

A46 Newark Bypass

TR010065/APP/6.3

6.3 Environmental Statement

Appendix 8.9 Invertebrate (Terrestrial) Technical Report

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(Applications: Prescribed Forms
and Procedure) Regulations 2009**

A46 Newark Bypass

Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT

APPENDIX 8.9 INVERTEBRATE (TERRESTRIAL) TECHNICAL REPORT

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Unless otherwise stated in this document, the assessments made assume that the study site referred to will continue to be used for its current purpose without significant change. The assessment, recommendations and conclusions contained in this document may be based upon information provided by third parties and upon the assumption that the information is relevant, correct and complete. There has been no independent verification of information obtained from third parties, unless otherwise stated in the report.

Where field investigations have been carried out, these have been restricted to the agreed scope of works and carried out to a level of detail required to achieve the stated objectives of the services. Natural habitats and species distributions may change over time and further data should be sought following any significant delay from the publication of this document.

1 Introduction

1.1 Study scope

- 1.1.1 Baker Consultants was commissioned by the Applicant to undertake the following works in relation to the Scheme:
- Invertebrate surveys to assess each Local Wildlife Site's (LWS) current value for invertebrates
- 1.1.2 This report takes into account standard guidance from a variety of sources including the Chartered Institute of Ecology and Environmental Management ^{1,2,3}, British Standards Institution ⁴, and www.gov.uk⁵.

1.2 The proposed development

- 1.2.1 This document provides the results of the terrestrial invertebrate surveys of the nine Local Wildlife Sites (LWS) identified along the route of the A46 between the Farndon junction and the A1133 junction, relating to proposals to widen the A46 a two-lane carriageway in both directions.
- 1.2.2 This report describes and assesses the invertebrate features of ecological value found to be present within the survey area.

¹ Chartered Institute of Ecology and Environmental Management (CIEEM) (2018). Guidelines for Ecological Impact Assessment In The UK And Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.

² CIEEM (2015). Guidelines on Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester.

³ CIEEM (2017). Guidelines for Preliminary Ecological Appraisal. Chartered Institute of Ecology and Environmental Management, Winchester.

⁴ BSI (2013). BS42020:2013 Biodiversity – Code of Practice for Planning and Development.

⁵ <https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications>.

2 Methods

2.1 Survey area

- 2.1.1 The survey area consisted of nine pre-identified Local Wildlife Sites (LWS) that were identified as having the potential to support notable invertebrate assemblages through a desk study undertaken in 2022. The nine LWS that were assessed for their terrestrial invertebrates are summarised in Table 2-1 below. Their locations are shown in Appendix A (Terrestrial Invertebrate Survey Areas) and Appendix B Figure B-1 (Recorded notable invertebrate species within the survey area) of this report.
- 2.1.2 There have been numerous design iterations resulting in changes to the Order Limits and therefore the survey area. Features recorded during surveys that are now located outside of the current survey area, are no longer within the zone of influence. However, these features have been included in this technical report and associated drawings for completeness.

Table 2-1: LWS location and site description

LWS ID	LWS name	Location (OS grid reference)	Site description
5/179	Newark Dismantled Railway	SK799547	This disused stretch of railway embankment in Newark is now partially wooded and scrubbed over.
5/182	Newark (Beet Factory) Dismantled Railway	SK798550	This disused railway line runs partly along an embankment and partly parallel to an active railway line. The sides are dominated by scrub with the old track bed and verges supporting scrubby grassland.
2/780	Newark Trent Grassland	SK785533	This pasture is situated in-between the River Trent and the Old Trent Dyke and has several depressions where water stands in winter supporting notable inundation communities. The grassland sward is typical of Trent valley alluvial soils.
5/1028	Kelham Road Redoubt Grassland	SK787544	This site is of historical significance with the earthworks of a Civil War Redoubt in the south-west section of the field. The sward comprises a semi-improved neutral grassland with some unimproved species-rich areas.
5/177	Newark Grassland	SK793549	This site situated on river gravels comprises the western half of a larger grassland divided by defunct hedgerows with scattered hawthorn <i>Crataegus monogyna</i> bushes. The sward is unimproved in places, but rather ruderal in character on uneven ground with dry banks and wet hollows.

LWS ID	LWS name	Location (OS grid reference)	Site description
5/3401	Valley Farm Grassland	SK790548	This grassland comprises two fields, a larger one to the north with a small pond and a smaller conjoined one to the south. The sward, sown around ten years ago, is well established and supports a species-rich grassland providing habitat for invertebrates and other wildlife.
5/661	Kelham Road Grassland II	SK7916547	This unimproved neutral grassland has a species-rich sward characterised by grasses such as meadow foxtail <i>Alopecurus pratensis</i> , sweet vernal grass <i>Anthoxanthum odoratum</i> and Yorkshire-fog <i>Holcus lanatus</i> with a good selection of forbs.
2/781	Kelham Road Grassland	SK783547	This semi-improved neutral grassland, which was unmanaged at the time of the survey, comprises of two fields which are partially divided by a mature overgrown hawthorn hedgerow.
2/778	Great North Road Grasslands	SK792546	This site comprises three small pony-grazed fields situated adjacent to the A46/A617/A616 roundabout to the west of Newark. They represent remnants of the neutral Trent valley pastures which were once common in the county.

2.2 Surveyor qualifications and experience

- 2.2.1 All field surveys were led by competent ecologists, familiar with terrestrial invertebrate ecology and survey methodology. Additionally, all field surveyors were members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and abided by CIEEMS Code of Professional Conduct.
- 2.2.2 The lead ecologist for all terrestrial invertebrate surveys undertaken has over 15 years' experience in undertaking invertebrate surveys.
- 2.2.3 Wherever appropriate during surveys, Natural England's Standing Advice on Protected Species⁶ was taken into account, along with a wide range of other best practice guidance on survey methods. These are referenced in the text below.

2.3 Desk study

- 2.3.1 A review of previous survey and assessment work for the Scheme was undertaken in relation to each Local Wildlife Sites (LWS) along with the supplied site citations. None of the LWSs are designated for invertebrates; the designations only cover the botanical interest for each site. Additionally, a review of aerial imagery of the sites was completed to assess whether the site is still likely to largely conform to the designation.
- 2.3.2 The review determined whether any of the LWSs have the potential to support protected or notable invertebrates. The desk study records were supplied and the invertebrate records were reviewed in relation to the LWSs.

2.4 Invertebrate survey

- 2.4.1 The terrestrial invertebrate survey methods were undertaken with reference to the standard guidance for terrestrial species^{7,8} and are outlined in Table 2-2.

⁶ <https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications>.

⁷ Joint Nature Conservation Committee (2008). Common Standards Monitoring Guidance for Invertebrates, Version March 2008. JNCC, Peterborough.

⁸ English Nature (2005). Organising Surveys to Determine Site Quality for Invertebrates: A Framework Guide for Ecologists. English Nature, Peterborough.

Table 2-2: Terrestrial invertebrate survey methods

Method	Description
Sweep netting	Netting invertebrates in low vegetation using a stout-handled net which was moved vigorously through the vegetation to dislodge resting invertebrates. This method can be considered to be quantitative, when carried out for a specified amount of time. This method was undertaken within the grassland areas of the survey area for 10 sweeps on each occasion
Beating tray	Beating trees and bushes with a stick using a sharp tap to dislodge the invertebrates which then fall onto the beating tray held beneath. This technique was effective in sampling arboreal invertebrate species
Aerial netting	Netting and capturing for identification any flying invertebrate species. This technique was undertaken in suitable habitats throughout the LWS sites. Aerial netting was undertaken where flying invertebrates were found
Direct searching	Looking for invertebrates in the suitable habitats or microhabitats for species known or considered likely to occur within the survey area

2.4.2 Invertebrates exist in all habitats but certain habitat types are potentially of higher value and were therefore considered more closely in the survey. These included semi-natural vegetation, open mosaics and previously developed brownfield land.

2.4.3 The weather conditions and survey timings are given in Table 2-3, with each site being surveyed on four occasions between June and August.

