominant species is hawthorn, with occasional elder present.

Hedgerow – H05

99. Hedgerow 05 is the northern boundary of the arable field to the south of the A635. The hedgerow consists entirely of hawthorn.

Hedgerow – H06

100. Hedgerow 06 runs parallel to the A635 to the north of the site. The dominant species present is hawthorn.

Hedgerow – H07

101. Part of this native species-rich hedgerow falls within the survey boundary, it runs in a north-south direction in between two arable fields. Middleton Bell (2020) have identified this hedgerow as Important under the Hedgerow Regulations 1997.

Hedgerow – H08

102. This hedgerow follows the line of a dry ditch to the south of the A635. Hawthorn is dominant, with occasional blackthorn and dog rose and rarely field maple.

Hedgerow – H09.1 & H09.2

103. This double hedge forms the south boundary of the triangular field of Christmas trees, running parallel with the A635. One line of the hedge is at the bottom of a bank running down from the road, the other line is along the edge of the pavement at the top of the bank. The hedges are both comprised of hawthorn.

Hedgerow – H10

104. This is a defunct hawthorn hedge with some blackthorn and standing dead wood along the edge of Carr Dike to the north of the A635. It forms part of the west boundary of the triangular Christmas tree field.

Hedgerow – H11

105. This hedgerow forms the east boundary of the triangular Christmas tree field and continues to the north out of the survey area (area not accessible). The section accessed is dominated by hawthorn with elder and elm; an older ash tree is present within the hedge line.

Hedgerow – H12

106. This hedgerow forms the south boundary of the improved grassland pasture field situated in the northeast portion of the survey site, running parallel to the A635 on its north side. This is dominated by hawthorn with occasional ash saplings.

Hedgerow – H13

107. This native species-rich hedgerow runs parallel to the A635 on its south side, forming the boundary between the road and a large arable field. It is located at the bottom of a bank up to the road and comprises hawthorn, elder, hazel, ash, dog rose and field maple, with scattered bracken and common nettle.

Dense bracken

108. A small area of bank between the A635 and Hedgerow H13 is dominated by bracken, with common nettle and scattered shrubs/tree saplings.

Hardstanding (Bare Ground)

109. The survey site also includes areas of hardstanding/bare ground (gravel) associated with the existing carriageway and nearby layby. The botanical interest in this area is limited.

Scattered trees

110. There are scattered trees present along the boundary of the southern side of the carriageway and within the surrounding arable fields to the north and south west. The trees along the southern carriageway comprise of a row of relatively young sycamores and field maples. These tree will offer nesting and foraging opportunities for birds but are however due to their age of relatively low ecological value.

111. The trees within the fields to the north and south west are more mature/veteran and as such offer high ecological value and should therefore be protected during the proposed development.

4.2.2 Plants

112. The data search returned no records of S41 priority plant species within the last 10 years within 2km of the survey site.

113. The poor semi-improved grassland verge and does have a good but limited/localised diversity of common herbs and grasses, however no plants that are listed on the Red Data List or that are considered locally important were recorded during the survey visits.

Invasive species

114. Himalayan balsam was recorded in scattered quantities along the course of Carr Dike. No other invasive species were noted.

4.2.3 Invertebrates

115. No S41 priority invertebrates were returned within the data search.

116. Due to the habitats present on site, it is likely that invertebrates are present. However, it is unlikely that the habitats on-site support a diverse invertebrate assemblage. The veteran trees have the potential to support a range of deadwood invertebrates. However, both of the mature/veteran trees (T02 and T03) are isolated from each other and other veteran trees by arable farmland, so the amount of resource available for deadwood specialists is restricted.

4.2.4 Amphibians

117. The data search returned records of great crested newts (GCN), common frogs, common toads and smooth newts within 2km of the survey site. None of the records were from with 1km, however, waterbodies suitable for breeding amphibians are present within 250m of the construction zone. It is therefore likely that terrestrial amphibians are present within the vegetated habitats present within the survey site.

118. The eDNA sampling returned a negative result from all the ponds sampled. As such, it is reasonably likely that GCN are not within 500m of the survey site. Therefore, GCN do not pose any significant constraint to the proposals at this time and no further survey is required.

4.2.5 Reptiles

119. No records of reptiles were returned within the data search (i.e. 2km of the site). However, the survey undertaken to inform road improvement works along the A6195 to the west recorded a small population of grass snake in the local area in the area surrounding Cathill roundabout 1km to the west (Wildscapes, 2018).

120. The mosaic of habitats on site is suitable for use by reptiles, however the extent of suitable habitats is limited. It is therefore possible that the site is in use by a commuting grass snakes, however, the risk of a significant population being within the construction zone is considered to be low.

121. Reasonable avoidance measures for the protection of reptiles should therefore be implemented as part of the site clearance and construction works.

4.2.6 Birds

122. The grid references returned for the bird records were of varying resolutions (i.e. accurate to between 100m and 10km). As such, records accurate to under 1km have been excluded from this assessment Please refer to table for the remaining species, their current conservation status and the minimum possible distance of the closest record from the survey site.

123. The data search returned several records for amber listed species within 2km of the site. Please refer to Table 4-2 for a table summarizing the records returned. The closest amber species record was 1.2km from the site.

Table 4-2 Red and amber listed species with 2km

STATUS	S41	SCIENTIFIC NAME	COMMON NAME	TOTAL RECORDS	MIN DISTANCE (KM)*
Bird-Amber	No	*Alcedo atthis*	Kingfisher	25	1.2
		Anser anser	Greylag Goose	68	1.2
		Bucephala clangula	Goldeneye	4	1.2
		Turdus iliacus	Redwing	32	2.0
		Turdus pilaris	Fieldfare	40	1.9
	Yes	*Melanitta nigra*	Common Scoter	2	1.2
		Charadrius dubius	Little Ringed Plover	7	1.2
		Chlidonias niger	Black Tern	1	1.2

* Distance dependant on the accuracy of grid references provided within data consultation with BBRC

124. The site and surrounding land has suitability for nesting birds. The woodland and hedgerows offer potential nesting sites for tree dwelling species and the arable farmland offers suitability for ground nesting species.

125. The woodland and hedgerows will also offer a foraging resource and potential shelter (roosting) opportunities for a number of species.

