

Land at Deal Ground and May Gurney, Norwich

## Baseline Ecological Appraisal

June 2023

Quality Management	
<b>Client:</b>	Serruys Property Company Ltd
<b>Project:</b>	Land at Deal Ground and May Gurney, Norwich
<b>Report Title:</b>	Baseline Ecological Appraisal
<b>Project Number:</b>	ECO-6592
<b>File Reference:</b>	6592 BaselineEcoAp vf /TS/AB
<b>Date:</b>	16/06/2023

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## Executive Summary

- i) **Introduction.** Aspect Ecology was commissioned by Serruys Property Company Ltd in August 2022 to undertake an update baseline Ecological Appraisal in respect of land at Deal Ground and May Gurney, Norwich. The site is in receipt of outline planning permission for mixed development, including residential and commercial uses with landscaping and biodiversity enhancements. Ecological survey work to inform the outline permission was undertaken in 2008 and 2009. This report presents the findings of update ecology surveys undertaken to inform reserved matters.
- ii) **Survey.** Survey work was undertaken at the proposed development site, in addition to adjoining land to the east within the same landholding (together comprising the 'survey area'). Update surveys were undertaken in August, September and November 2022 based on standard extended Phase 1 methodology, while National Vegetation Classification (NVC) survey was undertaken of fen habitat within the survey area. In addition, a general update appraisal of faunal species was undertaken to record the potential presence of any protected, rare or notable species, with specific update surveys conducted in respect of bats, Badger, and Desmoulin's Whorl Snail. Additional update Phase 2 faunal surveys are being undertaken in 2023.
- iii) **Statutory Ecological Designations.** The nearest statutory designation to the survey area is Whitlingham Local Nature Reserve (LNR), located on the east side of the River Yare where it abuts the survey area. The closest international designation to the survey area comprises The Broads Special Area of Conservation and Broadland Ramsar and Special Protection Area (SPA), which lie approximately 5.4 km to the east.
- iv) **Non-statutory Ecological Designations.** Part of the survey area is designated as a non-statutory County Wildlife Site (CWS), named Carrow Abbey Marsh. The CWS is designated for its mosaic of tall fen and tall herb vegetation with young woodland and willow carr, and for the presence of Desmoulin's Whorl Snail.
- v) **Habitats.** The survey area itself comprises a number of different habitats, primarily comprising former industrial land in the north and south, and an area of fenland in the centre and east. Woody vegetation including wet and dry woodland, scrub, scattered trees, and Bramble thickets, is present in various locations across the survey area. In addition, relatively small areas of species-poor neutral grassland and tall ruderal vegetation are present in parts of the survey area. The River Wensum lies immediately adjacent to the north of the survey area, while the River Yare adjoins parts of the boundaries and intersects the survey area. Priority Habitats recorded within or adjacent to the survey area include lowland fen irreplaceable habitat, wet woodland, and the River Yare.
- vi) **Protected Species.** The survey area has potential to support roosting bats within trees and built structures. The breeding bird and invertebrate interest of the survey area is focused on the fen and associated wetland habitats. Bird species recorded within the survey area include the Schedule 1 species Cetti's Warbler and the RSPB red-listed species Grasshopper Warbler and Cuckoo. Invertebrate species include Desmoulin's Whorl Snail and 17 Priority Species, one Nationally Rare RDB3 species (a moth associated with reedbeds), and 14 Nationally Notable species. Grass Snake has been recorded within the grassland and fen within the survey area. The River Yare along the eastern boundary has potential to support Water Vole and Otter, although these species have not been recorded within the survey area.

# 1 Introduction

## 1.1 Background and Proposals

- 1.1.1 Aspect Ecology was commissioned by Serruys Property Company Ltd in August 2022 to undertake an update baseline Ecological Appraisal in respect of land at Deal Ground and May Gurney, Norwich, centred at grid reference TG 247 074 (see red line boundary on Plan 6592/ECO1). The proposed development site lies within a larger landholding which notably includes an area of fen to the east (see blue line boundary on Plan 6592/ECO1). This wider boundary represents the area of ecology survey work, and is hereafter referred to as the 'survey area'.
- 1.1.2 The survey area is split into two main parcels, comprising the larger 'Deal Ground' land to the north and west of the River Yare, and the 'May Gurney' land which lies to the south and east of the River Yare (see Plan 6592/ECO1).
- 1.1.3 The site is in receipt of outline planning permission (ref. 12/00875/O [Norwich City Council] and 2011/0152/O [South Norfolk Council]) for mixed development, including up to 670 residential dwellings, commercial uses, and landscaping and biodiversity enhancements.

## 1.2 Site Overview

- 1.2.1 The survey area is located in Trowse, south-east Norwich, within an urban-edge context. The survey area is bound by the River Wensum to the north, beyond which lies industrial and former industrial land within a railway depot. The River Yare intersects the survey area (separating the Deal Ground and May Gurney land) and runs adjacent to the east of the Deal Ground land, beyond which lies parkland (including Whitlingham Country Park) and low density residential development within the boundary of the Norfolk Broads Authority. An asphalt plant and railway line lies to the west of the survey area, with more dense development beyond this.
- 1.2.2 The survey area itself comprises a number of different habitats, primarily comprising former industrial land in the north and south, and an area of fenland in the east. Woody vegetation including wet and dry woodland, scrub, scattered trees, and Bramble thickets, is present in various locations across the survey area. In addition, relatively small areas of species-poor neutral grassland and tall ruderal vegetation are present in parts of the survey area.

## 1.3 Purpose of the Report

- 1.3.1 This report presents the findings of update ecology surveys undertaken to inform a reserved matters application. The report documents the methods and findings of the baseline ecology surveys and desktop study carried out in order to establish the existing ecological interest of the survey area. The importance of the habitats and species present is evaluated. A separate ES chapter presents an appraisal of the likely ecological effects of the proposals, along with mitigation, compensation and enhancement measures.

## 2 Methodology

### 2.1 Desktop Study

- 2.1.1 In order to compile background information on the site and its immediate surroundings, Norfolk Biodiversity Information Service (NBIS) was contacted in August 2022, with data requested on the basis of a search radius of 2km (see Plan 6592/ECO2). In addition, previous ecology reports for the survey area were reviewed, comprising ecological assessments undertaken in 2001<sup>1</sup>, 2003<sup>2</sup>, and 2008<sup>3</sup>.
- 2.1.2 Information on statutory designations was obtained from the online Multi-Agency Geographic Information for the Countryside (MAGIC) database, which utilises data provided by Natural England, with an extended search radius (25km). The MAGIC database was also searched to identify the known presence of any Priority Habitats within or adjacent the survey area.
- 2.1.3 In addition, the Woodland Trust database was searched for any records of ancient, veteran or notable trees within or adjacent to the survey area.

### 2.2 Habitat Survey

- 2.2.1 Previous surveys were undertaken by Aspect Ecology at the survey area in March 2008 and April to September 2009, to inform the outline planning application. Update survey work was undertaken at the Deal Ground land in August and September 2022, and of the May Gurney land in November 2022, in order to ascertain the general ecological value of the land contained within the boundaries of the survey area and to identify the main habitats and ecological features present.
- 2.2.2 The survey area was surveyed based on standard Phase 1 Habitat Survey methodology<sup>4</sup>, whereby the habitat types present are identified and mapped (see Plan 6592/ECO3), together with an assessment of the species composition of each habitat. This technique provides an inventory of the basic habitat types present and allows identification of areas of greater potential which require further survey. Any such areas identified can then be examined in more detail through Phase 2 surveys. This method was extended, in line with the Guidelines for Preliminary Ecological Appraisal<sup>5</sup> to record details on the actual or potential presence of any notable or protected species or habitats.
- 2.2.3 Using the above method, the survey area was classified into areas of similar botanical community types, with a representative species list compiled for each habitat identified. The nomenclature used for plant species is based on the Botanical Society for the British Isles (BSBI) Checklist.

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<sup>1</sup> Norfolk Wildlife Services (2001) *Background ecological assessment of Deal Land and implications for future development guidelines.*

<sup>2</sup> The Environment Practice (2003) *Deal Ground, Norwich: Ecological Survey & Assessment*

<sup>3</sup> Mott MacDonald (2008) *NCC Deal and Utilities: Ecological Review.*

<sup>4</sup> Joint Nature Conservation Committee (2010, as amended) *'Handbook for Phase 1 habitat survey: A technique for environmental audit.'*

<sup>5</sup> Chartered Institute for Ecology and Environmental Management (CIEEM) (2013) *'Guidelines for Preliminary Ecological Appraisal.'*

## 2.3 Plant Community Survey

- 2.3.1 To further evaluate the ecological value of the fen habitat within the Deal Ground land, and to evaluate changes since the previous survey work in 2009, update plant community survey work was carried out in August and September 2022. The survey was carried out in accordance with the National Vegetation Classification (NVC) methodology, as set out in the NVC Users' Handbook<sup>6</sup>.
- 2.3.2 Four categories of homogenous fen vegetation were identified within the Deal Ground land. Each of these was sampled using between five and ten quadrats, giving a total of 27 quadrats (see Plan 6592/ECO4). The quadrats were placed in areas of homogenous, representative vegetation.
- 2.3.3 Each quadrat measured 4x4 m, which is the appropriate size for tall herbaceous vegetation (according to the NVC Users' Handbook). Within each quadrat, the percentage cover of all plant species was recorded, with Domin scores of 1-3 used where cover was less than 4%. The height of the sward was recorded along with a 10-figure grid reference using a GPS smartphone app. The NVC survey was undertaken by an ecologist with over ten years of botanical survey experience, including NVC surveys of various habitats throughout the UK.
- 2.3.4 The quadrat data was analysed and interpreted using a combination of experience and the published keys and community descriptions<sup>7</sup>. The data was also analysed using the Modular Analysis of Vegetation Information System software (MAVIS version 1.04). MAVIS results were interpreted with caution and used only as an aid to identification<sup>8</sup>.