Table 2-3: Terrestrial invertebrate survey conditions

Date	Weather	Survey start/finish times	Sites surveyed
22/06/2022	16 - 26°C, Wind F1 - F2, NW, Cloud 4/8 - 2/8, Rain nil	10:15 – 16:15	5/177, 5/661, 5/3401, Part of 2/778
23/06/2022	18 - 26°C, Wind F1 - F2, SE, Cloud 4/8 - 8/8, Rain nil	10:00 – 16:05	2/778, 5/1028
05/07/2022	15 - 20°C, Wind F3, WNW, Cloud 8/8 - 4/8, Rain nil	10:00 – 16:30	5/177, 5/661, 5/3401, Part of 2/778
06/07/2022	16 - 22°C, Wind F3, W, Cloud 8/8 - 4/8 - 8/8, Rain nil	10:15 – 16:45	2/778, 5/1028
21/07/2022	19 - 20°C, Wind F2, NE, Cloud 8/8, Rain nil	10:00 – 16:15	5/177, 5/661, 5/3401, Part of 2/778

Date	Weather	Survey start/finish times	Sites surveyed
27/07/2022	21 - 22°C, Wind F2, SSE, Cloud 4/8 - 5/8, Rain nil	10:15 – 16:30	2/778, 5/1028
02/08/2022	24 - 27°C, Wind F3 gusting F4, SW, Cloud 8/8, Rail nil	10:00 – 16:30	5/177, 5/661, 5/3401, Part of 2/778
05/08/2022	19 - 20°C, Wind F3, WWN, Cloud 5/8, Rail nil	10:00 -16:45	2/778, 5/1028

2.5 Limitations

- 2.5.1 Whilst every effort was made during the field survey to provide a comprehensive description of the survey area, no investigation can ensure the complete characterisation and prediction of the natural environment. Natural and semi-natural habitats are subject to change, species may colonise the survey area after surveys have taken place and results included in this report may become less reliable over time.
- 2.5.2 Consent to access four of the sites could not be obtained from the respective landowners. These sites were 5/179 Newark Dismantled Railway, 2/780 Newark Trent Grassland, 2/781 Kelham Road Grassland and 5/182 Newark (Beet Factory) Dismantled Railway.
- 2.5.3 Due to programming constraints, it was not possible to start surveying until June. This resulted in the spring/early summer months (i.e. April and May) sampling periods being missed and the surveys being concentrated into the summer and autumn months June to August. This is not considered to be a significant limitation to the assessment of the invertebrate interest due to the number and diversity of species recorded for each LWS.

3 Results

3.1 Desk study

- 3.1.1 A desk study was undertaken in 2022 to identify any records of terrestrial invertebrates within the Order Limits or within 2 kilometres of the Order Limits.
- 3.1.2 Nottinghamshire Biological and Geological Record Centre (NBGRC) was contacted in June 2022 to request a copy of all protected species data within the search area.
- 3.1.3 The desk study provided records of the following terrestrial invertebrates: 12 butterfly records ranging in date from 2017 to 2021, 23 records of moths ranging in date from 2008 to 2022 and five records of Odonata (dragon - and damselflies) ranging in date from 2014 to 2022. None of these records are within or immediately adjacent to any of the Local Wildlife Sites (LWS).
- 3.1.4 Of the records detailed above, six were records of notable invertebrate species. Full details of these records are shown in Table 3-1 below.

Table 3-1: Notable desk study invertebrate records.

Scientific name	Common name	Type	Status	Number of records	Closest record to the Scheme
<i>Coenonympha pamphilus</i>	Small heath	Butterfly	IUCN post 2001 NT, NERC S41	3	1.7km south-east
<i>Hemistola chrysoprasaria</i>	Small emerald	Moth	NERC S41	2	1.1km south-east
<i>Xanthorhoe biriviata</i>	Balsam carpet	Moth	IUCN Pre 1994 R	1	1.1km west

Source: NBGRC, 2022

3.2 Invertebrate surveys

5/1028 Kelham Road Redoubt Grassland

- 3.2.1 The survey of 5/1028 Kelham Road Redoubt Grassland recorded 49 species of which two are protected and/or a notable species. These protected and/or notable species being the large garden bumblebee *Bombus ruderatus* and a solitary wasp *Lestiphorus bicinctus*, see Appendix B Figure B-5 (Recorded notable invertebrate species within site 5/1028 – Kelham Road Red) of this report for a plan showing their locations. Table 3-2 below gives details of the species recorded. A further recorded species, the latticed heath *Chiasmia clathrata*, is listed on The Natural Environment and Rural Communities (NERC) act for research only.

Table 3-2: Terrestrial invertebrates recorded at Kelham Road Redoubt Grassland

Scientific name	Common name	Type	Status
<i>Cantharis lateralis</i>	-	Coleoptera	IUCN GB red list post 2001 LC
<i>Coccinella septempunctata</i>	7 spot ladybird	Coleoptera	-
<i>Harmonia axyridis</i>	Harlequin ladybird	Coleoptera	-
<i>Malachius bipustulatus</i>	Common malachite beetle	Coleoptera	IUCN GB red list post 2001 LC
<i>Oedemera nobilis</i>	Thick thighed beetle	Coleoptera	IUCN GB red list post 2001 LC
<i>Pterostichus melanarius</i>	-	Coleoptera	IUCN GB red list post 2001 LC
<i>Chrysotoxum bicinctum</i>	-	Diptera	-
<i>Episyrphus balteatus</i>	Marmalade hoverfly	Diptera	-
<i>Eriothis rufomaculata</i>	-	Diptera	-
<i>Eristalis arbustorum</i>	-	Diptera	-
<i>Physocephala rufipes</i>	-	Diptera	-
<i>Urophora cardui</i>	Thistle gall fly	Diptera	-
<i>Volucella bombylans</i>	-	Diptera	-
<i>Valucella pellucens</i>	-	Diptera	-
<i>Dolycoris baccarum</i>	Sloe bug	Heteroptera	IUCN GB red list post 2001 LC
<i>Apis mellifera</i>	Honeybee	Hymenoptera	-
<i>Bombus lapidaries</i>	Red-tailed bumblebee	Hymenoptera	-
<i>Bombus lucorum aggagg.</i>	White-tailed bumblebee	Hymenoptera	-
<i>Bombus pascorum</i>	Common carder bumblebee	Hymenoptera	-
<i>Bombus ruderatus</i>	Large garden bumblebee	Hymenoptera	Notable B, NERC S41
<i>Bombus terrestris</i>	Buff-tailed bumblebee	Hymenoptera	-
<i>Bombus vestalis</i>	Vestal cuckoo bumblebee	Hymenoptera	-
<i>Lestiphorus bicinctus</i>	-	Hymenoptera	Notable B
<i>Vespula vulgaris</i>	Common wasp	Hymenoptera	-
<i>Aglais urticae</i>	Small tortoiseshell	Lepidoptera	IUCN GB red list post 2001 LC
<i>Aphantopus hyperantus</i>	Ringlet	Lepidoptera	IUCN GB red list post 2001 LC
<i>Autographa gamma</i>	Silver Y	Lepidoptera	-
<i>Chiasmia clathrate</i>	Latticed Heath	Lepidoptera	NERC S41 (for research only)
<i>Maniola jurtina</i>	Meadow brown	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pieris brassicae</i>	Large white	Lepidoptera	IUCN GB red list post

Scientific name	Common name	Type	Status
			2001 LC
<i>Pieris napi</i>	Green-veined white	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pieris rapae</i>	Small white	Lepidoptera	IUCN GB red list post 2001 LC
<i>Polygonia c-album</i>	Comma	Lepidoptera	IUCN GB red list post 2001 LC
<i>Polyommatus icarus</i>	Common blue	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pyronia tithonus</i>	Gatekeeper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Rhagonycha fulva</i>	Common red soldier beetle	Lepidoptera	IUCN GB red list post 2001 LC
<i>Thymelicus sylvestris</i>	Small skipper	Lepidoptera	IUCN GB red list post 2001 C
<i>Zygaena filipendulae</i>	6-spot burnet	Lepidoptera	-
<i>Zygaena trifolii</i>	5-spot burnet	Lepidoptera	-
<i>Succinea putris</i>	Amber snail	Mollusca	IUCN GB red list post 2001 LC
<i>Chrysoperla carnea</i>	Common green lacewing	Neuroptera	-
<i>Enallagma cyathigerum</i>	Common blue damselfly	Odonata	IUCN GB red list post 2001 LC
<i>Sympetrum sanguineum</i>	Ruddy darter	Odonata	IUCN GB red list post 2001 LC
<i>Sympetrum striolatum</i>	Common darter	Odonata	IUCN GB red list post 2001 LC
<i>Chorthippus brunneus</i>	Field grasshopper	Orthoptera	IUCN GB red list post 2001 LC
<i>Chorthippus parallelus</i>	Meadow grasshopper	Orthoptera	IUCN GB red list post 2001 LC
<i>Conocephalus fuscus</i>	Long-winged conehead	Orthoptera	IUCN GB red list post 2001 LC
<i>Omocestus viridulus</i>	Common green grasshopper	Orthoptera	IUCN GB red list post 2001 LC
<i>Roeseliana roeselii</i>	Rosesel's bush cricket	Orthoptera	IUCN GB red list post 2001 LC