126. A briefing note has been produced by Middleton Bell, reporting on bird surveys covering the ES10 Masterplan area to the south of the A635. This note identified that marsh harrier *Circus aeruginosus* was using the ES10 site, with RSPB Old Moor to the southwest holding regional importance for this species as they have successfully bred there. The flight lines recorded were mainly along Carr Dike with regular foraging on site, particularly in rough grassland alongside Carr Dike to the south. It is considered that the ES10 development area may be of up to county level importance to marsh harrier. However, the marsh harrier density map in the briefing note shows that the majority of marsh harrier activity is situated to the south and west of the proposed roundabout area, with no flightlines being recorded within the roundabout area or within a 150m buffer zone around the roundabout. It should be noted that the marsh harrier survey did not focus on land to the north of the A635 and the vantage point for the survey was a considerable distance from the proposed roundabout site.

127. Middleton Bell's briefing note also identified that the ES10 site is of general importance to farmland birds at a local level, and of district level importance for two species, grey partridge *Perdix perdix* and yellow wagtail *Motacilla flava.*

128. During the update survey, four bird kills were noted to the south, just outside the 150m buffer zone; at least one of these was a fox kill but the others appear to have been kills by birds of prey. Three buzzards (possibly a family group) were noted circling over Carr Dike to the north of the A635.

4.2.7 Bats

129. The data search returned roost records for the common pipistrelle *Pipistrellus pipistrellus,* Daubenton's bat *Myotis daubentoni* and noctule bat *Nyctalus noctula* from within the last 10 years. The closest roost record returned was for a noctule bat circa. 950m to the east of the site. The remaining roost records were over 1.7km from the site.

Habitat suitability – roosting

130. The culvert section of the Carr Dike offers negligible suitability for roosting bats.

131. Tree 2 and Tree 3 (T02, T03) offer moderate suitability for roosting bats and Tree 1 and Tree 4 (T01, T04) offers low suitability for roosting bats. As such, if any works (felling, pruning etc.) are to be undertaken on these trees as part of the proposals, further survey would be required to confirm the status of roosting bats within these trees. Likewise if any artificial lighting is to be installed within 20m of these trees, further survey or mitigation would be required to protect any bat roosts (if present).

Habitat suitability - foraging and commuting

132. Due to the low ecological value of the site, there are low foraging and commuting opportunities available to bats on site. The main features of value in the immediate area would be the hedgerows and plantation woodland, and the stream Carr Dike which may be used by commuting and foraging bats. The hedgerows may connect roosting opportunities within the local area to foraging grounds. Also, the site is currently unlit by artificial lighting which can restrict the movements and behaviour of bats species and as such should be maintained post development.

4.3 Other faunal species and species groups

4.3.1 Badgers

133. No records of badgers were returned with 2km of the survey site.

134. No evidence of badgers was recorded during the site survey or the update survey. The site does offer some suitability for sett creation along the north western boundary, but the majority of the site is devoid of vegetation cover so is less suitable. The woodland offsite to the north-east, east and west will likely be suitable for sett creation and as such the site could be used by foraging and commuting badgers.

4.3.2 Water Voles

135. No records of water voles were returned within the data search. Carr Dike crosses the site from north to south and is considered to offer reasonable suitability for water vole. The Dike is bordered with steep sided grassed banks and a hawthorn dominated hedgerow on the northern section which becomes lower on the southern side of the A635. The south side habitat mainly comprises of tall ruderal, with a small area of willow dominated semi-natural woodland and small areas of rough poor semi-grassland. The Dike was approximately 0.75 metres deep at its deepest point along the inspected sections at the time of survey, with the stretch assessed shallowing centrally before and after the culvert.

136. Evidence of mink (scats) was recorded in the culvert section of the stream during the presence/absence surveys. Likewise, rat burrows (disused) were noted on the northern section.

137. The update survey did not note any signs of water vole along the course of the Dike.

138. The evidence suggests that water voles are not present along the section of Dike survey. As such, water voles offer no further constraints to the proposal at this time.

4.3.3 Other mammals

139. The site visit recorded a dead hedgehog on the south-eastern bank of the stream next to the woodland plantation.

140. The habitats on site offer reasonable suitability for hedgehogs to be present, with plantation woodland and hedgerows present throughout.

5 Ecological opportunities and recommendations

5.1 Proposals

141. The proposals are to construct a roundabout to facilitate a new industrial site to the north of the A635.

5.2 Designated Sites

142. The effects of the development are limited to the site boundary and are unlikely to have an impact on any designated sites. However, the site lies within the impact risk zone for a newly designated SSSI, Dearne Valley Wetlands. The LPA is required to consult Natural England on likely risks that fall within the *Infrastructure* category, namely "*pipelines, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance)*".

5.3 Habitats and plants

143. The habitats to be lost on site comprise of poor semi-improved grassland road verges, plantation woodland, arable farmland and species poor hedgerows. It appear the veteran trees (T02 and T03) will not be impacted by the proposed works however guidance from suitably qualified arboriculture consultant should be sought to clarify this assumption.

144. The poor semi-improved road verges do have some limited species richness however this is typically localised around the entrance to the public footpath and along the south verge. The verges do not contain enough species richness to qualify for local importance however they do form part of a network of grassland road verges along the carriageway to the east and west.

145. The plantation woodland is small in area and young (under 20 years). It comprises a limited diversity of close-planted woody species which has restricted the development of the shrub and ground flora layers. Woodland is a local and national priority habitat and as such any loss of woodland would have to be compensated for by replanting within the local area. This woodland, without appropriate management, offers limited ecological value in its current state. As such it is considered to be of site value only, but has the potential to be of local value if managed and retained as part of the proposals.

146. The arable land is considered to be of low ecological value so is considered to be of site value.

147. The majority of the hedgerows do not qualify as important hedgerows under criteria E to J of the Hedgerow Regulations 1997; Hedge H07, which does, is over 50m away from the proposed roundabout so is unlikely to be affected by the works. However, the hedgerows form part of a network within the local area and as such are likely to be used by a variety of species as corridors in an otherwise limited arable landscape. As such, it is recommended that any hedgerows lost are compensated for by replanting species-rich hedgerows of at least the equivalent length.

148. Himalayan balsam is present within Carr Dike. Any works involving Carr Dike (including the banks) will require a suitable treatment/removal plan for this non-native invasive species.

5.4 Invertebrates

149. The site is highly unlikely to be in use by a diverse assemblage of invertebrates at present. No further action is required with regard to invertebrates.