## 2.4 Faunal Surveys

- 2.4.1 Previously, survey work has been undertaken at the survey area in 2009 and 2010 for bats, Badger *Meles meles*, Water Vole *Arvicola amphibius*, Otter *Lutra lutra*, breeding birds, Great Crested Newt *Triturus cristatus*, reptiles, and invertebrates.
- 2.4.2 During the update survey work in 2022, a habitat assessment was undertaken for the above groups to evaluate any change in habitat conditions since the previous surveys. General faunal activity, such as mammals or birds observed visually or by call during the course of the update surveys was recorded. Specific update surveys were undertaken for bats, Badger, and Desmoulin's Whorl Snail *Vertigo moulinsiana*, as described below.
- 2.4.3 Further to this, update Phase 2 survey work for bats (activity survey comprising walked transects and static detectors), Badger, Water Vole, Otter, reptiles, and breeding birds, is being undertaken in 2023. The results of these surveys will be reviewed separately when available.

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<sup>6</sup> Rodwell JS (2006) *National Vegetation Classification: Users' Handbook*. Joint Nature Conservation Committee, Peterborough

<sup>7</sup> Rodwell JS (ed.) (1995) *British Plant Communities Volume 4: Aquatic communities, swamps and tall-herb fens*. Cambridge University Press.

<sup>8</sup> The limitations of NVC analysis software are described in the NVC Users' Handbook (Rodwell 2006), for example, "they are no substitute for the experience of the ecologist and should never be used alone to provide identifications. Like written keys, they are simply a guide to negotiating a way around a complex classificatory landscape and to understanding variation that, in reality, is extremely complex." (p.48)



## Bats<sup>9</sup>

### *Visual Inspection Surveys*

- 2.4.4 **Buildings.** Buildings and other structures within the survey area were subject to specific internal and external inspection surveys using ladders, torches and binoculars where necessary, during the update Phase 1 habitat surveys in 2022.
- 2.4.5 During the external inspections, particular attention was given to any potential roost features or access points, such as broken or lifted roof tiles, lifted lead flashing, soffit boxes, weatherboarding, hanging tiles, etc. and for any external signs of use by bats such as accumulations of bat droppings or staining. Binoculars were used to inspect any inaccessible areas more closely where appropriate.
- 2.4.6 During the internal inspections, evidence for the presence of bats was searched for with particular attention paid to any loft voids and relevant potential roost features and locations, such as ridge boards, rafters, purlins, gable walls, and mortise joints. Specific searches were made for bat droppings that can indicate present or past use and extent of use, whilst other signs that can indicate the possible presence of bats were also searched for, e.g. presence of stained areas, feeding remains, corpses, etc.
- 2.4.7 **Trees.** During the update Phase 1 surveys in 2022, trees were assessed for their suitability to support roosting bats based on the presence of features such as holes, cracks, splits or loose bark. Suitability for roosting bats was rated based on relevant guidance<sup>10</sup> as:
- Negligible;
  - Low;
  - Moderate; or
  - High.
- 2.4.8 Any potential roost features identified were also inspected for any signs indicating possible use by bats, e.g. staining, scratch marks, bat droppings, etc.

## Badger (*Meles meles*)<sup>11</sup>

- 2.4.9 A detailed Badger survey was carried out during the update Phase 1 habitat surveys in 2022. The survey comprised two main elements. The first element involved searching for evidence of Badger setts. The second element involved searching for signs of Badger activity such as well-worn paths and push-throughs, snagged hair, footprints, latrines and foraging signs, so as to build up a picture of any use of the survey area by Badger.

## Desmoulin's Whorl Snail

- 2.4.10 Wetland habitats within the Deal Ground land were surveyed by specialists in this species from Abrehart Ecology in October 2022, to provide information on the population and distribution of the species, including its finer scale distribution.

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<sup>9</sup> Surveys based on: English Nature (2004) '*Bat Mitigation Guidelines*' and Collins, J. (ed.) (2016) '*Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3<sup>rd</sup> edn).' Bat Conservation Trust

<sup>10</sup> Collins, J. (ed.) (2016) '*Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3<sup>rd</sup> edn).' Bat Conservation Trust

<sup>11</sup> Based on: Mammal Society (1989) '*Occasional Publication No. 9 – Surveying Badgers*'

2.4.11 Survey methodology broadly followed the 'level 1' survey techniques detailed in Killeen & Moorkens (2003)<sup>12</sup>. Consequently, searches for Desmoulin's Whorl Snail were carried out by the well-established technique of beating herbaceous fen vegetation onto a gridded white plastic tray. Specifically, the survey comprised the following methods:

- Tray beating, undertaken in damp weather conditions. A gridded white beating tray measuring approximately 38cm x 54cm was used at selected locations. This allowed approximate Desmoulin's Whorl Snail numbers per unit area to be estimated (5 trays being approximately equivalent to 1m<sup>2</sup>). At each sample location the beating tray was placed at the base of a fresh, undisturbed area of vegetation. These samples were located within 5m of a single sampling point. All molluscs were recorded in the field with Desmoulin's Whorl Snail numbers counted in the field to record numbers of adult and juvenile. Survey stations were selected at approximate 5m distance from the previous point in a transect until the habitat had become obviously unsuitable. In areas of low or lying flat vegetation where beating was difficult, the vegetation was shaken over a sieve to try and release Desmoulin's Whorl Snail from the vegetation.
- Degree of ground moisture (using a version of the '5 Point Wetness scale') was recorded at all survey locations:
  1. Ground dry: Possibly with cracks, and no evidence of surface moisture;
  2. Ground damp: Moisture observed on the surface but water does not rise under light pressure;
  3. Ground wet: No surface veneer, but water rises under light (foot) pressure;
  4. Ground wet: Surface veneer of water less than 1-2cm deep;
  5. Ground very wet: Water depth greater than 2cm which may cover the sward and tussocks.
- Vegetation composition (via recording the abundance of plant species on a DAFOR scale).

## 2.5 Survey Constraints and Limitations

2.5.1 All of the species that occur in each habitat would not necessarily be detectable during survey work carried out at any given time of the year, since different species are apparent during different seasons. The Phase 1 habitat survey of the ecologically important habitats within the survey area was undertaken within the optimal season, therefore allowing a robust assessment of habitats and botanical interest across the survey area, and is further supported by previous ecology survey work.

2.5.2 Attention was paid to the presence of any invasive species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). However, the detectability of such species varies due to a number of factors, e.g. time of year, site management, etc., and hence the absence of invasive species in any part of the survey area should not be assumed.

2.5.3 Densely vegetated habitats within the survey area have the potential to reduce the detectability of field signs for faunal species such as Badger. Whilst dense scrub vegetation

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<sup>12</sup> Killeen IJ & Moorkens EA (2003). *Monitoring Desmoulin's Whorl Snail, Vertigo moulinsiana*. Conserving Natura 2000 Rivers Monitoring Series No. 6, English Nature, Peterborough.

is present within the survey area, it is considered that the survey results do provide an accurate baseline to assess the potential for impacts on Badger under the development proposals, particularly given that the results are supported by previous survey information.

- 2.5.4 The Desmoulin's Whorl Snail survey was carried out at an appropriate time of year. Sampling was limited to the southern, mid-reaches, and western areas of the fen due to the north-eastern areas being difficult to access, specifically a flooded ditch prevented crossing for extensive sampling in this section. However, the distribution of this species was strongly concentrated in the wetter south-centre part of the fen, such that this constraint is unlikely to significantly underestimate the population and distribution of this species within the survey area.

## 2.6 Ecological Evaluation Methodology

- 2.6.1 The evaluation of ecological features and resources is based on professional judgement whilst also drawing on the latest available industry guidance and research. The approach taken in this report is based on that described by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018)<sup>13</sup>, which involves identifying 'important ecological features' within a defined geographical context (i.e. international, national, regional, county, district, local or site importance). For full details refer to Annex 6592/1.

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<sup>13</sup> CIEEM (2018) 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine', ver. 1.2, Chartered Institute of Ecology and Environmental Management, Winchester

## 3 Ecological Designations

### 3.1 Statutory Designations

#### Description

- 3.1.1 The statutory designations of ecological importance that occur within the local area are shown on Plan 6592/ECO2. The nearest statutory designation to the survey area is Whitlingham Local Nature Reserve (LNR), located on the east side of parts of the River Yare where it abuts the survey area. The LNR is managed as a Country Park within the Broads Authority, supporting a variety of habitats including woodland, meadow, lakes and associated wetland habitat.
- 3.1.2 One biological SSSI lies within 5km of the survey area, comprising Sweetbriar Road Meadows, located approximately 4.1km north-west of the survey area. The SSSI is designated for its unimproved wet meadows with tall fen, which is subject to traditional grazing management. A number of geological SSSIs also lie within 5km of the survey area, the closest being around 1.7km north of the survey area.
- 3.1.3 The closest international designations to the survey area comprise The Broads Special Area of Conservation and Broadland Ramsar and Special Protection Area (SPA), which lie approximately 5.4 km east of the survey area. The SAC is designated for its wetland habitats and populations of Desmoulin's Whorl Snail, Ramshorn Snail *Anisus vorticulus*, and Fen Orchid *Liparis loeselii*, while Otter is present as a qualifying feature. Broadland SPA, which follows the same boundary as the SAC at this point, is designated for its populations of breeding and wintering wetland birds. The component SSSI of the SPA/SAC at the closest point to the survey area is Yare Broads and Marshes. The site lies within the nutrient neutrality catchment for Norfolk Broads Special Area of Conservation (SAC).
- 3.1.4 The River Wensum SAC lies approximately 5.4 km upstream (north-west) of the survey area. The SAC is designated for its vegetated watercourse habitat and its population of White-clawed Crayfish *Austropotamobius pallipes*. Other species present as qualifying features, but not primary reasons for selection, comprise Desmoulin's Whorl Snail, Brook Lamprey *Lampetra planeri*, and Bullhead *Cottus gobio*.
- 3.1.5 Further afield, European and international designations include Norfolk Valley Fens SAC, located 11.3km south-west of the survey area at its closest point, and Breydon Water SPA and Ramsar, located 18.7km east of the survey area.