Key:

International Union for Conservation of Nature (IUCN) GB red list post 2001 LC: Least Concern
Notable B: Nationally Scarce (Nationally Notable) B species found in between 31 and 100 hectads
NERC S41: NERC Act Section 41 listed species

5/177 Newark Grassland

3.2.2 The survey of 5/177 Newark Grassland recorded 42 species of which one is a protected and/or notable species, these being the large garden bumblebee *Bombus ruderatus*, see Appendix B Figure B-3 (Recorded notable invertebrate species within site 5/177 – Newark Grassland LWS) of this report for a plan showing their locations. The Table 3-3 below gives details of the species recorded. A further two recorded species, the white ermine *Spilosoma lubricipeda* and the

cinnabar moth *Tyria jacobaeae* are listed on the NERC act for research only.

Table 3-3: Terrestrial invertebrates recorded at Newark Grassland

Scientific name	Common name	Type	Status
<i>Adalia bipunctata</i>	2 spot ladybird	Coleoptera	-
<i>Cantharis lateralis</i>	-	Coleoptera	IUCN GB red list post 2001 LC
<i>Coccinella septempunctata</i>	7 spot ladybird	Coleoptera	-
<i>Harmonia axyridis</i>	Harlequin ladybird	Coleoptera	-
<i>Rhagonycha fulva</i>	Common red soldier beetle	Coleoptera	IUCN GB red list post 2001 LC
<i>Chloromyia Formosa</i>	Broad centurion	Diptera	IUCN GB red list post 2001 LC
<i>Episyrphus balteatus</i>	-	Diptera	-
<i>Episyrphus balteatus</i>	Marmalade hoverfly	Diptera	-
<i>Eriothix rufomaculata</i>	-	Diptera	-
<i>Eristalis arbustorum</i>	-	Diptera	-
<i>Eristalis intricarius</i>	-	Diptera	-
<i>Eristalis tenax</i>	-	Diptera	-
<i>Eupeodes luniger</i>	-	Diptera	-
<i>Platcheius albimanus</i>	-	Diptera	-
<i>Syrirta pipiens</i>	-	Diptera	-
<i>Palomena prasine</i>	Common green shieldbug	Heteroptera	IUCN GB red list post 2001 LC
<i>Pentatoma rufipes</i>	Forest bug	Heteroptera	IUCN GB red list post 2001 LC
<i>Apis mellifera</i>	Honeybee	Hymenoptera	-
<i>Bombus lapidarius</i>	Red-tailed bumblebee	Hymenoptera	-
<i>Bombus lucorum aggagg.</i>	White-tailed bumblebee	Hymenoptera	-
<i>Bombus pascorum</i>	Common carder bumblebee	Hymenoptera	-
<i>Bombus ruderatus</i>	Large garden bumblebee	Hymenoptera	Notable B, NERC S41
<i>Bombus terrestris</i>	Buff-tailed bumblebee	Hymenoptera	-
<i>Lasioglossum leucopus</i>	White-footed furrow bee	Hymenoptera	-
<i>Lasioglossum morio</i>	Green furrow bee	Hymenoptera	-
<i>Vesputula vulgaris</i>	Common wasp	Hymenoptera	-
<i>Porcellio spinicornis</i>	-	Isopoda	-
<i>Aglais urtica</i>	Small tortoiseshell	Lepidoptera	IUCN GB red list post 2001 LC
<i>Maniola jurtina</i>	Meadow brown	Lepidoptera	IUCN GB red list post 2001 LC

Scientific name	Common name	Type	Status
<i>Noctua pronuba</i>	Large yellow underwing	Lepidoptera	-
<i>Pieris brassicae</i>	Large white	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pieris rapae</i>	Small white	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pyronia tithonus</i>	Gatekeeper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Spilosoma luvbricipeda</i>	White ermine	Lepidoptera	NERC S41 (for research only)
<i>Tyria jacobaeae</i>	Cinnabar moth	Lepidoptera	NERC S41 (for research only)
<i>Vanessa cardui</i>	Painted lady	Lepidoptera	IUCN GB red list post 2001 LC
<i>Cornu aspersum</i>	Garden snail	Mollusca	IUCN GB red list post 2001 LC
<i>Coenagrion puella</i>	Azure damselfly	Odonata	IUCN GB red list post 2001 LC
<i>Enallagma cyathigerum</i>	Common blue damselfly	Odonata	IUCN GB red list post 2001 LC
<i>Sympetrum striolatum</i>	Common darter	Odonata	IUCN GB red list post 2001 LC
<i>Chorthippus brunneus</i>	Field grasshopper	Orthoptera	IUCN GB red list post 2001 LC
<i>Chorthippus parallelus</i>	Meadow grasshopper	Orthoptera	IUCN GB red list post 2001 LC

Key:

IUCN GB red list post 2001 LC: Least Concern

Notable B Nationally Scarce (Nationally Notable) B species found in between 31 and 100 hectads

NERC S41 NERC Act Section 41 listed species

5/3401 Valley Farm grassland

3.2.3 The site 5/3401 Valley Farm Grassland recorded 47 species of which three are listed on the NERC act for research only, these being the latticed heath *Chiasmia clathrate*, shaded broad-bar *Scotopteryx chenopodiata* and cinnabar moth *Tyria jacobaeae*, see Appendix B Figure B-6 (Recorded notable invertebrate species within site 5/3401 – Valley Farm Grassland LWS) of this report for a plan showing their locations. Table 3-4 below gives details of the species recorded.

Table 3-4: Terrestrial invertebrates recorded at Valley Farm Grassland

Scientific name	Common name	Type	Status
<i>Adalia bipunctata</i>	2 spot ladybird	Coleoptera	-
<i>Athous haemorrhoidalis</i>	-	Coleoptera	-
<i>Cantharis lateralis</i>	-	Coleoptera	IUCN GB red list post 2001 LC
<i>Coccinella septempunctata</i>	7 spot ladybird	Coleoptera	-
<i>Harmonia axyridis</i>	Harlequin ladybird	Coleoptera	-

Scientific name	Common name	Type	Status
<i>Oedemera nobilis</i>	Thick thighed beetle	Coleoptera	IUCN GB red list post 2001 LC
<i>Poecilus cupreus</i>	-	Coleoptera	IUCN GB red list post 2001 LC
<i>Rhagonycha fulva</i>	Common red soldier beetle	Coleoptera	IUCN GB red list post 2001 LC
<i>Episyrphus balteatus</i>	Marmalade hoverfly	Diptera	-
<i>Eriothrix rufomaculata</i>	-	Diptera	-
<i>Eristalis arbustorum</i>	-	Diptera	-
<i>Panorpa communis</i>	Scorpion fly	Diptera	-
<i>Volucella pellucens</i>	-	Diptera	-
<i>Apis mellifera</i>	Honeybee	Hymenoptera	-
<i>Bombus lapidarius</i>	Red-tailed bumblebee	Hymenoptera	-
<i>Bombus lucorum agg.</i>	White-tailed bumblebee	Hymenoptera	-
<i>Bombus pascuorum</i>	Common carder bumblebee	Hymenoptera	-
<i>Vespa vulgaris</i>	Common wasp	Hymenoptera	-
<i>Aglais urticae</i>	Small tortoiseshell	Lepidoptera	IUCN GB red list post 2001 LC
<i>Aphantopus hyperantus</i>	Ringlet	Lepidoptera	IUCN GB red list post 2001 LC
<i>Chiasmia clathrata</i>	Latticed heath	Lepidoptera	NERC S41 for research only)
<i>Eremobia ochroleuca</i>	Dusky Sallow	Lepidoptera	-
<i>Euclidia glyphica</i>	Burnet companion	Lepidoptera	-
<i>Lycaena phlaeas</i>	Small copper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Maniola jurtina</i>	Meadow brown	Lepidoptera	IUCN GB red list post 2001 LC
<i>Ochlodes sylvanus</i>	Large skipper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pieris brassicae</i>	Large white	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pieris napi</i>	Green-veined white	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pieris rapae</i>	Small white	Lepidoptera	IUCN GB red list post 2001 LC
<i>Polygonia c-album</i>	Comma	Lepidoptera	IUCN GB red list post 2001 LC
<i>Polyommatus icarus</i>	Common blue	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pyronia tithonus</i>	Gatekeeper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Scotopteryx chenopodiata</i>	Shaded Broad-bar	Lepidoptera	NERC S41 (for research only)
<i>Thymelicus lineola</i>	Essex skipper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Thymelicus sylvestris</i>	Small skipper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Tyria jacobaeae</i>	Cinnabar moth	Lepidoptera	NERC S41 (for research only)
<i>Vanessa cardui</i>	Painted lady	Lepidoptera	IUCN GB red list post 2001 LC
<i>Zygaena filipendulae</i>	6 spot burnet	Lepidoptera	-