150. Additional habitat creation will improve the value of the site for invertebrates by providing nectar and shelter opportunities.

5.5 Amphibians

151. The PEA highlighted 3 waterbodies within 250-300m of the proposed construction zone. The data search confirmed that great crested newts are present within Ordnance Survey grid SE40 (0 to 1km from the site). As such, Environmental DNA tests were undertaken on the waterbodies within 300m.

152. Please refer to Appendix D for the results of the eDNA survey.

153. All the eDNA samples returned a negative result for GCN. As such it is extremely unlikely that GCN are present within the immediate area (up to 250m). GCN offer no further constraints to the proposals at this time.

154. The data search returned records of common frog, smooth newt and common toad and the site is close to standing water. As such, there is a reasonable likelihood that these species may be within the construction zone and surrounding area. As such, the reasonable protection measures detailed below should be use during site clearance works and the construction period.

5.6 Reptiles

155. A small population of grass snakes are known to be present 1.5km to west of the site. It is possible but unlikely due to the limited connectivity that grass snakes may use the grass verges, hedgerow and woodland on site to connect to other more suitable foraging habitats.

156. As such, it is recommended that reasonable avoidance and protection measures for reptiles are used during the site clearance and construction periods. Likewise, habitat enhancement post development should aim to improve the potential for reptiles to move along the carriageway's adjacent habitats (i.e. by the incorporation of wide road verges with a mosaic of habitats).

5.7 Birds

157. The habitats on site are considered to offer some value to foraging/commuting and nesting birds. Marsh harrier is present in the vicinity, but not thought to be foraging or passing through the area of the proposed roundabout, so this should not present a constraint. The land take of arable land potentially used by farmland birds is minimal and unlikely to present a constraint.

158. The hedgerows and trees are considered to offer suitable habitat for nesting birds. Therefore, vegetation removal works could injure or kill nesting birds if undertaken inappropriately.

159. All vegetation clearance works should be planned to be undertaken outside the main nesting period which is March to August, inclusive. Some species can nest in February and September so care must also be taken outside the above period.

160. If clearance works are required in the above period, a suitable method statement for the protection of nesting birds should be put in place which will include:

- Pre-works inspection of suitable nesting features and nests within the site and immediate surroundings of the work area by a Suitably Qualified Ecologist (SQE). If active nests are found, works cannot commence until all chicks have fledged.
- If at any point during the works nesting birds are found, works will be suspended and advice sought from Suitably Qualified Ecologist.

161. It is recommended that bird netting is not used to prevent the establishment of nesting sites. This practice is not illegal however it can injure or kill birds though accidental entanglement and entrapment.

5.8 Bats

162. Tree T02 offers moderate potential, Tree T03 offers moderate to low potential and Trees T01 and T04 offer low potential to support roosting bats. As such, if these trees are to undergo any works as part of the proposals (felling, pruning etc.), further surveys are required to confirm their status for roosting bats. Likewise, if any Artifical Lighting at Night (ALAN) is to be installed within 20m of these trees, further survey would be required to determine if they are used by roosting bats.

163. These surveys should comprise of a combination of Aerial PRF inspection surveys which can be undertaken at any time of year, and nocturnal surveys. The surveys should be designed and informed by the guidance set out in the Bat Habitat Key (Andrews H. , 2018).

164. The proposals should aim to retain these trees if possible. Likewise, no artificial lighting should be installed within 20m of these trees if retained.

165. The hedgerows and woodland have some limited potential to be used by commuting and foraging bats, as such no artificial lighting should be installed which casts light over these areas.

5.9 Badgers

166. There was no evidence of badgers found during either survey. No further action is required with regard to badgers. Should any evidence of badgers be found ahead of works, a Suitably Qualified Ecologist must be contacted and works ceased immediately. Best practice approach for the protection of terrestrial mammals should be adhered to during the construction phase of the proposed works (see below).

5.10 Water Voles

167. The water vole surveys confirmed that water voles are not currently using Carr Dike. The surveys also recorded evidence of mink along the dike (scats within the culvert) during the second survey visit. Mink actively predate water voles so it is unlikely that a population will survive without adequate mink control methods in place.

5.11 Other mammals

168. Reasonable avoidance measures for the protection of terrestrial mammals should be adopted during works, such as:

- Building materials should be stored off the ground where possible.
- Chemicals, fuel and other potential pollution agents should be appropriately stored, used and deposed of to ensure pollution or poisoning events do not happen.
- Any water troughs should be sealed or not open at the top to prevent bird and mammal drowning events.

169. It is also recommended that solid garden fences and walls be avoided, or gaps left in order to allow movement of small mammals around the site following construction. Hedgerows are recommended as a replacement to walls and fences, where possible.

6 Conclusions and recommendations

170. The LPA will need to consult with Natural England as the site falls within an SSSI impact risk zone which lists transport projects as a trigger for consultation.

171. The surveys confirm that water voles and GCN are not currently present within the site or immediate surrounding area. As such, water voles and GCN do not pose any further constraint to the proposals at this time.

172. Trees 01, 02, 03 and 04 offer suitability for roosting bats. Therefore, if these trees are to be impacted/lost by the proposed works, further surveys are required to confirm their status for roosting bats. Likewise, if any Artificial Lighting at Night (ALAN) is to be installed within 20m of these trees, further survey would be required. The further surveys should comprise of a combination of PRF aerial inspections and nocturnal surveys.

173. The proposals will result in the loss of species poor hedgerows and plantation woodland. It is recommended that these features are re-instated post construction.

174. Himalayan balsam is present in the footprint of Carr Dike. If any works need to be carried out on/in the Dike, this invasive non-native species needs to be dealt with appropriately.

175. A dead hedgehog was recorded during the PEA site visit. As such, it is likely that other individuals use the site and surrounding areas. Mammal protection measures should be adopted during the construction phase. Likewise, any hedgerows or woodland lost as part of the proposals should be re-planted post construction.

176. A suitably qualified arborist must be appointed to determine the root protection zones of any trees to be affected by works, this is of particular importance with regard to the mature trees T02 and T03 along the north boundary of the proposed site construction zone.

177. Any site clearance work must take place outside the main nesting bird season (March to August, inclusive). If this is not possible, the site must be inspected by a Suitably Qualified Ecologist ahead of works.