### 3.2 Non-statutory Designations

#### Description

- 3.2.1 The non-statutory designations of nature conservation interest that occur within the local area are shown on Plan 6592/ECO2. A non-statutory County Wildlife Site, 'Carrow Abbey Marsh', occupies much of the Deal Ground land (see citation at Annex 6592/2). The boundary of the CWS provided by NBIS shows this to include dry woodland and other habitats e.g. in the north, however these areas are excluded from the boundary of the CWS shown on the Norwich City Council Local Plan<sup>14</sup> (see Annex 6592/3).
- 3.2.2 Carrow Abbey Marsh CWS is designated for its mosaic of tall fen and tall herb vegetation with young woodland and willow carr, and for the presence of Desmoulin's Whorl Snail

<sup>14</sup> <https://ncc.maps.arcgis.com/apps/webappviewer/index.html?id=7ff6d4cdf8ca4d70b50e935fec378e11>

which according to the citation occurs in some of the fen ditches. Update survey information in relation to the features is included in Section 4.

3.2.3 The next nearest CWS comprises Trowse Meadows CWS, which forms part of Whitlingham LNR (described above), designated for its mix of habitats including semi-improved grassland, marshy grassland, woodland, and swamp. Trowse Wood CWS lies adjacent to the east of this (c. 0.1 km east of the survey area), comprising a broadleaved woodland within the same LNR. A number of other CWS' are located in the wider area, including County Hall Woods which lies 0.4 km to the west of the survey area, comprising a belt of woodland, and Carey's Meadow CWS, located approximately 0.5 km to the north-east of the survey area, which is a former brownfield site that has been colonised with semi-natural vegetation including neutral grassland, inundated grassland, grassland with a calcareous influence, and scrub.

#### Assessment of Carrow Abbey Marsh Against CWS Criteria

3.2.4 According to Aspect Ecology's survey work in 2022, habitats within the NBIS CWS boundary largely comprise eutrophic floodplain fen, with substantial areas of wet and dry woodland, in addition to smaller areas of scrub and tall ruderal vegetation. Current CWS habitat selection criteria are set out within a 2016 document published by NBIS<sup>15</sup>. An assessment of the site's qualification under the CWS criteria, based on the 2022 survey information provided in Section 4, is set out in Table 3.1 below.

**Table 3.1.** Assessment of habitats within the CWS boundary under the 2016 CWS criteria. Further descriptions of each habitat are presented in Section 4.

Habitat	Selection criteria	Criterion met?	Habitat justifies inclusion within CWS?
Fen	1. Single species swamp dominated by typical swamp species	Mostly yes, save for F13 and F14 in the south	Mostly yes: criterion 4 met with criterion 1, 2 and/or 5.  Parts in the south (F13 and F14) do not presently qualify but have potential for restoration
	2. Tall fen with typical species, not dominated indicators of drying	Mostly yes, save for F13 and F14 in the south	
	3. Significant population or combination of rare, scarce or priority plant species	No	
	4. Size at least 0.5 ha	Yes	
	5. Presence of rare, scarce, or priority fauna	Yes, Desmoulin's Whorl Snail, albeit patchily distributed, plus other invertebrate and bird species (see Section 5)	
Tall ruderal vegetation	Not included as a CWS habitat	N/A	No
Dry woodland (W4, W7, W11)	1. Ancient semi-natural woodland	No	No
	2. Herb layer of native plants typical of semi-natural woodland	No	
	3. Presence of rare, scarce, or priority plant species	No	
	4. At least 2 ha in extent	No	
	5. Predominantly woody species native to Norfolk	No (non-natives are prevalent, especially Sycamore in W4 & W7)	

<sup>15</sup> 'Criteria for the selection of County Wildlife Sites in Norfolk (2016 Version)

	6. Diverse physical and age structure	No	
	7. Presence of rare, scarce or priority faunal species	Potentially Priority Species of invertebrates and birds	
Wet woodland (W6, W8, W9, W10, W11)	1. Ancient semi-natural woodland	No	Not currently (fails criterion 1 and 4), but potentially restorable to fen
	2. Herb layer of native plants typical of semi-natural woodland	Yes	
	3. Presence of rare, scarce, or priority plant species	No	
	4. At least 2 ha in extent	No	
	5. Predominantly woody species native to Norfolk	Yes	
	6. Diverse physical and age structure	No	
	7. Presence of rare, scarce or priority faunal species	Potentially Priority Species of invertebrates and birds	
Scrub (S2-S6 plus Bramble scrub)	1. Part of, or adjacent to, another CWS habitat	Yes – adjacent to fen	Yes, only scrub S3 to S6
	2. More than 2 ha	No	
	3. At least three species of native shrub	Yes, except for S2 which is dominated by non-native species and Bramble scrub	
	4. Presence of rare or scarce fauna	Potentially Priority Species of invertebrates and birds	
Grassland (NG4)	1-4. Appropriately species-rich acid, neutral, basic, or wet grassland	No	No
	5. Significant rare, scarce, or priority plant species	No	
	6. Moderately species-rich, adjacent to another CWS habitat or extensive	No	
	7. >0.5 ha for species-rich, or >5 ha for moderately species-rich	No	
	8. Presence of rare, scarce, or priority fauna	Potentially Priority Species of invertebrates	
Riverine habitat	1. Appropriately species-rich marginal and riverine flora	No	No – fails essential criterion 1
Habitat mosaics	1. Individual habitats do not meet size criteria	No – fen habitat does meet size criteria individually	No

3.2.5 The above table indicates that the majority of the fen habitat and associated scrub within the CWS boundary is considered to warrant CWS status, while the wet woodland has potential to be restored to CWS-quality habitat. However, the tall ruderal vegetation along the eastern margin of the CWS, the dry woodland (W4, W7 and W11) particularly in the north of the CWS (according to the NBIS boundary), and the dry grassland (NG4), do not justify inclusion within the CWS.

3.2.6 On the basis of this review, the CWS boundary shown in the Norwich City Council Local Plan (see Annex 6592/3), represents the most relevant for assessment purposes. This boundary was also used for the assessment in the outline planning permission.

### 3.3 **Priority Habitats, Ancient Woodland (and other irreplaceable habitat) and Notable Trees**

#### Description

- 3.3.1 Three Priority Habitat types are mapped by the MAGIC database within the survey area. These comprise (i) lowland fen (added to the National Policy Planning Framework as an irreplaceable habitat in 2018), which occupies much of the area designated as Carrow Abbey Marsh CWS, (ii) deciduous woodland, woodland W4 and tree cover along the River Yare in the east of the Deal Ground land, and (iii) open mosaic habitat, which occupies areas covered by grassland and scrub in the west of the Deal Ground land. These are described further in the relevant habitat sections below.
- 3.3.2 No ancient woodland is present within or in close proximity to the survey area. There are no records of any notable or veteran trees within or adjacent to the survey area.

## 4 Habitats and Ecological Features

### 4.1 Background Records

4.1.1 Information received from NBIS included two records of Pointed Stonewort *Nitella mucronata* adjacent to the survey area, most recently recorded in 2009. Although the grid references refer to the River Wensum adjacent to the north of the survey area, the location details state 'River Yare'. This is an aquatic species which is Nationally Scarce.

4.1.2 In addition, previous surveys of the survey area in 2000 and 2003 recorded Bee Orchid *Ophrys apifera* and Hoary Mullein *Verbascum pulverulentum* in the northern area of grassland (NG1). Hoary Mullein was also recorded in tall ruderal vegetation in 2009. Bee Orchid is somewhat local in its distribution but has no formal conservation designation, while Hoary Mullein is Nationally Scarce. These species were not rerecorded in 2022, although Hoary Mullein could have been overlooked in the tall ruderal vegetation, where the similar species Great Mullein *Verbascum thapsus* occurred frequently.

### 4.2 Overview

4.2.1 The habitats and ecological features present within the survey area are described below and evaluated in terms of whether they constitute an important ecological feature and their level of importance, taking into account the status of habitat types and the presence of rare plant communities or individual plant species of elevated interest. The likely effects of the proposals on the habitats and ecological features are then assessed. The value of habitats for the fauna they may support is considered separately in Chapter 5 below.

4.2.2 The following habitats/ecological features were identified within or adjacent to the survey area:

- Eutrophic floodplain fen;
- Species-poor neutral grassland;
- Tall ruderal vegetation;
- Dry woodland;
- Wet woodland;
- Scrub and Bramble;
- Tree lines;
- Scattered trees and shrubs;
- Rivers and banks;
- Ephemeral pond;
- Colonising vegetation on previously developed land;
- Amenity planting;
- Hardstanding;
- Buildings and structures;
- Invasive species.



- 4.2.3 In addition, a number of invasive plant species and species of conservation importance were recorded within the survey area. The locations of these habitat types and features are illustrated on Plan 6592/ECO3 and described further below.