Scientific name	Common name	Type	Status
<i>Cepaea nemoralis</i>	Brown-lipped banded snail	Mollusca	IUCN GB red list post 2001 LC
<i>Anax imperator</i>	Emperor dragonfly	Odonata	IUCN GB red list post 2001 LC
<i>Enallagma cyathigerum</i>	Common blue damselfly	Odonata	IUCN GB red list post 2001 LC
<i>Ischnura elegans</i>	Blue-tailed damselfly	Odonata	IUCN GB red list post 2001 LC
<i>Sympetrum striolatum</i>	Common darter	Odonata	IUCN GB red list post 2001 LC
<i>Chorthippus brunneus</i>	Field grasshopper	Orthoptera	IUCN GB red list post 2001 LC
<i>Chorthippus parallelus</i>	Meadow grasshopper	Orthoptera	IUCN GB red list post 2001 LC
<i>Leptophyes punctatissima</i>	Speckled bush cricket	Orthoptera	IUCN GB red list post 2001 LC
<i>Roeseliana roeselii</i>	Roesel's bush cricket	Orthoptera	IUCN GB red list post 2001 LC

Key:

IUCN GB red list post 2001 LC Least Concern
NERC S41 NERC Act Section 41 listed species

5/661 Kelham Road Grassland II

3.2.4 The site 5/661 Kelham Road Grassland II recorded 46 species of which one is a protected and/or notable species, this being the large yellow-face bee *Hylaeus signatus*, see Appendix B Figure B-4 (Recorded notable invertebrate species within site 5/661 – Kelham Road Grassland II LWS) of this report for a plan showing their locations. Table 3-5 below gives details of the species recorded. A further recorded species the cinnabar moth *Tyria jacobaeae* is listed on the NERC act for research only.

Table 3-5: Terrestrial invertebrates recorded at Kelham Road Grassland II

Scientific Name	Common Name	Type	Status
<i>Adalia bipunctata</i>	2 spot ladybird	Coleoptera	-
<i>Cantharis flavilabris</i>	-	Coleoptera	-
<i>Coccinella septempunctata</i>	7 spot ladybird	Coleoptera	-
<i>Oedemera nobilis</i>	Thick thighed beetle	Coleoptera	IUCN GB red list post 2001 LC
<i>Rhagonycha fulva</i>	Common red soldier beetle	Coleoptera	IUCN GB red list post 2001 LC
<i>Episyrphus balteatus</i>	Marmalade hoverfly	Diptera	-
<i>Eriothrix rufomaculata</i>	-	Diptera	-
<i>Eupeodes luniger</i>	-	Diptera	-
<i>Panorpa communis</i>	Scorpion fly	Diptera	-
<i>Scaeva pyrastris</i>	-	Diptera	-
<i>Syrirta pipiens</i>	-	Diptera	-
<i>Urophora cardui</i>	Thistle gall fly	Diptera	-
<i>Volucella inanis</i>	-	Diptera	-

Scientific Name	Common Name	Type	Status
<i>Lygocoris pabulinus</i>	Common green capsid	Hemiptera	-
<i>Apis mellifera</i>	Honeybee	Hymenoptera	-
<i>Bombus hypnorum</i>	Tree bumblebee	Hymenoptera	-
<i>Bombus lapidarius</i>	Red-tailed bumblebee	Hymenoptera	-
<i>Bombus lucorum aggagg.</i>	White-tailed bumblebee	Hymenoptera	-
<i>Bombus pascuorum</i>	Common carder bumblebee	Hymenoptera	-
<i>Bombus terrestris</i>	Buff-tailed bumblebee	Hymenoptera	-
<i>Bombus vestalis</i>	Vestal cuckoo bumblebee	Hymenoptera	-
<i>Hylaeus signatus</i>	Large yellow-face bee	Hymenoptera	Notable B
<i>Vespa vulgaris</i>	Common wasp	Hymenoptera	-
<i>Aglais io</i>	Peacock	Lepidoptera	IUCN GB red list post 2001 LC
<i>Aglais urticae</i>	Small tortoiseshell	Lepidoptera	IUCN GB red list post 2001 LC
<i>Autographa gamma</i>	Silver-Y	Lepidoptera	-
<i>Lycaena phlaeas</i>	Small copper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Maniola jurtina</i>	Meadow brown	Lepidoptera	IUCN GB red list post 2001 LC
<i>Odezia atrata</i>	Chimney sweeper moth	Lepidoptera	-
<i>Pieris brassicae</i>	Large white	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pieris rapae</i>	Small white	Lepidoptera	IUCN GB red list post 2001 LC
<i>Polygona c-album</i>	Comma	Lepidoptera	IUCN GB red list post 2001 LC
<i>Polyommatus icarus</i>	Common blue	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pyronia tithonus</i>	Gatekeeper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Thymelicus lineola</i>	Essex skipper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Thymelicus sylvestris</i>	Small skipper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Tyria jacobaeae</i>	Cinnabar moth	Lepidoptera	NERC S41 (for research only)
<i>Vanessa cardui</i>	Painted lady	Lepidoptera	IUCN GB red list post 2001 LC
<i>Zygaena filipendulae</i>	6 spot burnet	Lepidoptera	-
<i>Zygaena trifolii</i>	5 spot burnet	Lepidoptera	-
<i>Anax imperator</i>	Emperor dragonfly	Odonata	IUCN GB red list post 2001 LC
<i>Coenagrion puella</i>	Azure damselfly	Odonata	IUCN GB red list post 2001 LC
<i>Enallagma cyathigerum</i>	Common blue damselfly	Odonata	IUCN GB red list post 2001 LC
<i>Chorthippus brunneus</i>	Field grasshopper	Orthoptera	IUCN GB red list post 2001 LC
<i>Chorthippus parallelus</i>	Meadow grasshopper	Orthoptera	IUCN GB red list post 2001 LC
<i>Leptophyes</i>	Speckled bush cricket	Orthoptera	IUCN GB red list post

Scientific Name	Common Name	Type	Status
<i>punctatissima</i>			2001 LC

Key:

IUCN GB red list post 2001 LC Least Concern
Notable B Nationally Scarce (Nationally Notable) B species found in between 31 and 100 hectads
NERC S41 NERC Act Section 41 listed species

2/778 Great North Road Grasslands

3.2.5 The site 2/778 Great North Road Grasslands recorded 91 species of which two are protected and/or notable species, these being the large garden bumblebee *Bombus ruderatus* and large yellow-face bee *Hylaeus signatus*, see Appendix B Figure B-2 (Recorded notable invertebrate species within site 2/778 – Great North Road LWS) of this report for a plan showing their locations. Table 3-6 below gives details of the species recorded. A further recorded species the cinnabar moth *Tyria jacobaeae* is listed on the NERC act for research only.