178. As all bat species are negatively affected by light (Eurobats, 2018) (Institute of Lighting Professionals, 2018), and as the site is currently largely unlit, the current level of lighting should be maintained or ideally reduced as part of the proposals. It is recommended that measures to reduce the impact of ALAN should be considered and adopted as part of the design process. The use of any artificial lighting should be avoided.

179. On site lighting throughout the construction and operational phases should be managed to avoid light spillage onto ecologically sensitive areas such as the hedgerow and scattered trees.

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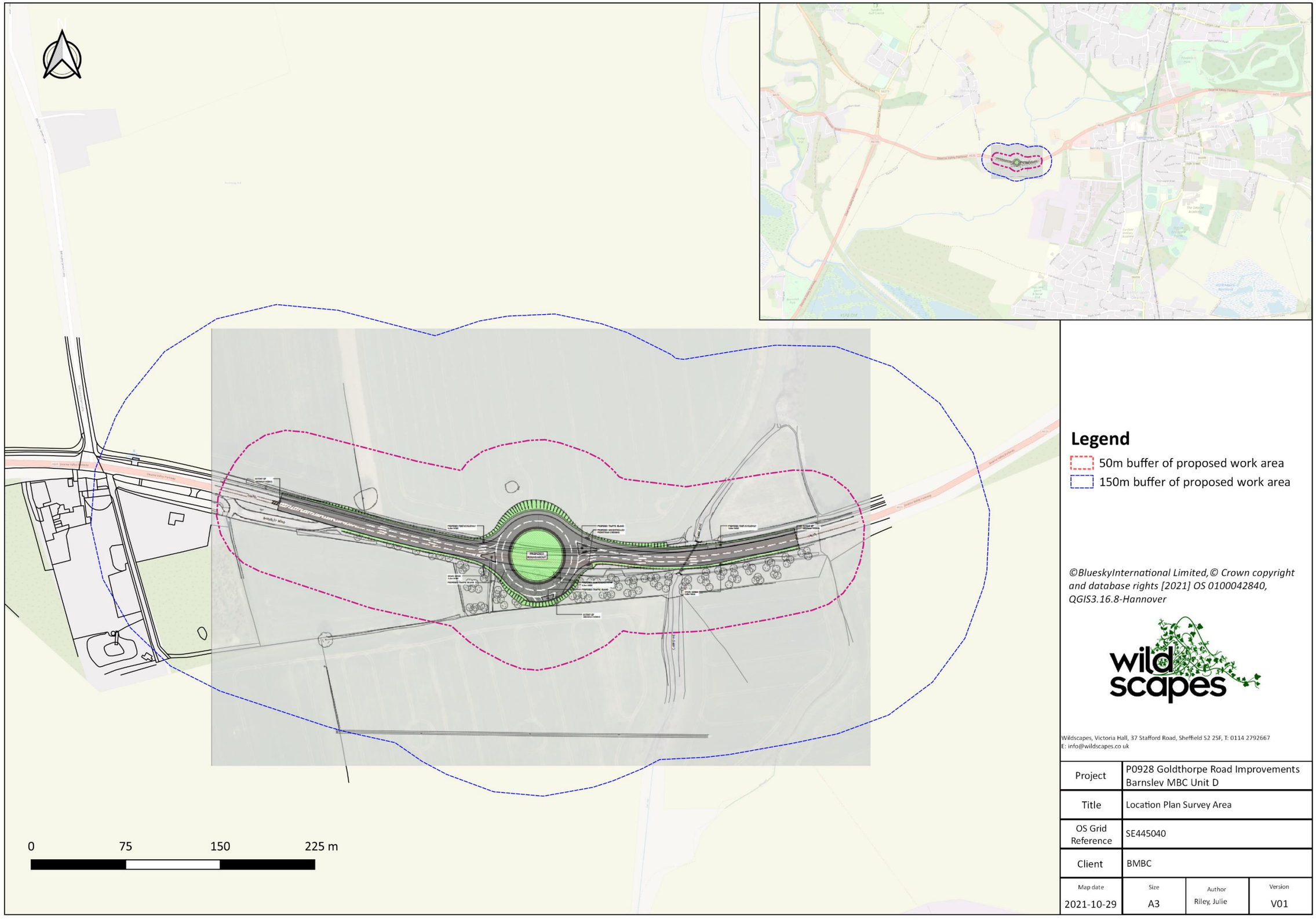
8 Appendices