### 4.3 Priority Habitats

- 4.3.1 Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006 places duties on public bodies to have regard to the conservation of biodiversity in the exercise of their normal functions. In particular, Section 41 of the NERC Act requires the Secretary of State to publish a list of habitats which are of principal importance for conservation in England. This list is largely derived from the 'Priority Habitats' listed under the former UK Biodiversity Action Plan (BAP), which continue to be regarded as priority habitats under the subsequent country-level biodiversity strategies.
- 4.3.2 Of the habitats within the survey area, the eutrophic floodplain fen, wet woodland, and River Yare are considered to qualify as Priority Habitats and therefore constitute important ecological features. This is discussed further in the relevant habitat sections below.
- 4.3.3 At the local level, the Norfolk Biodiversity Partnership has produced Habitat Action Plans for Priority Habitats represented in the county, including fens and wet woodland. These are referred to in the relevant sections below.

### 4.4 Eutrophic Floodplain Fen

#### Description

- 4.4.1 An area of fen intersected with a drainage ditch system, which forms the majority of Carrow Abbey Marsh CWS, is located in the centre and east of the Deal Ground land, while two very small areas were recorded at the margins of the May Gurney land.
- 4.4.2 The fen habitat is somewhat variable in its vegetation types, the majority being dominated by Greater Pond Sedge *Carex riparia* (see Photograph 1), while Reed Sweet-grass *Glyceria maxima*, Reed Canary-grass *Phalaris arundinacea* and Common Reed *Phragmites australis* are locally dominant. At the southern end, the fen becomes drier and transitions into tall ruderal vegetation (see Photograph 2). The vegetation is consistently tall and dense, with no evidence of recent management or access, albeit small deer (Muntjac *Muntiacus reevesi* or Chinese Water Deer *Hydropotes inermis*) were noted which cause some very small-scale and localised disturbance. The fen has been broadly categorised into 17 compartments, which are described in turn below, albeit the transitions between these compartments is typically gradual and indistinct.
- 4.4.3 **F1** is dominated by dense Greater Pond-sedge with frequent Hemp-agrimony *Eupatorium cannabinum*. Other species noted in this area include Tufted Vetch *Vicia cracca*, Wild Angelica *Angelica sylvestris*, Creeping Thistle *Cirsium arvense*, Common Nettle *Urtica dioica*, Marsh Woundwort *Stachys palustris*, Amphibious Bistort *Persicaria amphibia*, Orange Balsam *Impatiens capensis*, Meadowsweet *Filipendula ulmaria*, Great Willowherb *Epilobium hirsutum*, Common Skullcap *Scutellaria galericulata*, Water Mint *Mentha aquatica*, and Hop *Humulus lupulus*.
- 4.4.4 **F2** is dominated by Reed Canary-grass, but otherwise supports similar species to F1, with a somewhat higher localised prevalence of Creeping Thistle.

- 4.4.5 **F3** is again dominated by Greater Pond-sedge and supports a number of additional species including Green Figwort *Scrophularia nodosa* (in the north), Purple Loosestrife *Lythrum salicaria*, and Common Meadow-rue *Thalictrum flavum*.
- 4.4.6 **F4** supports dominant Greater Pond-sedge but with a greater tall ruderal component, particularly Common Nettle which is locally abundant, in addition to Hemp-agrimony, Creeping Thistle, Hedge Bindweed *Calystegia sepium*, Orange Balsam, Meadowsweet, Common Meadow-rue, and Water Forget-me-not *Myosotis scorpioides*.
- 4.4.7 **F5** is dominated by Reed Sweet-grass in a notably wetter community which includes Amphibious Bistort, Marsh Woundwort, Meadowsweet, and Gypsywort *Lycopus europaeus*. Common Nettle and Reed Canary-grass are locally abundant in the east.
- 4.4.8 **F6** is an extensive, very tall and dense area dominated by Greater Pond-sedge, with Amphibious Bistort, Great Willowherb, Marsh Woundwort, Common Nettle, Hemp-agrimony, Creeping Thistle, and Common Meadow-rue. Reed Canary-grass and Reed Sweet-grass are locally frequent. The dominance of Greater Pond-sedge is somewhat reduced to the east, where the sward is slightly more open with greater species diversity.
- 4.4.9 **F7** is dominated by dense Common Reed with locally frequent Reed Canary-grass and Greater Pond-sedge. Other species in this area include Orange Balsam, Hop, Water Mint, Common Nettle, Amphibious Bistort, Marsh Woundwort, Hemp-agrimony, Common Skullcap, Gypsywort, and Meadowsweet.
- 4.4.10 **F8** comprises a small area dominated by Greater Pond-sedge, with Common Valerian *Valeriana officinalis*, Hemp-agrimony, Purple Loosestrife, and Marsh Woundwort.
- 4.4.11 **F9** is another small area, dominated by Reed Sweet-grass with abundant Greater Pond-sedge, in addition to other species as recorded in F8.
- 4.4.12 **F10** is a small area in the west of the fen which supports dominant Wood Small-reed *Calamagrostis epigejos* with Creeping Cinquefoil *Potentilla reptans*, Water Mint, Common Nettle, Bramble *Rubus fruticosus* agg., Creeping Thistle, Hemp-agrimony, and Jointed Rush *Juncus articulatus*.
- 4.4.13 **F11** is a small area of dominant Reed Sweet-grass which supports a relatively diverse range of herbaceous species, including frequent Water Mint, in addition to Amphibious Bistort, Hemp-agrimony, Creeping Thistle, Marsh Horsetail *Equisetum palustre*, and Jointed Rush.
- 4.4.14 **F12** comprises a relatively large area in the south of the fen, dominated by Greater Pond-sedge which reaches a comparatively lower sward height of approximately 1 m, in a more diverse sward with locally abundant Marsh Woundwort, Hemp-agrimony, and Reed Canary-grass. Other species include Amphibious Bistort, Common Meadow-rue, Creeping Thistle, Wild Angelica, Hedge Bindweed, Hop, Jointed Rush, Soft Rush *Juncus effusus*, and Hairy Sedge *Carex hirta*.
- 4.4.15 **F13** comprises a small area of fen - tall ruderal transition vegetation dominated by Creeping Thistle with abundant Greater Pond-sedge and Hemp-agrimony. Other species recorded here include Marsh Woundwort, Common Nettle, Wild Angelica, and Marsh Horsetail.
- 4.4.16 **F14** is dominated by Wild Angelica to approximately 1 m height, in addition to Creeping Thistle, Common Nettle, Green Figwort, Water Mint, Common Couch *Elymus repens*, and False Oat-grass *Arrhenatherum elatius*.

- 4.4.17 **F15** comprises a small riparian area in the south-west of the fen, on very damp ground which is likely to be inundated by the adjacent River Yare for parts of the year. Common Reed is dominant with locally abundant Common Nettle in a species-poor sward, in addition to Himalayan Balsam *Impatiens glandulifera*, Orange Balsam, and Hedge Bindweed.
- 4.4.18 **F16** comprises a small area adjoining the northern boundary of the May Gurney land, along the River Yare. This area is dominated by Reed Sweet-grass.
- 4.4.19 **F17** lies offsite to the south-east of the May Gurney land, comprising a back channel supporting a dense stand of Greater Pond-sedge.
- 4.4.20 The **ditches** are similarly dominated by Greater Pond-sedge but support a number of species which are otherwise restricted in the fen, including Water Dock *Rumex hydrolapathum*, Bulrush *Typha latifolia*, Purple Loosestrife, Bittersweet *Solanum dulcamara*, and Gypsywort.

#### NVC Survey Results

- 4.4.21 The eutrophic floodplain fen habitat within the survey area is considered to represent a mosaic of four swamp and fen NVC communities, which are described in turn below. The NVC manual specifically highlights that these communities frequently occur as patchy mosaics<sup>16</sup>. This was reflected during the 2022 survey, where the communities occurred as mosaics with intermediate and transition stages frequently encountered. Nevertheless, an attempt has been made to partition the fen into NVC community types. Quadrat data, including percentages of each species recorded, grid references, sward height, and Ellenberg wetness values, are provided in Annex 6592/4. MAVIS output for the quadrats is presented at Annex 6592/5.
- 4.4.22 **S5 *Glyceria maxima* swamp**: this community is characterised by dense and tall cover of Reed Sweet-grass, and was somewhat scarcely represented, being confined to F5, F9 and F11. Coverage of Reed Sweet-grass in the five quadrats recorded in this community was at least 85%. Meadowsweet was the next most frequent species, recorded in three of the five quadrats at low abundance (10% or less). Few other species were recorded in these quadrats (range of species richness 5 to 7). This community was associated with the wettest parts of the fen, with Ellenberg wetness values of 9.6 to 9.9. MAVIS analysis of the quadrat data strongly supported their identification as S5, with a score of 64.79% for this community.
- 4.4.23 **S6 *Carex riparia* swamp**: This community is characterised by an overwhelming dominance of Greater Pond-sedge. This was the most widespread community recorded in the fen, and included areas F1, F3, F4, F6, F8 and F12. The dominance of Greater Pond-sedge was somewhat variable in the 10 quadrats recorded in this community, ranging from 60% in F12 and the eastern part of F6, to 90% in F3 and the western part of F6. Other frequently recorded species in these quadrats, albeit at a lower abundance, included Amphibious Bistort, Marsh Woundwort (both recorded in 8 of 10 quadrats), Hemp-agrimony, and Meadowsweet (both in 7 of 10 quadrats). Species richness was generally low but somewhat variable, ranging from 4 species (in the west of F6) to 9 species (in the east of F6) per quadrat. This community was associated with drier parts of the fen, with Ellenberg values of 7.4 to 8.4. Analysis of quadrat data using MAVIS strongly supported the classification as S6, with a score of 53.97%.

<sup>16</sup> Rodwell, JS (ed.) (1995) British Plant Communities Volume 4: Aquatic communities, swamps and tall-herb fens. Cambridge University Press.