Table 3-6: Terrestrial invertebrates recorded at Great North Road Grasslands

Scientific Name	Common Name	Type	Status
<i>Adalia bipunctata</i>	2 spot ladybird	Coleoptera	-
<i>Cantharis flavilabris</i>	-	Coleoptera	-
<i>Cantharis livida</i>	-	Coleoptera	IUCN GB red list post 2001 LC
<i>Coccinella septempunctata</i>	7 spot ladybird	Coleoptera	-
<i>Curtonotus aulicus</i>	-	Coleoptera	IUCN GB red list post 2001 LC
<i>Gastrophysa viridula</i>	Green dock beetle	Coleoptera	IUCN GB red list post 2001 LC
<i>Harmonia axyridis</i>	Harlequin ladybird	Coleoptera	-
<i>Malachius bipustulatus</i>	Common malachite beetle	Coleoptera	IUCN GB red list post 2001 LC
<i>Oedemera nobilis</i>	Thick thighed beetle	Coleoptera	IUCN GB red list post 2001 LC
<i>Poecilus cupreus</i>	-	Coleoptera	IUCN GB red list post 2001 LC
<i>Propylea quattuordecimpunctata</i>	14 spot ladybird	Coleoptera	-
<i>Rhagonycha fulva</i>	Common red soldier beetle	Coleoptera	IUCN GB red list post 2001 LC
<i>Rutpela maculata</i>	-	Coleoptera	-
<i>Stictoleptura cordigera</i>	-	Coleoptera	-
<i>Chrysotoxum bicinctum</i>	-	Diptera	-
<i>Chrysotoxum festivum</i>	-	Diptera	-
<i>Conops quadrifasciatus</i>	-	Diptera	-
<i>Diplolepis rosae</i>	-	Diptera	-
<i>Epistrophe diaphana</i>	-	Diptera	-
<i>Episyrphus balteatus</i>	Marmalade hoverfly	Diptera	-
<i>Eriothrix rufomaculata</i>	-	Diptera	-
<i>Eristalis arbustorum</i>	-	Diptera	-

Scientific Name	Common Name	Type	Status
<i>Eristalis intricarius</i>	-	Diptera	-
<i>Eristalis pertinax</i>	-	Diptera	-
<i>Eristalis tenax</i>	-	Diptera	-
<i>Helophilus pendulus</i>	-	Diptera	-
<i>Melanostoma dubium</i>	-	Diptera	-
<i>Myathropa florea</i>	-	Diptera	-
<i>Neoascia podagrica</i>	-	Diptera	-
<i>Nephrotoma flavescens</i>	Primrose tiger	Diptera	-
<i>Physocephala rufipes</i>	-	Diptera	-
<i>Sphaerophoria scripta</i>	-	Diptera	-
<i>Syrirta pipiens</i>	-	Diptera	-
<i>Urophora cardui</i>	Thistle gall fly	Diptera	-
<i>Volucella bombylans</i>	-	Diptera	-
<i>Volucella Inanis</i>	-	Diptera	-
<i>Volucella pellucens</i>	-	Diptera	-
<i>Volucella zonaria</i>	-	Diptera	-
<i>Xanthogramma pedissequum</i>	-	Diptera	-
<i>Xylota segnis</i>	-	Diptera	-
<i>Aphrophora alni</i>	-	Hemiptera	-
<i>Coreus marginatus</i>	Dock shieldbug	Hemiptera	IUCN GB red list post 2001 LC
<i>Dolycoris baccarum</i>	Hairy shieldbug	Hemiptera	IUCN GB red list post 2001 LC
<i>Philaenus spumarius</i>	-	Hemiptera	-
<i>Amblyteles armatorius</i>	-	Hymenoptera	-
<i>Andricus quercuscalicis</i>	-	Hymenoptera	-
<i>Apis mellifera</i>	Honeybee	Hymenoptera	-
<i>Bombus lapidarius</i>	Red-tailed bumblebee	Hymenoptera	-
<i>Bombus lucorum aggagg.</i>	White-tailed bumblebee	Hymenoptera	-
<i>Bombus pascuorum</i>	Common carder bumblebee	Hymenoptera	-
<i>Bombus ruderatus</i>	Large garden bumblebee	Hymenoptera	Notable B, NERC S41
<i>Bombus terrestris</i>	Buff-tailed bumblebee	Hymenoptera	-
<i>Bombus vestalis</i>	Vestal cuckoo bumblebee	Hymenoptera	-
<i>Crossocerus annulipes</i>	-	Hymenoptera	-
<i>Ectemnius cephalotes</i>	-	Hymenoptera	-
<i>Halictus tumulorum</i>	Bronze furrow bee	Hymenoptera	-
<i>Hylaeus signatus</i>	Large yellow-face bee	Hymenoptera	Notable B
<i>Lasius niger</i>	-	Hymenoptera	-
<i>Myrmica rubra</i>	-	Hymenoptera	-
<i>Vespula vulgaris</i>	Common wasp	Hymenoptera	-
<i>Aglais urticae</i>	Small tortoiseshell	Lepidoptera	IUCN GB red list post 2001 LC
<i>Aphantopus hyperantus</i>	Ringlet	Lepidoptera	IUCN GB red list post 2001 LC
<i>Aricia agestis</i>	Brown argus	Lepidoptera	IUCN GB red list post 2001 LC

Scientific Name	Common Name	Type	Status
<i>Autographa gamma</i>	Silver Y	Lepidoptera	-
<i>Lycaena phlaeas</i>	Small copper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Maniola jurtina</i>	Meadow brown	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pieris brassicae</i>	Large white	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pieris napi</i>	Green-veined white	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pieris rapae</i>	Small white	Lepidoptera	IUCN GB red list post 2001 LC
<i>Polygonia c-album</i>	Comma	Lepidoptera	IUCN GB red list post 2001 LC
<i>Polyommatus icarus</i>	Common blue	Lepidoptera	IUCN GB red list post 2001 LC
<i>Pyrausta aurata</i>	Mint moth	Lepidoptera	-
<i>Pyronia tithonus</i>	Gatekeeper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Thymelicus lineola</i>	Essex skipper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Thymelicus sylvestris</i>	Small skipper	Lepidoptera	IUCN GB red list post 2001 LC
<i>Tyria jacobaeae</i>	Cinnabar moth	Lepidoptera	NERC S41 (for research only)
<i>Vanessa atalanta</i>	Red admiral	Lepidoptera	IUCN GB red list post 2001 LC
<i>Vanessa cardui</i>	Painted lady	Lepidoptera	IUCN GB red list post 2001 LC
<i>Succinea putris</i>	Amber snail	Mollusca	IUCN GB red list post 2001 LC
<i>Trochulus striolatus</i>	Strawberry snail	Mollusca	IUCN GB red list post 2001 LC
<i>Chrysoperla carnea</i>	Green lacewing	Neuroptera	-
<i>Aeshna grandis</i>	Brown hawker	Odonata	IUCN GB red list post 2001 LC
<i>Anax imperator</i>	Emperor dragonfly	Odonata	IUCN GB red list post 2001 LC
<i>Calopteryx splendens</i>	Banded demoiselle	Odonata	IUCN GB red list post 2001 LC
<i>Enallagma cyathigerum</i>	Common blue damselfly	Odonata	IUCN GB red list post 2001 LC
<i>Ischnura elegans</i>	Blue tailed damselfly	Odonata	IUCN GB red list post 2001 LC
<i>Sympetrum striolatum</i>	Common darter	Odonata	IUCN GB red list post 2001 LC
<i>Chorthippus brunneus</i>	Field grasshopper	Orthoptera	IUCN GB red list post 2001 LC
<i>Chorthippus parallelus</i>	Meadow grasshopper	Orthoptera	IUCN GB red list post 2001 LC
<i>Leptophyes punctatissima</i>	Speckled bush cricket	Orthoptera	IUCN GB red list post 2001 LC
<i>Omocestus viridulus</i>	Common green grasshopper	Orthoptera	IUCN GB red list post 2001 LC

Key:

IUCN GB red list post 2001 LC: Least Concern

Notable B: Nationally Scarce (Nationally Notable) B species found in between 31 and 100 hectads
NERC S41: NERC Act Section 41 listed species

Notable invertebrate species

3.2.6 The notable invertebrate species recorded within the survey areas are described in more detail below:

Large garden bumblebee *Bombus ruderatus* (Notable B, NERC S41)⁹

3.2.7 This species is a large bumblebee with a very long tongue, which is often held outstretched as the bee approaches a flower. It is one of the three species found visiting very deep blooms such as foxglove *Digitalis purpurea* and honeysuckle *Lonicera periclymenum*. Modern populations appear to have become centred on extensive river-valley systems in southern and central England, where it forages at plants such as comfrey *Symphytum spp.*, yellow iris *Iris pseudacorus* and marsh woundwort *Stachys palustris*. However, it has recently shown a great liking for the legume-dominated 'Pollen and Nectar Margins' being promoted as part of agri-environment programmes. The species is eusocial with queens emerging from hibernation from April to June; workers are present from May and males and new females from July to October.