8.1 Appendix A - Location Information and survey results



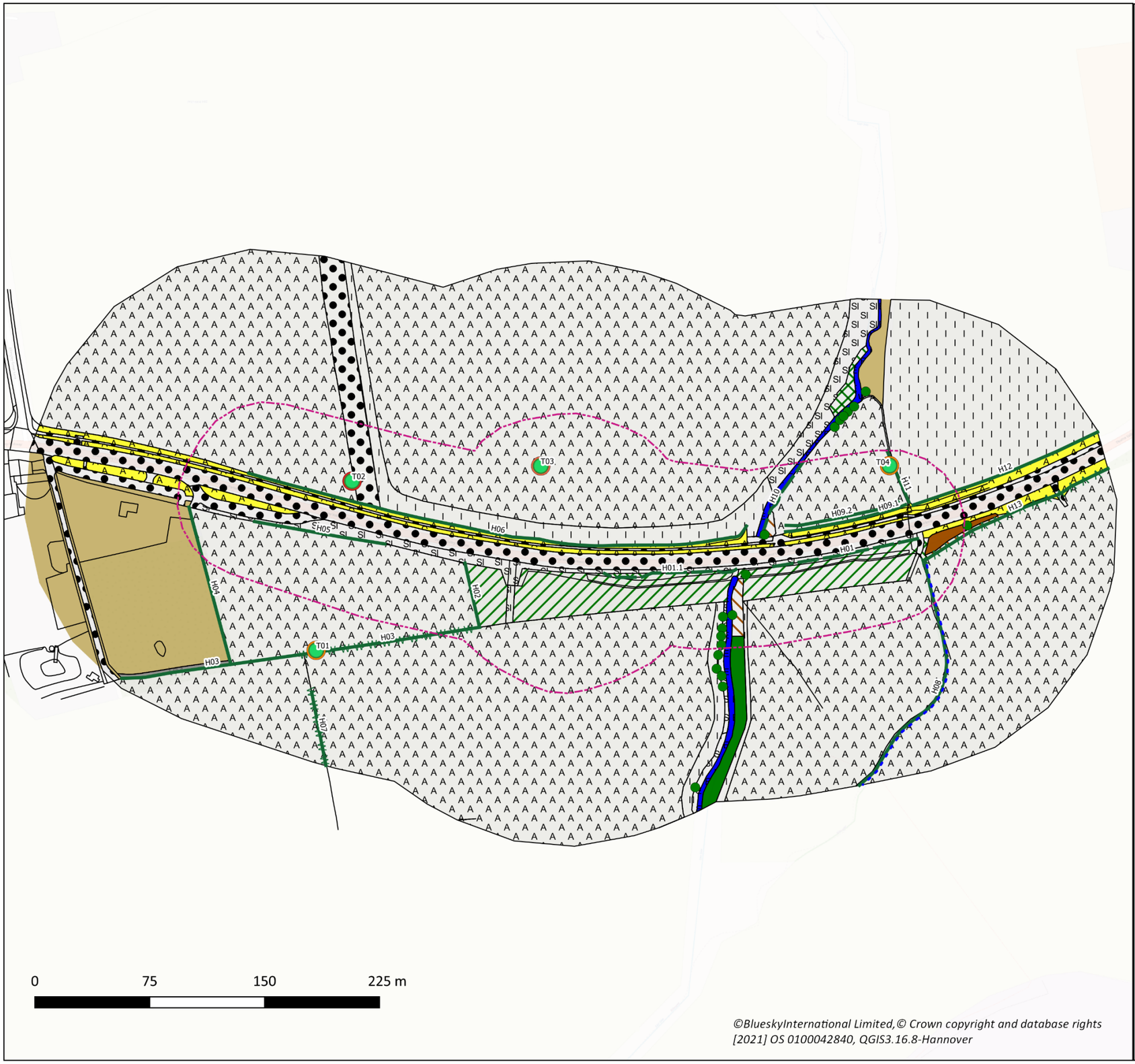
Legend

- 50m buffer of proposed work area
- 150m buffer of proposed work area

Wildscapes, Victoria Hall, 37 Stafford Road, Sheffield S2 2SF, T: 0114 2792667
E: info@wildscapes.co.uk

Project	P0928 Goldthorpe Road Improvements Barnsley MBC Unit D		
Title	Location Plan Survey Area		
OS Grid Reference	SE445040		
Client	BMBC		
Map date: 2021-10-29	Size: A3	Author: Riley, Julie	Version: V01

Figure 1 Location Plan Map



Legend

- 50m_Buffer_2021

Linear features

- J2.1.1 - Native species-rich intact hedge
- J2.1.2 - Species-poor intact hedge
- J2.2.2 - Species-poor defunct hedge
- J2.3.1 - Native species-rich hedge and trees
- J2.6 - Dry ditch

Area habitats

- A1.1.1 - Broadleaved woodland - semi-natural
- A1.1.2 - Broadleaved woodland - plantation
- A2.1 - Scrub - dense/continuous
- B4 - Improved grassland
- B6 - Poor semi-improved grassland
- C1.1 - Bracken - continuous
- C3.1 - Other tall herb and fern - ruderal
- G2.1 - Running water - eutrophic
- J1.1 - Cultivated/disturbed land - arable
- J1.2 - Cultivated/disturbed land - amenity grassland
- J4 - Tracks/Road/Pavement
- J5 - Other habitat (ditch)
- Not included in survey

Scattered trees: Bat Roost Potential

- Low
- Low/Moderate
- Moderate
- Negligible

Wildscapes, Victoria Hall, 37 Stafford Road, Sheffield S2 2SF, T: 0114 2792667
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Project	P0928 Goldthorpe Road Improvements Barnsley MBC Unit D		
Title	Phase 1 Habitat Plan		
OS Grid Reference	SE445040		
Client	BMBC		
Map date: 2021-10-29	Size: A3	Author: Riley, Julie	Version: V01

Figure 2 Phase 1 Results Map

8.2 Appendix B – Species List

CODE	DAFOR	COMMON NAME	*LATIN NAME*
C01	R	Alder (sapling)	*Alnus glutinosa*
C01	R	Broad-leaved Dock	*Rumex obtusifolius*
C01	LF	Brambles	*Rubus fruticosus agg.*
C01	LF	Cleavers	*Galium aparine*
C01	O	Cleavers	*Galium aparine*
C01	O	Cock's-foot	*Dactylis glomerata*
C01	R	Common mouse-ear	*Cerastium fontanum*
C01	LF	Common nettle	*Urtica dioica*
C01	O	Common ragwort	*Senecio jacobaea*
C01	O	Common vetch	*Vicia sativa*
C01	O	Cow parsley	*Anthriscus sylvestris*
C01	LF	Creeping cinquefoil	*Potentilla reptans*
C01	R	Creeping thistle	*Cirsium arvense*
C01	F	Daffodil	
C01	O	Daisy	*Bellis perennis*
C01	O	Dandelion	*Taraxacum officinale agg.*
C01	F	Danish scurvygrass	*Cochlearia danica*
C01	O	Dove's-foot Crane's-bill	*Geranium molle*
C01	R	Fat-hen	*Chenopodium album*
C01	R	Fescue sp	*fescue species*
C01	O	Garlic mustard	*Alliaria petiolata*
C01	O	Greater plantain	*Plantago major*
C01	R	Groundsel	*Senecio vulgaris*
C01	R	Hard-rush	*Juncus inflexus*
C01	O	Hogweed	*Heracleum sphondylium*
C01	R	Common knapweed	*Centaurea nigra*
C01	O	Lesser celandine	*Ranunculus ficaria*
C01	R	Meadowsweet	*Filipendula ulmaria*
C01	O	Perennial rye-grass	*Lolium perenne*
C01	O	Red clover	*Trifolium pratense*
C01	R	Red dead-nettle	*Lamium purpureum*
C01	R	Ribwort plantain	*Plantago lanceolata*
C01	O	Rosebay willowherb	*Chamerion angustifolium*
C01	R	Greater Stitchwort	*Stellaria holostea*
C01	R	Spear thistle	*Cirsium vulgare*
C01	R	Germander speedwell	*Veronica chamaedrys*
C01	O	Sycamore	*Acer pseudoplatanus*
C01	O	White clover	*Trifolium repens*
C01	LF	Yarrow	*Achillea millefolium*
C01	O	Yorkshire-fog	*Holcus lanatus*
C02	O	Silver birch	*Betula pendula*
C02	O	Field maple	*Acer campestre*
C02	R	Willow sp	*Salix species*
C02	O	Alder	*Alnus glutinosa*
C02	LF	Brambles	*Rubus fruticosus agg.*
C02	O	Dog-rose	*Rosa canina*
C02	O	Hazel	*Corylus avellana*
C02	F	Common ash	*Fraxinus excelsior*
C02	O	Common ash	*Fraxinus excelsior*
C02	O	Field maple	*Acer campestre*