- 4.4.24 **S26 *Phragmites australis-Urtica dioica* tall-herb fen:** Typically, Common Reed and Common Nettle are characteristically prominent in this community, along with other tall herb species in a patchier sward. Within the survey area, this community was represented by F7 and F15. Specifically, the *Epilobium hirsutum* sub-community S26d is considered to be most closely represented within the survey area, because this sub-community has dominant patches of Reed Sweet-grass and Greater Pond-sedge, with herb species including Great Willowherb and Bittersweet. Parts of the fen also show some affinity to the *Filipendula ulmaria* 26a sub-community, given the prevalence of Meadowsweet, albeit at low abundance, and local frequency of Hemp-agrimony.
- 4.4.25 In the six quadrats recorded in this community, Common Reed varied from 60% coverage in F15, to 95% coverage in F7. Amphibious Bistort was the next most frequent species, recorded in four of the six quadrats, while Common Nettle was recorded in two of the six quadrats, one of which was at 40% coverage (in F15). The quadrats were notably species-poor, with a range of three to five species recorded per quadrat. This community was associated with wetter parts of the fen, with Ellenberg values ranging from 8.4 to 9.8. MAVIS analysis of the quadrat data returned a highest score for S26 (51.99%), closely followed by S4 (51.84%). The latter is the *Phragmites australis* swamp and reed-beds community, characterised by overwhelming dominance of Common Reed. In places (e.g. parts of F7 where Common Reed is heavily dominant), the vegetation is indeed tending towards the S4 community.
- 4.4.26 **S28 *Phalaris arundinacea* tall-herb fen:** this community is typically dominated by Reed Canary-grass, and was relatively scarcely represented within the survey area, primarily by area F2. This area shows some affinity to the *Epilobium hirsutum-Urtica dioica* S28b sub-community, given the occurrence of Great Willowherb and Common Nettle.
- 4.4.27 Reed Canary-grass was strongly dominant in all five quadrats representative of this community, with at least 70% quadrat coverage. Two other species were recorded in all five quadrats, namely Greater Pond-sedge (5-20% abundance) and Amphibious Bistort (5-10% abundance). Marsh Woundwort was recorded at low abundance in four of the five quadrats. Species richness in these quadrats was somewhat variable, ranging from 4 to 8 species per quadrat. This community was associated with a similar level of wetness to the S6 community, with Ellenberg values between 8.0 and 8.2. Analysis of the quadrat data using MAVIS produced highest scores for S6 (50.08%), closely followed by S28 and S28b (48.35%, 45.45%), indicating the complex intermediate nature of the communities.
- 4.4.28 **Other communities.** At the margins of the fen, particularly in F13 and F14, the fen transitions into tall ruderal vegetation and does not readily classify as any NVC community. This is supported by the MAVIS analysis of quadrat Q17 (in fen area F13), where all matches were less than 35%, with a mix of open vegetation and swamp communities returned. This indicates the transition of these areas from swamp vegetation to tall ruderal communities as the fen dries. In addition, area F10 was distinct in character compared with the remainder of the fen, comprising a drier area with dominant Wood Small-reed. This area does not readily classify as any NVC community.

#### Summary of Habitat Changes Since 2009

- 4.4.29 In general the dominance of Reed Sweet-grass appears to have declined since the previous survey work, replaced by an increased dominance of Greater Pond-sedge. This could reflect a gradual drying of the fen, given that the latter species and its principal plant communities are associated with somewhat lower water levels. This is unsurprising given the lack of management and the consequent build-up of vegetation detritus at ground level. In addition, the area of fen habitat has slightly declined as a result of woodland and scrub

encroachment, particularly at the margins of the fen, again a consequence of the lack of management.

- 4.4.30 In terms of NVC communities, although the four communities identified above were recognised as part of the mosaic of communities during the previous survey, much of the fen was previously attributed to the S24b *Phragmites australis* – *Peucedanum palustre* tall-herb fen community, which is a somewhat richer community. However, the previous survey report does note that the fen habitats “represent a rather intermediate phase between these two community types [S24b and S26d] and choosing between the two may be rather arbitrary.” The NVC key to fen communities specifically highlights the difficulty in separating S24 and S26 along the Yare Valley, but notes that the frequency of Common Meadow-rue and Marsh Pea *Lathyrus palustris* is usually diagnostic. In this case, Marsh Pea was not recorded at all, while Common Meadow-rue was only recorded in four of 27 quadrats across the fen, all with an abundance of 5% or less. By contrast, Common Meadow-rue was previously noted to be locally common in the fen during the 2009 surveys. Furthermore, in 2022 the S24 community was not returned in the top 10 matches for any of the communities, nor all quadrats combined, according to MAVIS. As such, the latest survey results demonstrate that the fen habitat is not currently a good match for S24, which indicates a degradation in floristic diversity in the absence of management.

#### Evaluation

- 4.4.31 The habitat conforms to the Priority Habitat ‘lowland fens’. In the national context, the NVC communities represented are widely distributed across the lowlands, and are well represented in the Norfolk Broads, particularly in eutrophic conditions with seasonal waterlogging. The principal fen communities present at the survey area are typical of the Norfolk Broads and are well represented in the local area. Fen habitat has declined substantially on a national level, with Norfolk now a major stronghold for the habitat type, supporting approximately 5,000 ha<sup>17</sup>.
- 4.4.32 The fen habitat appears to be well-established feature and likely formed productive grazing marsh historically, when it would have been subject to regular management. Nevertheless, with the cessation of management in recent decades, it appears likely that the habitat has degraded, possibly exacerbated by the input of industrial effluent from past industrial activities at the survey area, in the form of the Coleman’s Factory previously located to the northwest and also the build-up of organic matter. Nevertheless, the fen habitat represents a semi-natural habitat community that reflects the eutrophic substrate, typical of the Yare Valley. Also in keeping with other Yare valley fens, the fen is relatively dry in nature and has established over a relatively low water table level, but appears to be slowly drying out, as discussed above. In addition, its hydrological connection to the River Yare is somewhat interrupted by the banks of the Yare, which are raised above the fen according to Lidar data and also evidenced by the drier tall ruderal vegetation with mature trees.
- 4.4.33 As with most fen habitats, and especially those which are drier in nature, there is a constant threat of eventual succession into scrub and woodland in the absence of management. This threat is specifically stated in the UK and Norfolk Habitat Action Plans for lowland fen<sup>18,19</sup>. The threat of drying in the absence of management is clearly indicated by the trends towards drier plant communities and the noticeably higher cover of Willow scrub and woodland, particularly at the margins, compared with 2009. Nevertheless, this encroachment is occurring slowly, and much of the central parts of the fen remain

<sup>17</sup> <https://www.norfolkbiobiodiversity.org/assets/Uploads/Fens-HAP3.pdf>

<sup>18</sup> <https://webarchive.nationalarchives.gov.uk/ukgwa/20110303150139/http://www.ukbap.org.uk/UKPlans.aspx?ID=18>

<sup>19</sup> <https://www.norfolkbiobiodiversity.org/assets/Uploads/Fens-HAP3.pdf>

unaffected even by scattered scrub. It is however possible that this process could accelerate as the colonising scrub and woodland begins to take up more water and deposit more organic matter.

- 4.4.34 Overall, on the basis of the habitat's qualification as a CWS, supporting a Priority Habitat albeit in deteriorating condition, this habitat is considered to be an important ecological feature, of value at the county level.

## 4.5 Species-poor Neutral Grassland

### Description

- 4.5.1 Areas of neutral grassland were recorded on higher and drier ground towards the west of the Deal Ground land (see Photograph 3), and in the eastern part of the May Gurney land. These were compartmentalised into four areas, NG1-5 (see Plan 6592/ECO3), which are described in turn below.
- 4.5.2 **NG1** largely comprises a very short sward with patches of bare ground, apparently caused by heavy Rabbit grazing. However, some taller sward patches are present, in addition to scattered Bramble with colonising scrub species including Buddleia *Buddleia davidii*, Sycamore *Acer pseudoplatanus*, Hawthorn *Crataegus monogyna*, and Silver Birch *Betula pendula*. The sward itself is dominated by Red Fescue *Festuca rubra*, in addition to Yorkshire-fog *Holcus lanatus*, Creeping Cinquefoil, Common Ragwort *Jacobaea vulgaris*, Wild Parsnip *Pastinaca sativa*, Creeping Thistle, Selfheal *Prunella vulgaris*, Yarrow *Achillea millefolium*, Common Centaury *Centaureum erythraea*, Jointed Rush, Common Prickly Sedge *Carex muricata* ssp. *lamprocarpa*, and Hairy Sedge. Bryophytes are locally abundant in the sward with occasional lichens.
- 4.5.3 **NG2** lies adjacent to the south of NG1, but grazing pressure is relaxed here such that the sward is, for the most part, much taller with a higher prevalence of encroaching Bramble and scrub with tall ruderal species such as Green Alkanet *Pentaglottis sempervirens*, Creeping Thistle, and Great Mullein. The grassland sward is dominated by False Oat-grass and Yorkshire-fog, with other species including Creeping Bent *Agrostis stolonifera*, Glaucous Sedge *Carex flacca*, and Ground-ivy *Glechoma hederacea*.
- 4.5.4 **NG3** is located in the south-western corner of the Deal Ground land, comprising a tall and dense grass-dominant sward, with False Oat-grass and Creeping Bent particularly prevalent, in addition to frequent Cock's-foot *Dactylis glomerata*. Other species recorded here included Ribwort Plantain *Plantago lanceolata*, Creeping Cinquefoil, Perforate St John's-wort *Hypericum perforatum*, and Black Medick *Medicago lupulina*. Some encroaching Hawthorn, Bramble, and Ivy *Hedera helix* was also noted.
- 4.5.5 **NG4** lies adjacent to the north of NG3, occupying a larger area with a more variable sward structure apparently resulting from moderate levels of Rabbit grazing. Red Fescue is dominant in this area, while local damp patches support Jointed Rush. The species composition is otherwise similar to NG3, in addition to Yarrow, Creeping Thistle, Common Ragwort, Glaucous Sedge, and Wood Small-reed.
- 4.5.6 **NG5** is located in the east of the May Gurney land. The sward is variable in nature, ranging from apparently recently established and relatively open short sward grassland to rank grassland largely comprising coarse grasses and robust herb species. This variation, together with the continued presence of numerous ruderal species reflecting earlier successional stages, combines to give a relatively long list of recorded species. However, in any one location the diversity of the sward was recorded to be low to moderate, with approximately