Latticed heath *Chiasmia clathrate* (NERC S41 for research only)¹⁰

3.2.8 This species is found around lucerne crops, but occurs elsewhere in open ground, including gardens, waste ground, calcareous grassland, fens, open woodland, heathland and moorland. The caterpillars of this species feed on clovers *Trifolium sp.*, trefoils *Lotus sp.* and lucerne *Medicago sativa*.

A solitary wasp *Lestiphorus bicinctus* (Notable B)¹¹

3.2.9 A distinctive wasp with its yellow-banded, waisted abdomen combined with distinctive dark smudges on the forewing. This species is associated with scrub or bramble in sunny locations on light soils. Habitats where this species is found include heathland, rough grassland, parkland, coastal landslips and soft rock cliffs, coastal dunes and occasionally suburban gardens and woodland clearings. The prey consists of cicadellid and cercopid bugs.

⁹ <https://www.bwars.com/bee/apidae/bombus-ruderatus>.

¹⁰ <https://ukmoths.org.uk/species/chiasmia-clathrata> and <https://butterfly-conservation.org/moths/latticed-heath>.

¹¹ <https://www.bwars.uk/wasp/crabronidae/nyssoninae/lestiphorus-bicinctus>

White ermine *Spilosoma lubricipeda* (NERC S41 for research only)¹²

3.2.10 A white moth with small black spots on the forewing found in most rural and urban habitats including gardens, hedgerows, grassland, heathland, moorland, woodland and on the coast. The caterpillar larvae feed on a wide range of herbaceous plants including Common nettle *Urtica dioica* and docks *Rumex sp.*

Cinnabar moth *Tyria jacobaeae* (NERC S41 for research only)¹³

3.2.11 The cinnabar moth is generally nocturnal but is quite often disturbed during the day whilst sheltering within long grass and low herbage. The caterpillar larvae feeds gregariously on ragwort *Senecio jacobaea* and other related plants.

Shaded broad-bar *Scotopteryx chenopodiata* (NERC S41 for research only)¹⁴

3.2.12 This species frequents a wide range of open grassy places, including calcareous grassland, hedgerows, heathland, sand dunes and woodland rides. The larvae feed on vetch *Vicia sp.* and clover.

Large yellow-face bee *Hylaeus signatus* (Notable B)¹⁵

3.2.13 This species is a large *Hylaeus* that is most often found at flowers of mignonette *Reseda lutea* and weld *Reseda luteola*. It is generally associated with open habitats, including calcareous grassland, quarries, coastal marshes and beaches, post-industrial sites and private gardens, flying between mid-June to September. Nests are generally found in burrows in the vertical faces of compacted soil (both sand and clay), dead woody stems (such as bramble *Rubus fruticosus* agg.), in vacated nests of *Colletes daviesanus* and in crevices in mortar joints.

¹² <https://www.ukmoths.org.uk/species/spilosoma-lubricipeda/> and <https://butterfly-conservation.org/moths/white-ermine>

¹³ <https://www.ukmoths.org.uk/species/tyria-jacobaeae/> and <https://butterfly-conservation.org/moths/cinnabar>

¹⁴ <https://butterfly-conservation.org/moths/shaded-broad-bar> and <https://ukmoths.org.uk/species/scotopteryx-chenopodiata/>

¹⁵ <https://www.bwars.uk/bee/colletidae/hylaeus-signatus>

4 Summary

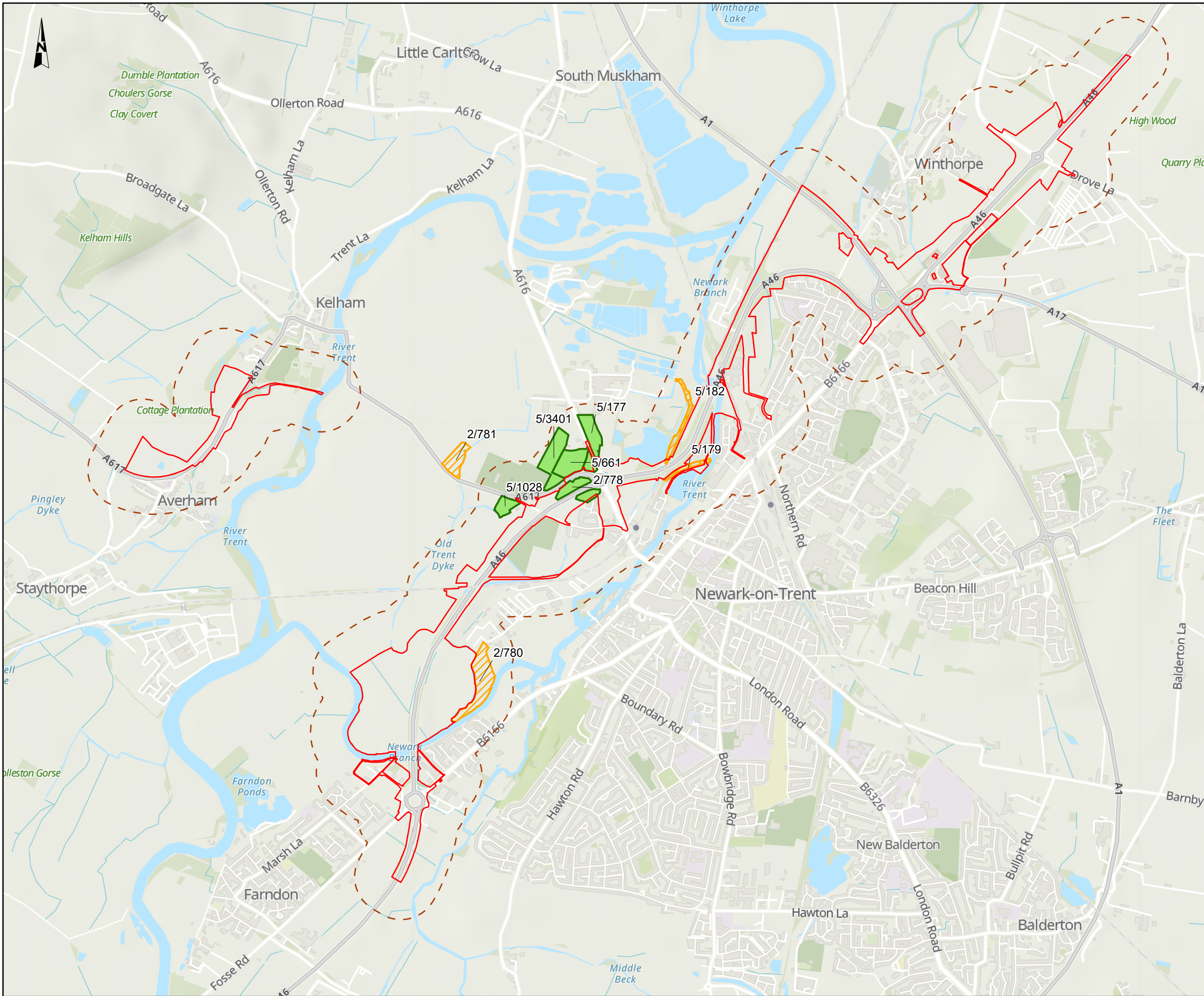
4.1 Ecological receptors

- 4.1.1 The invertebrate assessments conducted for the Scheme found that each of the surveyed Local Wildlife Sites (LWSs) had a district level of importance for invertebrates.
- 4.1.2 The protected and/or notable invertebrates recorded throughout the survey area are as followed:
- Large garden bumblebee *Bombus ruderatus* (Notable B, The Natural Environment and Rural Communities (NERC) S41)
 - Latticed heath *Chiasmia clathrate* (NERC S41 for research only)
 - A solitary wasp *Lestiphorus bicinctus* (Notable B)
 - White ermine *Spilosoma lubricipeda* (NERC S41 for research only)
 - Cinnabar moth *Tyria jacobaeae* (NERC S41 for research only)
 - Shaded broad-bar *Scotopteryx chenopodiata* (NERC S41 for research only)
 - Large yellow-face bee *Hylaeus signatus* (Notable B)
-