CODE	DAFOR	COMMON NAME	*LATIN NAME*
C02	O	Silver birch	*Betula pendula*
C02	O	Hawthorn	*Crataegus monogyna*
C02	O	Alder	*Alnus glutinosa*
C02	F	Hogweed	*Heracleum sphondylium*
C02	O	Hazel	*Corylus avellana*
C02	O	Oak sp.	*Quercus sp.*
C02	LF	Brambles	*Rubus fruticosus agg.*
C02	O	Cleavers	*Galium aparine*
C02	R	broad-leaved dock	*Rumex obtusifolius*
C02	R	Yorkshire-fog	*Holcus lanatus*
C02	R	cow parsley	*Anthriscus sylvestris*
C02	R	Dog-rose	*Rosa canina*
C02	LF	Ground-ivy	*Glechoma hederacea*
C02	O	Common ash	*Fraxinus excelsior*
C02	O	Field maple	*Acer campestre*
C02	O	Silver birch	*Betula pendula*
C02	O	Hawthorn	*Crataegus monogyna*
C02	O	Alder	*Alnus glutinosa*
C02	O	Hogweed	*Heracleum sphondylium*
C02	O	hazel	*Corylus avellana*
C02	O	Oak sp.	*Quercus sp.*
C02	LF	Brambles	*Rubus fruticosus agg.*
C02	LF	Cleavers	*Galium aparine*
C02	R	broad-leaved dock	*Rumex obtusifolius*
C02	R	Yorkshire-fog	*Holcus lanatus*
C02	R	cow parsley	*Anthriscus sylvestris*
C03	D	Bramble	*Rubus fruticosus agg.*
C03	F	Hawthorn	*Crataegus monogyna*
C03	R	Willow	*Salix sp.*
C04	D	Wheat	*triticum*
C05	O	hogweed	*Heracleum sphondylium*
C05	R	broad-leaved dock	*Rumex obtusifolius*
C05	F	Yorkshire-fog	*Holcus lanatus*
C05	R	Dandelion	*Taraxacum officinale agg.*
C05	LF	Common nettle	*Urtica dioica*
C05	R	Spear thistle	*Cirsium vulgare*
C05	O	Cock's-foot	*Dactylis glomerata*
C05	O	perennial rye-grass	*Lolium perenne*
C06	LF	Rosebay willowherb	*Chamerion angustifolium*
C06	O	Cleavers	*Galium aparine*
C06	O	Common nettle	*Urtica dioica*
C06	LF	Lesser celandine	*Ranunculus ficaria*
C06	O	spear thistle	*Cirsium vulgare*
C06	LD	Brambles	*Rubus fruticosus agg.*
C06	O	perennial rye-grass	*Lolium perenne*
C06	R	broad-leaved dock	*Rumex obtusifolius*
C07	D	sycamore	*Acer pseudoplatanus*
C07		Crack-willow	*Salix fragilis*
H01	D	hawthorn	*Crataegus monogyna*
H01	LD	Common Ivy	*Hedera helix*
H01	O	common nettle	*Urtica dioica*
H01	LF	Ground-ivy	*Glechoma hederacea*

CODE	DAFOR	COMMON NAME	*LATIN NAME*
H01	R	sycamore	*Acer pseudoplatanus*
H01	R	Common ash	*Fraxinus excelsior*
H02	D	Hawthorn	*Crataegus monogyna*
H02	O	Common ash	*Fraxinus excelsior*
H02	O	Cow parsley	*Anthriscus sylvestris*
H02	O	Cleavers	*Galium aparine*
H02	O	Perennial rye-grass	*Lolium perenne*
H02	R	Red dead-nettle	*Lamium purpureum*
H02	R	Elder	*Sambucus nigra*
H02	O	Yorkshire-fog	*Holcus lanatus*
H03	R	Sycamore	*Acer pseudoplatanus*
H03	R	Elder	*Sambucus nigra*
H03	D	Hawthorn	*Crataegus monogyna*
H03	O	Yorkshire-fog	*Holcus lanatus*
H03	O	Cleavers	*Galium aparine*
H03	R	Field maple	*Acer campestre*
H03	O	Cow parsley	*Anthriscus sylvestris*
H03	O	Perennial rye-grass	*Lolium perenne*
H03	R	Garlic mustard	*Alliaria petiolata*
H03	R	Blackthorn	*Prunus spinosa*
H04	D	Hawthorn	*Crataegus monogyna*
H04	O	Common nettle	*Urtica dioica*
H04	O	Yorkshire-fog	*Holcus lanatus*
H04	O	Perennial rye-grass	*Lolium perenne*
H04	R	Cock's-foot	*Dactylis glomerata*
H04	R	Red dead-nettle	*Lamium purpureum*
H04	O	Cow parsley	*Anthriscus sylvestris*
H04	F	Garlic mustard	*Alliaria petiolata*
H04	F	Cleavers	*Galium aparine*
H04	O	Elder	*Sambucus nigra*
H05	D	Hawthorn	*Crataegus monogyna*
H05	O	Cow parsley	*Anthriscus sylvestris*
H05	R	Wheat	*triticum*
H05	R	Red dead-nettle	*Lamium purpureum*
H05	O	Garlic mustard	*Alliaria petiolata*
H05	O	Cleavers	*Galium aparine*
H05	R	Dandelion	*Taraxacum officinale agg.*
H06	R	Elder	*Sambucus nigra*
H06	R	Comfrey	*Symphytum officinale*
H06	D	Hawthorn	*Crataegus monogyna*
H06	O	Cow parsley	*Anthriscus sylvestris*
H06	O	Common fumitory	*Fumaria officinalis*
H06	O	Red dead-nettle	*Lamium purpureum*
H06	O	Yarrow	*Achillea millefolium*
H06	O	Dandelion	*Taraxacum officinale agg.*
H06	R	Ribwort plantain	*Plantago lanceolata*
H06	LF	Common nettle	*Urtica dioica*
H06	O	Common mouse-ear	*Cerastium fontanum*
H06	LF	Garlic mustard	*Alliaria petiolata*
H06	O	Cleavers	*Galium aparine*
H06	R	Common ash	*Fraxinus excelsior*
H08	D	Hawthorn	*Crataegus monogyna*
H08	O	Blackthorn	*Prunus spinosa*