nine species per square metre. The grass species recorded include Cock's-foot *Dactylis glomerata*, Yorkshire Fog, False Oat-grass, Barren Brome *Anisantha sterilis*, Perennial Ryegrass *Lolium perenne*, Red Fescue, Creeping Bent, Tall Fescue *Festuca arundinacea*, Soft Brome *Bromus hordeaceus* and Wood Small-reed. Herb species include Wild Carrot *Daucus carota*, Red Bartsia *Odontites vernus*, Common Ragwort, Red Clover *Trifolium pratense*, Ribbed Melilot, a Tare *Vicia* sp., Crane's-bill, Ribwort Plantain, Creeping Buttercup *Ranunculus repens*, Creeping Cinquefoil, Common Mallow *Malva sylvestris*, Teasel, Mugwort, Canadian Fleabane, Colt's-foot *Tussilago farfara*, Spear Thistle, Creeping Thistle, Black Knapweed *Centaurea nigra*, Yarrow (including cultivars), Hawkbit *Leontodon* sp., Hawkweed Oxtongue *Picris hieracioides*, Smooth Hawk's-beard *Crepis capillaris*, Germander Speedwell *Veronica chamaedrys* and Hemp-agrimony. Scrub, in the form of Bramble and young Buddleia, is scattered throughout most of this grassland area.

#### Summary of Habitat Changes Since 2009

- 4.5.7 The grassland in the Deal Ground land was noted to be similar in structure and species composition to the description in 2009, albeit its extent has reduced as a result of Bramble and scrub encroachment.
- 4.5.8 In the May Gurney land, the extent of grassland has increased since the 2009 survey work, expanding southwards into former developed land. The sward structure and composition remains similar to the previous description.

#### Evaluation

- 4.5.9 The habitat is not considered to represent Priority Habitat on account of its relatively low species diversity and scarcity of unimproved indicator species. Two notable plant species, namely Bee Orchid and Hoary Mullein, have previously been recorded from the grassland in 2000 and 2003, but were not rerecorded in 2009, nor during the current 2022 survey, probably because of heavy Rabbit grazing and/or scrub encroachment.
- 4.5.10 The grassland occupies areas mapped as the Priority Habitat 'Open Mosaic Habitat' on the MAGIC database. However, the grassland is not considered to currently qualify as this Priority Habitat, because it does not support any significant areas of unvegetated, loose bare substrate, which is required under the fourth criterion of the Priority Habitat definition.
- 4.5.11 Therefore, this habitat is not considered an important ecological feature.

## 4.6 Tall Ruderal Vegetation

#### Description

- 4.6.1 Tall ruderal vegetation was recorded at various locations across the survey area, particularly along the road which runs through the survey area and along the banks of the River Yare and River Wensum.
- 4.6.2 The tall ruderal vegetation recorded along the road within the survey area was noted to be dense and tall, typically dominated by Weld *Reseda luteola* with locally abundant Creeping Thistle and Creeping Bent. A number of other tall ruderal species were recorded, including Canadian Fleabane *Erigeron canadensis*, Broadleaved Dock *Rumex obtusifolius*, Perforate St John's-wort, Great Mullein, Common Nettle, and Green Alkanet. In addition, Bramble and Buddleia were noted to be encroaching in places.
- 4.6.3 A substantial area of tall ruderal vegetation was also recorded along the bank of the River Yare on the eastern margin of the survey area (see Photograph 4). Here, the vegetation was

dominated by Common Nettle, which was very dense in places but sparser under tree cover, with locally abundant Creeping Thistle in addition to Hemp-agrimony, Common Ragwort, Hedge Bindweed, Giant Hogweed *Heracleum mantegazzianum*, Bramble, and False Oat-grass.

- 4.6.4 A band of tall ruderal vegetation was also noted along part of the River Wensum banks in the north of the survey area, where Mugwort *Artemisia vulgaris* was dominant in addition to Great Mullein, Creeping Thistle, and Perforate St John's-wort.
- 4.6.5 A small area dominated by Common Nettle with colonising Sycamore was recorded on the west side of grassland NG1.

#### Summary of Habitat Changes Since 2009

- 4.6.6 The areas occupied by tall ruderal vegetation have substantially changed since the previous survey work, as a result of woodland regrowth in areas previously recorded as tall ruderal vegetation (e.g. W4), and colonisation of this habitat in other parts of the survey area. However, the species composition of the habitat remains similar to the previous descriptions.

#### Evaluation

- 4.6.7 This habitat does not represent any Priority Habitat type. The habitat has recently developed and supports a low to moderate range of common plant species. As such, the habitat is not considered to represent an important ecological feature.

## 4.7 Dry Woodland

#### Description

- 4.7.1 Five areas of dry woodland were recorded within the survey area, in addition to one recently felled woodland. These were typically young in nature and dominated by non-native tree species (see Photograph 5). The woodland areas are described in Table 4.1 below.

**Table 4.1.** Descriptions of dry woodland (for locations, see Plan 6592/ECO3).

Woodland	Structure	Woody species	Ground flora
W1	Semi-mature to mature, dense canopy structure over a sparse to moderate understorey and a moderate ground flora.	White Poplar <i>Populus alba</i> dominant with Pedunculate Oak <i>Quercus robur</i> , Ash <i>Fraxinus excelsior</i> , Sycamore, Goat Willow <i>Salix caprea</i> , Elder <i>Sambucus nigra</i> . Much Sycamore regeneration.	Dominated by ruderal species, especially Common Nettle, with Bramble, Spear Thistle <i>Cirsium vulgare</i> , Green Alkanet, Ground-ivy <i>Glechoma hederacea</i> .
W2	Recently felled woodland on made ground, now comprising 'previously developed land' (PDL8)		
W4	Young, dense canopy with little ground flora. Canopy largely continuous. Some dense impenetrable thickets of Buddleia and Common Nettle. Ride and glade present in south-west. Ground appears	Sycamore dominant, locally abundant Silver Birch, scattered mature Hybrid Black Poplar <i>Populus x canadensis</i> . Also Buddleia, White Willow <i>Salix alba</i> ,	Largely bare ground but frequent Common Nettle, sometimes forming dense stands. Also Ground-ivy, Herb-Robert <i>Geranium robertianum</i> , Sand Sedge <i>Carex arenaria</i> . Rides and



	to be previously developed with rubble piles.	Goat Willow, Hawthorn, Dog-rose <i>Rosa canina</i> agg..	glades are dominated by Creeping Bent. Localised stands of Japanese Knotweed <i>Reynoutria japonica</i> .
W5	Young, dense canopy with little ground flora	Sycamore dominant, plus Goat Willow, Crack Willow <i>Salix fragilis</i> , Elder, Wild Privet <i>Ligustrum vulgare</i> , Hawthorn, Buddleia.	Largely bare ground, occasional Bramble thickets, locally abundant Common Nettle, plus Green Alkanet, Ivy, Wood Avens <i>Geum urbanum</i> , Herb-Robert, Garlic Mustard <i>Alliaria petiolata</i> .
W7	Young, dense canopy on steep bank with much rubble and broken concrete. Ground flora largely bare.	Sycamore dominant with Goat Willow (locally dominant in east), Beech <i>Fagus sylvatica</i> , Buddleia, Hawthorn, Dog-rose.	Large bare ground, localised stands of Japanese Knotweed and Bramble.
W11	Mature but somewhat open canopy with moderate understorey and dense ground flora	Mix of Horse Chestnut <i>Aesculus hippocastanum</i> , White Willow, Silver Birch, Sycamore, Ash, Elder.	Dominated by Garlic Mustard and Common Nettle.

4.7.2 Subsequent update tree survey work in June 2023 has recorded that much of woodland W4 and a small part of woodland W1 have since been felled (see Plan 6592/ECO3).

#### Summary of Habitat Changes Since 2009

4.7.3 The 2022 survey work found that the extent of woodland had substantially increased since the previous survey, with many areas previously recorded as scattered trees and shrubs having since developed into woodland. One small area of woodland on previously developed land, W2, had since been felled. The structure and species composition of the remaining woodland W1 is similar to previously described. However, the update tree survey work in June 2023 identified that much of woodland W4 and a small part of woodland W1 have since been felled.

#### Evaluation

4.7.4 The dry woodland is not considered to represent UK Priority Habitat, because it is dominated by non-native species and does not represent a recognisable semi-natural NVC community type. The dry woodlands are comprised of a limited diversity of tree species, typically dominated by non-native species such as Sycamore. Much of the woodland appears to have colonised previously developed land. The woodlands are young in age and lack a complex structure, while woodland ground flora species are poorly represented and primarily limited to typical early colonists of secondary woodland. The habitat is therefore not considered to represent a feature of ecological importance.

## 4.8 Wet Woodland

### Description

- 4.8.1 Six areas of wet woodland were recorded within the survey area. These were all young in nature and dominated by Willow species, much of which has recently colonised historically open fen, which is reflected in the ground flora (see Photograph 6). The areas of wet woodland are described in Table 4.2 below.