5 References

- ¹ Chartered Institute of Ecology and Environmental Management (CIEEM) (2018). Guidelines for Ecological Impact Assessment In The UK And Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.
 - ² CIEEM (2015). Guidelines on Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester.
 - ³ CIEEM (2017). Guidelines for Preliminary Ecological Appraisal. Chartered Institute of Ecology and Environmental Management, Winchester.
 - ⁴ BSI (2013). BS42020:2013 Biodiversity – Code of Practice for Planning and Development.
 - ⁵ <https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications>. Last accessed November 2023.
 - ⁶ <https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications>. Last accessed November 2023.
 - ⁷ Joint Nature Conservation Committee (2008). Common Standards Monitoring Guidance for Invertebrates, Version March 2008. JNCC, Peterborough.
 - ⁸ English Nature (2005). Organising Surveys to Determine Site Quality for Invertebrates: A Framework Guide for Ecologists. English Nature, Peterborough.
 - ⁹ [REDACTED] Last accessed November 2023.
 - ¹⁰ <https://ukmoths.org.uk/species/chiasmia-clathrata> and [REDACTED] Last accessed November 2023.
 - ¹¹ [REDACTED] Last accessed November 2023.
 - ¹² <https://www.ukmoths.org.uk/species/spilosoma-lubricipeda/> and [REDACTED]. Last accessed November 2023.
 - ¹³ <https://www.ukmoths.org.uk/species/tyria-jacobaeae/> and [REDACTED] Last accessed November 2023.
 - ¹⁴ <https://butterfly-conservation.org/moths/shaded-broad-bar> and [REDACTED]. Last accessed November 2023.
 - ¹⁵ [REDACTED]. Last accessed November 2023.
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A. Appendix A: Terrestrial Invertebrate Survey Areas

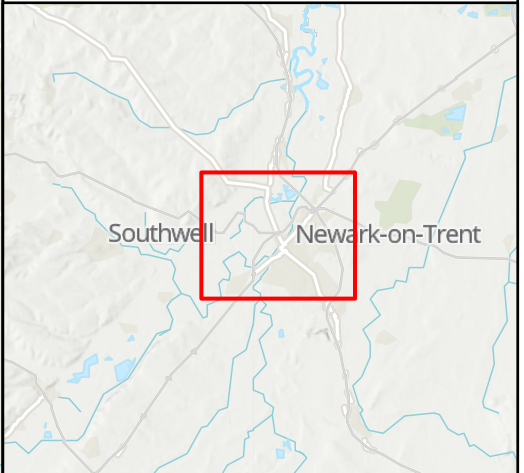


NOTES
 Source
 Ecology data collected by Mott MacDonald, 2022-2023.
 Service Layer Credits
 Contains OS data © Crown Copyright and database right 2023
 Contains data from OS Zoomstack

KEY TO SYMBOLS

- Order Limits
- Order Limits 250m buffer
- Site surveyed
- Site not surveyed due to access constraints

Terrestrial invertebrate survey



C01	08/12/23	DCO APPLICATION	JB	BC	HF
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD	APPD

CLIENT

PURPOSE OF ISSUE
 DCO APPLICATION

DEVELOPMENT CONSENT ORDER NUMBER
 TR010065

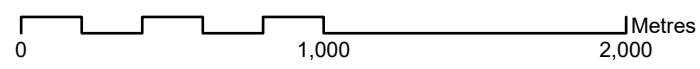
PROJECT TITLE
 A46 NEWARK BYPASS

DRAWING TITLE
 Appendix A
 Terrestrial Invertebrate Survey Areas

ORIGINAL SIZE A3 SCALE 1:25,000

DRAWING NUMBER HE PIN	ORIGINATOR SKAG	VOLUME EBD	PROJECT REF NO. HE551478
CONWI_CONW	DR	LE	00113
LOCATION	TYPE	ROLE	NUMBER
			REVISION C01

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B. Appendix B: Protected and/or notable invertebrate plans

Figure B-1: Recorded notable invertebrate species within the survey area

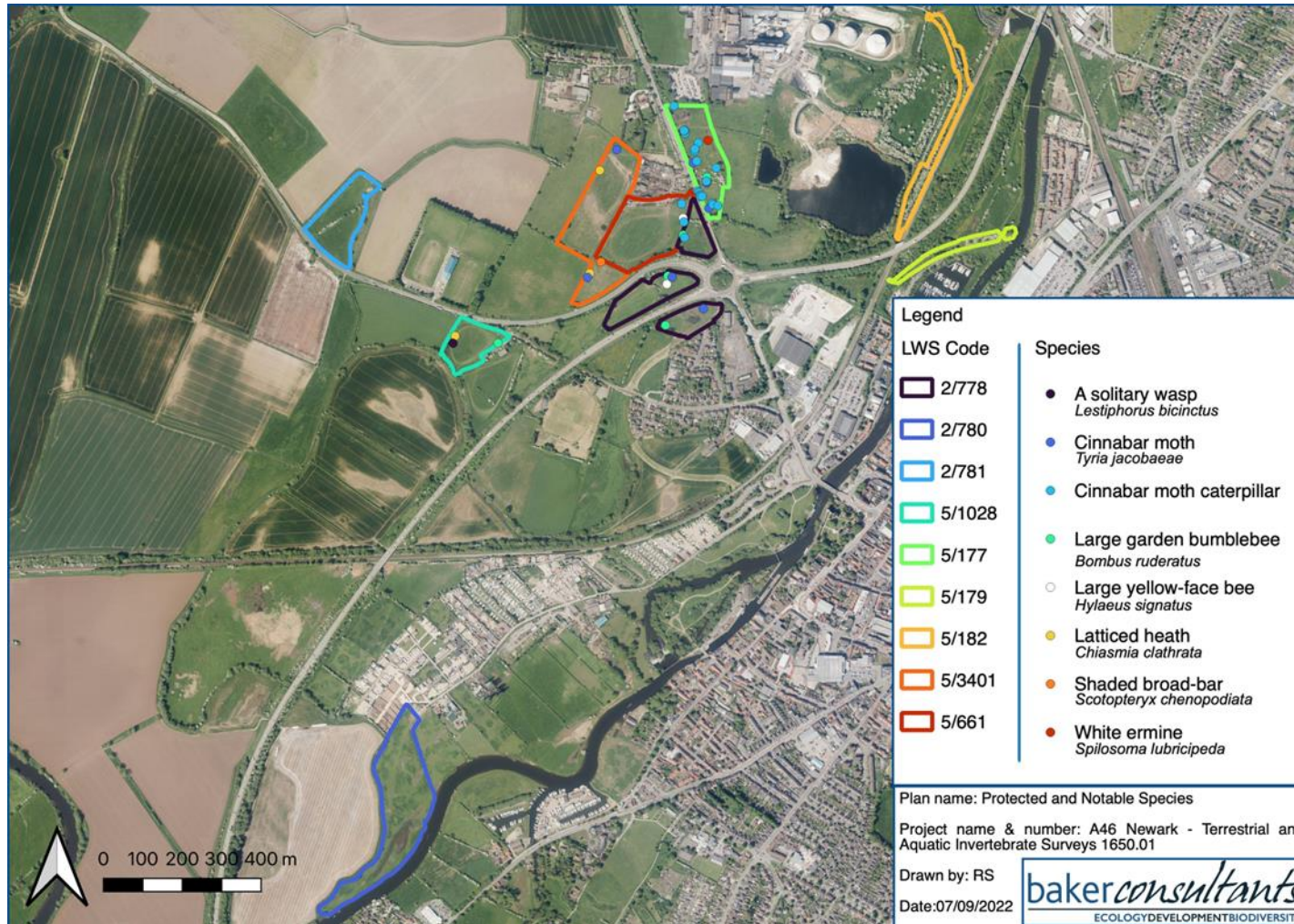


Figure B-2: Recorded notable invertebrate species within site 2/778 – Great North Road LWS