CODE	DAFOR	COMMON NAME	*LATIN NAME*
H08	R	Dog rose	*Rosa canina*
H08	O	Field maple	*Acer campestre*
H08	R	Hazel	*Corylus avellana*
H09	D	Hawthorn	*Crataegus monogyna*
H10	D	Hawthorn	*Crataegus monogyna*
H10	O	Blackthorn	*Prunus spinosa*
H11	D	Hawthorn	*Crataegus monogyna*
H11	O	Elder	*Sambucus nigra*
H11	R	Elm sp.	*Ulmus sp.*
H11	R	Ash	*Fraxinus excelsior*
H12	D	Hawthorn	*Crataegus monogyna*
H12	O	Ash	*Fraxinus excelsior*
H13	D	Hawthorn	*Crataegus monogyna*
H13	O	Elder	*Sambucus nigra*
H13	R	Hazel	*Corylus avellana*
H13	O	Ash	*Fraxinus excelsior*
H13	R	Dog rose	*Rosa canina*
H13	R	Field maple	*Acer campestre*
H13	R	Bracken	*Pteridium aquilinum*
H13	O	Common nettle	*Urtica dioica*

8.2.1 Hedgerow Survey Results

ITEM	HEDGE REFERENCE NUMBER						
	H01/H1.1	H02	H03	H04	H05	H06	H07
Date surveyed:	12/04/2019	12/04/2019	12/04/2019	12/04/2019	12/04/2019	12/04/2019	12/04/2019
Grid reference: (centre of hedge)	SE4450704051	SE4426304024	SE4415103985	SE4409204030	SE4417504065	SE4426904073	SE4450904075
Hedgerow > 20m in length	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hedgerow > 30 years old	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Total length (m)	174	43	236	106	86	358	82
Total length of gaps (m)	20		10				
% gaps	30%	0	10%	5	10	0	0
Height (m)	4	5	2	3.5	2.5	2.0	1.5
Width (m)	1.5	2.0	2.5	2.5	2.2	2.2	2.0
Hedgerow type	Shrubby hedgerow with trees	Line of trees	Shrubby hedgerow	Shrubby hedgerow	Shrubby hedgerow	Shrubby hedgerow	Shrubby hedgerow
Hedgerow shape	Untrimmed with outgrowths	Untrimmed with outgrowths	trimmed & dense	untrimmed	Untrimmed with outgrowths	trimmed & dense	Trimmed & dense
Mature trees	0	0	Yes (1)	0	0	0	0

ITEM	HEDGE REFERENCE NUMBER						
	H01/H1.1	H02	H03	H04	H05	H06	H07
Adjacent land use	Woodland	Woodland/Arable Farmland	Arable Farmland	Arable Farmland	Arable Farmland	Arable Farmland	Arable Farmland
Adjacent to public right of way	Yes	No	No	No	No	No	No
Protected species present	No- However, potential for nesting birds	No- However, potential for nesting birds	No- However, potential for nesting birds	No- However, potential for nesting birds	No- However, potential for nesting birds	No- However, potential for nesting birds	No- However, potential for nesting birds
Connections score							
Total number of other hedgerows connected to each end of the hedgerow =1 point	0	1	1	1	0	0	1
Connections to a broad- leaved woodland over 0.25ha = 2 points	Yes (2)	Yes (2)	No	No	No	No	No
Connections to a pond = 2 points	No	No	Yes (2)	No	No	No	No
Total connection points	2	2	2	0	0	0	0
No of woody Species	3	2	5	2	1	3	2
Associated features present	-	iv)	ii)	iv)	-	iv)	iv)
Total associated features	-	1	1	1	-	1	1

ITEM	HEDGE REFERENCE NUMBER						
	H01/H1.1	H02	H03	H04	H05	H06	H07
Age/earliest reference date	>30 Years	>30 Years	>30 Years	>30 Years	>30 Years	>30 Years	>30 Years
Important Hedgerow	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Qualifying Criteria	**-**	**-**	**-**	**-**	-	-	-