**Table 4.2.** Descriptions of wet woodland (for locations, see Plan 6592/ECO3).

Woodland	Structure	Woody species	Ground flora
W3	Mature, very open canopy over a moderate ground flora. Almost devoid of any understorey layer.	White Willow dominant with Sycamore, Lombardy Poplar <i>Populus nigra 'italica'</i> , Weeping Willow <i>Salix babylonica</i> .	Dominated by ruderal species, especially Common Nettle, with Ground-ivy, Spear Thistle, Canadian Fleabane, Bramble.
W6	Dense, mature, continuous canopy over dense ground flora.	White Willow dominant with Sycamore.	Greater Pond-sedge dominant, plus Bramble.
W8	Mature canopy, somewhat open in places, over sparse understorey and dense ground flora.	White Willow dominant with Alder <i>Alnus glutinosa</i> , Hawthorn, Raspberry <i>Rubus idaeus</i> , Blackcurrant.	Greater Pond-sedge dominant with other fen species.
W9	Very dense, semi-mature to mature canopy over dense ground flora.	White Willow dominant with Sycamore, Hawthorn, Blackcurrant <i>Ribes nigrum</i> .	Greater Pond-sedge dominant with Reed Sweet-grass, Hemp-agrimony, Common Nettle, Bittersweet.
W10	Mature and dense canopy with shrubby expanding margins, dense ground flora.	White Willow dominant with Grey Willow <i>Salix cinerea</i> . Osier <i>Salix viminalis</i> dominant at the margins.	Greater Pond-sedge dominant with Hemp-agrimony.
W12	Moderately dense canopy with moderately dense understorey and margins, over dense and relatively diverse ground flora.	White Willow dominant with Sycamore, Silver Birch	Including Greater Pond-sedge, Hemp-agrimony, Jointed Rush, Water Mint

### Summary of Habitat Changes Since 2009

- 4.8.2 The extent of wet woodland has substantially increased since the previous survey, particularly around the margins of the fen.

### Evaluation

- 4.8.3 The habitat represents the UK Priority Habitat 'wet woodland'. The Norfolk BAP for wet woodland<sup>20</sup> notes that this habitat type is particularly well represented in East Anglia, and

<sup>20</sup> <https://www.norfolkbiobiodiversity.org/assets/Uploads/Wet-woodlands-HAP2.pdf>

its area is increasing in fenland because of the cessation of active management and degradation of open fen.

- 4.8.4 The wet woodlands were all dominated by White Willow, with a poor diversity of other species. The woodlands are young in age and lack a complex structure. The ground flora is dominated either by ruderal species (in the case of W1) or by fen vegetation, particularly Greater Pond-sedge. As such, although representing Priority Habitat, the woodland is a poor example of the habitat type. Nevertheless, its interest (except W1) is somewhat elevated by its association with adjacent fen habitat, while it has potential for restoration to fen habitat. The habitat is considered to represent a feature of ecological importance, and is of importance at the local level.

## 4.9 Scrub and Bramble

### Description

- 4.9.1 Areas of continuous scrub within the survey area can be broadly characterised into (i) Buddleia scrub with scattered young Sycamore and Bramble on drier ground adjacent to grassland, and (ii) Willow scrub within (or at the margins of) the fen. The latter areas include various Willow species, including Goat Willow, White Willow, Grey Willow, and Osier. The ground flora in these areas comprises bare ground where the canopy cover is dense, or otherwise fen vegetation dominated by Greater Pond-sedge. Further information on the areas of scrub within the survey area is set out at Table 4.3 below.

**Table 4.3.** Descriptions of scrub (for locations, see Plan 6592/ECO3).

Scrub	Woody species	Ground flora
S1	Buddleia dominant with abundant young Sycamore, plus Bramble, Snowberry <i>Symphoricarpos albus</i> , Goat Willow, Silver Birch	Negligible cover
S2		
S3	Very dense, impenetrable Goat Willow to 5 m high	Fen vegetation dominated by Greater Pond-sedge
S4	Very dense White Willow to 5 m high	
S5	Dense Grey Willow to 6 m high	Largely bare, occasional Greater Pond-sedge and Common Nettle
S6	Very dense, impenetrable Goat Willow to 5 m high	Some remnants of Common Reed, otherwise bare ground
S7	Bramble and Buddleia scrub	Negligible

- 4.9.2 In addition, dense Bramble thickets were recorded in the south-west of the Deal Ground land and in the May Gurney land, where they are encroaching into the adjacent grasslands (see Plan 6592/ECO3). Few other species were noted in these Bramble thickets, limited to scattered young to semi-mature trees, predominantly comprising Sycamore with Ash, Goat Willow, White Willow, and False Acacia *Robinia pseudoacacia*.

### Summary of Habitat Changes Since 2009

- 4.9.3 This habitat has expanded in area since the previous survey, particularly around the margins of the fen.

## Evaluation

- 4.9.4 Scrub does not represent Priority Habitat. The scrub habitat is species-poor, comprising species which are common in the local area. In places, the scrub habitat acts to form an ecotone of value to birds and invertebrates and may also have a buffering effect on the fen, while scrub habitat in the wetter parts of the fen has potential value in terms of restoration to fen. Nevertheless, at present the habitat is not considered to represent an important ecological feature.

## 4.10 Tree Lines

### Description

- 4.10.1 The 2022 survey work recorded a line of riverside trees along the western, northern and eastern boundaries of the May Gurney land, dominated by young to semi-mature Sycamore. Also recorded were rare to occasional Holly *Ilex aquifolium*, Alder *Alnus glutinosa*, Silver Birch *Betula pendula*, Ash *Fraxinus excelsior*, White Willow and a Poplar, probably Grey Poplar *Populus x canescens*. Ivy *Hedera helix* was frequent within the treeline and dense growth was present on three, relatively mature, trees on the riverbank adjacent to building B7. Also recorded were Common Nettle *Urtica dioica*, Cleavers, Nipplewort *Lapsana communis* and very occasional Angelica *Angelica sylvestris*. The tree line was widened somewhat at the northeastern corner of the May Gurney land, but covered too small an area to be considered as woodland.
- 4.10.2 Subsequent update tree survey work in June 2023 recorded that the tree line at the margin of the May Gurney site has since been felled.

### Summary of Habitat Changes Since 2009

- 4.10.3 The tree line adjacent to the River Yare was recorded to remain in a similar condition to 2009, although update tree survey work in June 2023 identified that this has since been felled.

### Evaluation

- 4.10.4 The tree line was dominated by non-native Sycamore and was therefore not considered to qualify as the Priority Habitat 'hedgerows'. A moderate mix of species was present, including some native species, but these were only occasional to rare and no very mature specimens were present. The ground flora was dominated by ruderal vegetation with little botanical interest. As such, this habitat was not (and is not) considered to represent an important ecological feature.

## 4.11 Scattered Trees and Shrubs

### Description

- 4.11.1 A number of scattered trees and shrubs are present throughout the Deal Ground land, particularly at the boundaries. These include mature Weeping Willows and Lombardy Poplars at the northern boundary of the survey area on the bank of the River Wensum. Along the eastern boundary, on the bank of the River Yare, scattered trees include semi-mature to mature specimens of White Willow, Sycamore, and Ash, in addition to scattered shrubs including Elder. Occasional trees and shrubs are present in drier parts of the fen, particularly towards the south, including Pedunculate Oak, Ash, Hawthorn, and

Blackcurrant. Scattered young trees and shrubs were also recorded along the western boundary of the survey area, primarily comprising Sycamore, Silver Birch, and Buddleia.

- 4.11.2 A line of 15 young to semi-mature Beech *Fagus sylvatica* was recorded to the east and south of building B10 in the May Gurney land. It is understood from tree survey work undertaken in June 2023 that these have since been felled.

#### Summary of Habitat Changes Since 2009

- 4.11.3 Much of the habitat previously recorded as trees and scrub has since developed into woodland, as described above. Otherwise, the scattered trees remain in similar condition to the previous description in 2009.

#### Evaluation

- 4.11.4 The scattered trees within the survey area include a high proportion of non-native species including some mature specimens, particularly along the River Yare. The trees and scrub are also slowly encroaching into the fen habitat, which threatens its future viability. As such, although the more mature trees are of some ecological interest, overall the scattered trees and shrubs are not considered to represent an important ecological feature.

## 4.12 Rivers and Banks

### Description

- 4.12.1 **River Wensum** flows along the northern boundary of the survey area in an easterly direction (see Photograph 7). The River itself is approximately 10m in width with a slow steady flow of water which accommodates frequent boating traffic. The site-side riverbanks in this area are formed by concrete canalised sections with metal sheet piling present, offering few if any opportunities for a naturalised bankside flora to develop. Thus the bankside vegetation is largely limited to tall ruderal vegetation or sparse vegetation on previously developed land, with occasional Lombardy Poplar and Weeping Willow present which overhang the river.
- 4.12.2 **River Yare** flows along the western and northern boundaries of the May Gurney land, briefly passing within the survey area, before flowing northwards along the eastern boundary of the Deal Ground land (see Photograph 8). The river itself is more natural in character than the River Wensum, measuring approximately 6-10m in width, and supports some aquatic vegetation likely due to the much reduced boating traffic. The banks support a mixture of tall ruderal vegetation with scattered trees, especially in the south and the central portion of the stretch along the Deal Ground land, while dense woodland in the form of W4 (albeit much of this has since been felled) and W11 abut the river in the southern and northern sections of the Deal Ground land. The bankside vegetation is thus generally characteristic of drier soils than the main part of the fen, such that there is no distinct community of emergent vegetation along the river aside from occasional Reed Sweet-grass, Greater Pond Sedge, and Purple Loosestrife. However, two small pockets of riverine swamp were recorded along the river, on the north and south banks (F15 and F16).
- 4.12.3 The opposite bank of the River Yare from the Deal Ground land forms part of The Broads, in the form of Whitlingham Park, and is bordered by grassland fields and in places woodland located on steeply sloping banks. Nevertheless, along the eastern riverbank (off-site) the banks themselves are in places canalised with sections of metal sheet piling present.