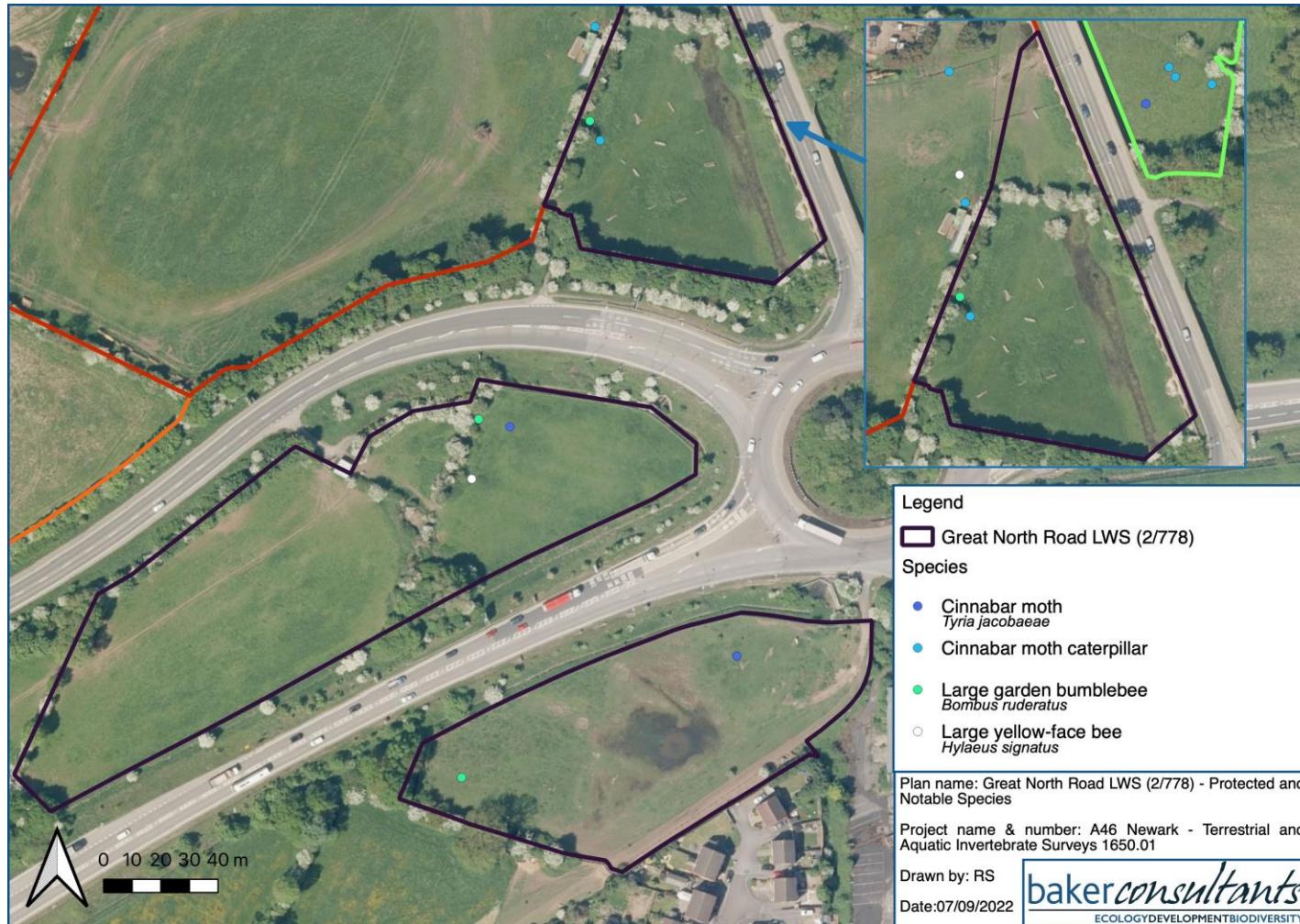


Figure B-3: Recorded notable invertebrate species within site 5/177 – Newark Grassland LWS

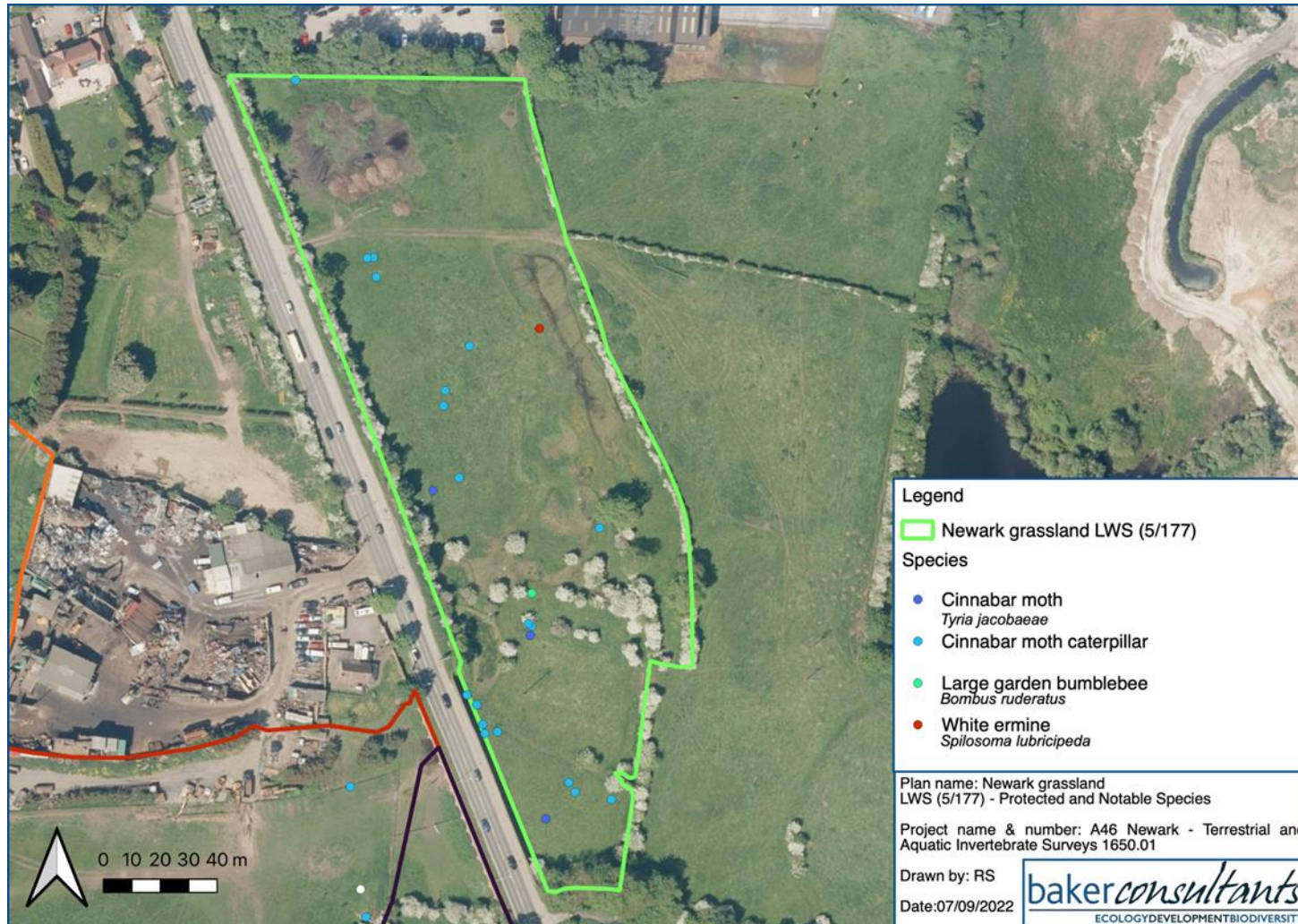


Figure B-4: Recorded notable invertebrate species within site 5/661 – Kelham Road Grassland II LWS



Figure B-5: Recorded notable invertebrate species within site 5/1028 – Kelham Road Redoubt LWS



Figure B-6: Recorded notable invertebrate species within site 5/3401 – Valley Farm Grassland LWS