8.3 Appendix C – Photographs

Photo 1: Plantation Woodland

Photo 2: Arable

Photo 3: Hedgerow H02

Photo 4: Hedgerow H03

Photo 5: Arable with Hedgerow H05 in distance

Photo 6: Veteran tree T03

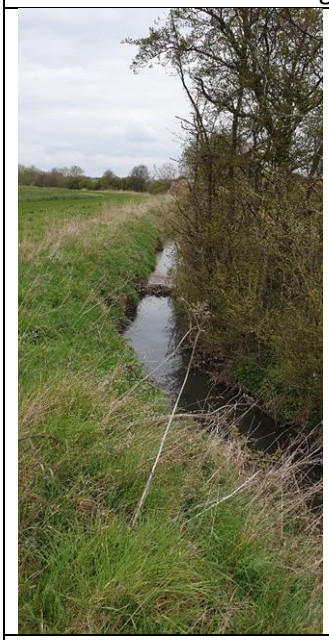


Photo 7: Carr Dike

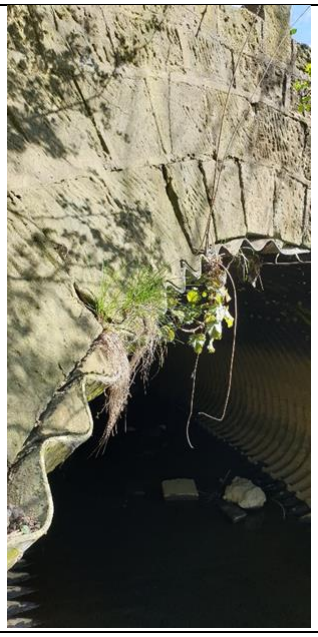
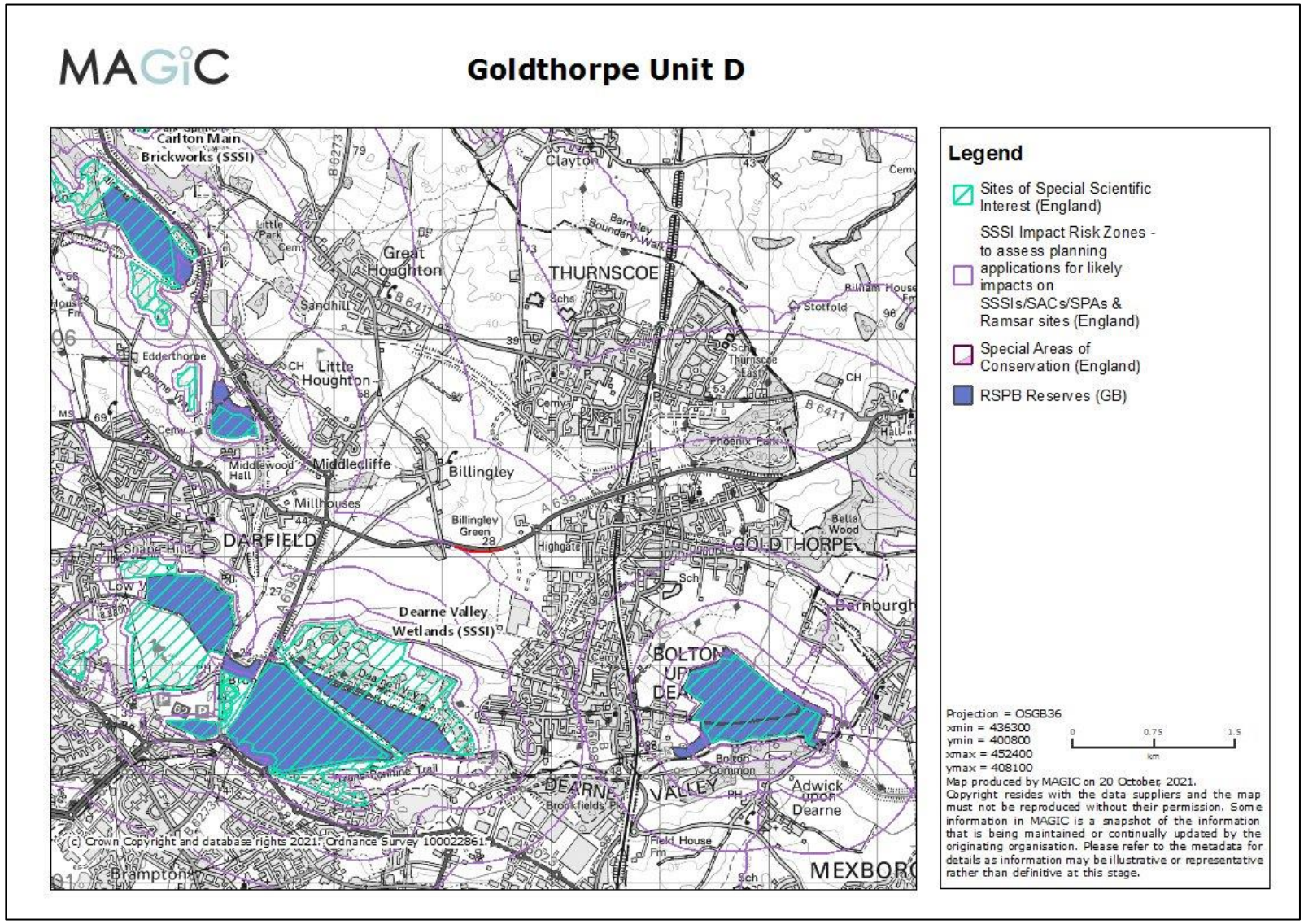


Photo 8: Culvert under road

	
Photo 9: Grassland verge	Photo 10: Hedgerow H08
	
Photo 11: Hedgrow H13	Photo 12: Area of dense bracken
	
Photo 13: Double hedgerow H09.1 & H09.2	Photo 14: Hedgerow H10
	
Photo 15: Hedgerow H11	

8.4 Appendix D – MAGIC map showing SSSI



8.5 Appendix E – GCN Results

DNA Analysis Report - Commercial in Confidence

Customer:	Sheffield Wildlife Trust
Address:	Victoria Hall 37 Stafford Road Sheffield South Yorkshire S2 2SF
Contact:	Adele Harrison
Email:	a.harrison@wildsheffield.com
Tel:	01142792667
Report date:	29-Apr-2019
Order Number:	GCN19-1017
Samples:	Pond Water
Analysis requested:	Detection of Great Crested Newt eDNA from pond water.

Thank you for submitting your samples for analysis with the Fera eDNA testing service. The details of the analysis are as follows:

Method:
The method detects pond occupancy from great crested newts (GCN) using traces of DNA shed into the pond environment (eDNA). The detection of GCN eDNA is carried out using real time PCR to amplify part of the cytochrome 1 gene found in mitochondrial DNA. The method followed is detailed in Biggs J., et al, (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA. Freshwater Habitats Trust, Oxford.

The limits of this method are as follows: 1) the results are based on analyses of the samples supplied by the client and as received by the laboratory, 2) any variation between the characteristics of this sample and a batch will depend on the sampling procedure used. 3) the method is qualitative and therefore the levels given in the score are for information only, they do not constitute the quantification of GCN DNA against a calibration curve, 4) a 'not detected' result does not exclude presence at levels below the limit of detection.

The results are defined as follows:

Positive:	DNA from the species was detected.
eDNA Score:	Number of positive replicates from a series of twelve.
Negative:	DNA from the species was not detected; in the case of negative samples the DNA extract is further tested for PCR inhibitors and degradation of the sample.
Inconclusive:	Controls indicate degradation or inhibition of the sample, therefore the lack of detection of GCN DNA is not conclusive evidence for determining the absence of the species in the sample provided.

DNA Analysis Report - Commercial in Confidence

CustomerReference	Fera Reference	GCN Detection	eDNA Score	Inhibition	Degradation
Waterbody 1 Ponyfield	S19-015936	Negative	0	No	No
Waterbody 2 Ditch	S19-015937	Negative	0	No	No

The results indicate that eDNA for great crested newts was not detected in either of the samples submitted. Analysis was conducted in the presence of the following controls: 1) extraction blank, 2) appropriate positive and negative PCR controls for each of the TaqMan assays (GCN, Inhibition, and Degradation). All controls performed as expected.

This test procedure was developed using research funded by the Department of Environment, Food and Rural Affairs.

Issuing officer: Steven Bryce
Tel: 01904 462 070
Email: e-dna@fera.co.uk