- 4.12.4 In the southern part of the survey area, adjacent to the May Gurney land, the riverbank is variable with some areas of stone walling or metal sheet piling but predominantly comprising heavily shaded steep banks supporting sparse vegetation largely dominated by Ivy. The eastern boundary of the May Gurney land lies adjacent to a man-made channel which feeds into the River Yare at the north-eastern corner of the May Gurney land. This channel supports a steep, Ivy-dominated bank beneath the marginal tree belt.

#### Summary of Habitat Changes Since 2009

- 4.12.5 The rivers and their associated banks were recorded to be in similar condition to the descriptions in 2009, albeit with a higher cover of trees and shrubs where woodland has developed.

#### Evaluation

- 4.12.6 The River Wensum is heavily modified with straight, built canalised banks within an urban context, with built land also on its north bank. The River supports frequent boat traffic such that little emergent or aquatic vegetation is present. As such, the section of the River Wensum adjacent to the survey area is not considered to represent an important ecological feature.
- 4.12.7 The River Yare is, by contrast, largely semi-natural in that it supports meandering, unbuilt banks (for the most part) with shallows and aquatic vegetation. The banks of the river are well vegetated by woodland, scattered trees, tall ruderal vegetation, and, to the east, parkland (including Whitlingham CWS) and rural gardens, while the fen habitat within the survey area is in close proximity, contributing to a wide riparian corridor. Nevertheless, its ecological value is somewhat limited by the prevalence of invasive plant species along its banks, particularly Giant Hogweed, while Himalayan Balsam is also present in the south of the May Gurney land. On the basis of its semi-natural characteristics, this section of the River Yare is considered to represent the UK Priority Habitat 'rivers', and does represent an important ecological feature which is of value at the local to county level.

### 4.13 Ephemeral Ponds

#### Description

- 4.13.1 A single ephemeral pond (P1) has previously been recorded within the Deal Ground land, specifically within woodland W1. This was revisited and found to comprise a completely dry depression within the woodland, largely devoid of vegetation save for some Reed Sweet-grass and Greater Pond Sedge.

#### Summary of Habitat Changes Since 2009

- 4.13.2 Pond P1 was previously noted to be an ephemeral feature which likely dries out annually, such that the habitat remains similar to the previous description.
- 4.13.3 An additional ephemeral pond (P2) was previously recorded in the east of the May Gurney land. This pond was not re-recorded in 2022 and is presumed to have been infilled either naturally or through site clearance works.

#### Evaluation

- 4.13.4 The pond is unlikely to meet the criteria for the Priority Habitat 'ponds'. The pond is highly ephemeral in nature, being completely dry at the time of survey in September 2022, and is likely to hold water for only a few months of the year. The pond supports very little

emergent or wetland vegetation. As such, it is not considered to represent an important ecological feature.

#### 4.14 Colonising Vegetation on Previously Developed Land

##### Description

4.14.1 This habitat was recorded most extensively in the north of the Deal Ground land, in addition to smaller areas in the May Gurney land. This habitat comprised areas of previous industrial land which now support varying levels of recolonising vegetation, largely on flat, compacted gravel substrate (see Photographs 9 and 10). Given the various stages of vegetation colonisation, these were compartmentalised into 11 areas (see Plan 6592/ECO3), described in Table 4.4 below.

4.14.2 The colonising vegetation in these areas largely comprised annual and tall ruderal species, especially Weld, in addition to Perforate St John's-wort, Great Mullein, Spear Thistle, Common Nettle, Canadian Fleabane, Vervain *Verbena officinalis*, Black Horehound *Ballota nigra*, Ground-ivy, Sticky Groundsel *Senecio viscosus*, Scentless Mayweed *Tripleurospermum inodorum*, Bristly Ox-tongue *Helminthotheca echioides*, Great Willowherb, Common Knotgrass *Polygonum aviculare*, Large-flowered Evening-primrose *Oenothera glazioviana*, Square-stalked Willowherb *Epilobium tetragonum*, Common Ragwort, Nipplewort, Ribbed Melilot *Melilotus officinalis*, Black Medick, Hare's-foot Clover *Trifolium arvense* and Teasel. Grasses were occasionally recorded, including Creeping Bent, Yorkshire-fog and Cock's-foot, while Biting Stonecrop *Sedum acre* was also occasional. In places, very young and low Buddleia shrubs were noted to be colonising, whilst low creeping Bramble was also noted.

4.14.3 Areas of this habitat were compartmentalised into 11 areas, based on the proportion of vegetation cover, vegetation structure, and species composition. These are described in Table 4.4 below.

**Table 4.4.** Descriptions of colonising vegetation on previously developed land.

Area	Percentage vegetation cover	Botanical characteristics	Topographical variation
PDL1	30 – 50 %	Low diversity, abundant Weld.	Negligible
PDL2	5 %	Largely devoid of vegetation.	Negligible
PDL3	50 – 90 %	Locally abundant Creeping Bent in south with higher vegetation cover developing into grassland with tall ruderal, otherwise similar to PDL1, plus locally frequent low Bramble.	Negligible
PDL4	30 %	Similar to PDL1, but with locally abundant very young and low Buddleia.	Negligible
PDL5	50 – 80 %	Locally abundant Buddleia up to 1 m tall with locally abundant Canadian Fleabane.	Negligible
PDL6	70 – 80 %	Merges into tall ruderal TR2 and similar in character and species composition, but sparser over stonier	Negligible

		ground. Weld dominant with abundant Canadian Fleabane and frequent Spear Thistle and Great Mullein.	
PDL7	50 %	Abundant Canadian Fleabane with frequent Perforate St John's-wort. Locally abundant young Buddleia.	Negligible
PDL8	50 %	Dominant Perforate St John's-wort and Canadian Fleabane, locally abundant Creeping Cinquefoil and young Buddleia. Marsh Fern <i>Thelypteris palustris</i> noted in north.	Uneven with several small undulations plus higher (to 1m) mounds, variable substrate including sandy ground
PDL9	5 %	Largely devoid of vegetation.	Negligible
PDL10	10 – 40 %	Abundant Canadian Fleabane, low species diversity	Negligible
PDL11	50 – 90 %	Mix of species including Canadian Fleabane, Bristly Oxtongue, Mugwort, Ragwort, Hare's-foot Clover. Merging into adjacent grassland.	Negligible

#### Summary of Habitat Changes Since 2009

- 4.14.4 The majority of this habitat was previously recorded as 'derelict industrial area / hardstanding' which supported little vegetation. Ruderal species have since begun to colonise, albeit the process is slow because of the nutrient-poor, compacted nature of the substrate. Part of this habitat area (PDL8) was previously recorded as woodland (W2) which has since been cleared.

#### Evaluation

- 4.14.5 The colonising vegetation comprises distinct compartments with varying degrees of vegetation cover, but any such cover is heavily dominated by annual and biennial ruderal species, with poor representation of other vegetation types such as mosses, lichens, inundation species, and flower-rich grassland. The habitat supports a low to moderate plant species diversity.
- 4.14.6 This habitat has been assessed for its potential qualification as the UK Priority Habitat 'open mosaic habitats on previously developed land' ('OMH'). The criteria for this Priority Habitat are somewhat open in that they require habitats to contain 'some vegetation' along with bare ground to qualify. Further guidance is available from Buglife<sup>21</sup>, who states that "Not all brownfields will support open mosaic habitats, particularly where hardstanding areas dominate, providing only limited opportunities for vegetation or exposed friable

<sup>21</sup> Buglife (2020) Identifying open mosaic habitat. <https://cdn.buglife.org.uk/2020/01/Identifying-open-mosaic-habitat.pdf>



*material.*” Furthermore, the Norfolk BAP for OMH<sup>22</sup> sets out five criteria for examples of ‘high nature conservation value’, which are taken from JNCC’s 2007 review of the UK BAP<sup>23</sup>:

- Rich and/or large examples of habitats, which demonstrate mosaics of bare ground, pioneer communities, flower-rich grassland and other habitat patches;
- Areas that have retained bare ground and pioneer communities over an extended period, demonstrating arrested succession;
- Threatened areas that support either the last remaining examples where the habitat was formerly widespread/extensive, or rare/ specialised types of this habitat;
- Presence of UK BAP priority species or Red Data Book/List species;
- Importance for an exceptional assemblage of key species groups.

4.14.7 The habitat within the survey area is unlikely to meet any of the above criteria, on account of its poor diversity of habitats, recent origin, absence of a wider threatened area of the habitat type, and lack of evidence of any UK Priority Species or exceptional assemblage of species. Furthermore, the majority of this habitat is dominated by flat gravel substrate with low levels of early colonising vegetation cover. In addition, with the exception of PDL8, the habitat supports very little topographical diversity such as hummocks and seasonal pools which are associated with OMH, while the substrate is also relatively homogenous. The habitat has developed in the past ten years, since the previous survey when these areas were largely devoid of vegetation or comprised denser vegetation cover (as with PDL8).

4.14.8 As such, the habitat is not considered to qualify as OMH Priority Habitat due to the lack any significant spatial variation in its communities, instead, the habitat comprises homogeneous early successional ruderal vegetation.

4.14.9 One notable plant species, Marsh Fern *Thelypteris palustris*, was recorded within this habitat, which was limited to PDL8 and is more characteristic of open or wooded fen rather than previously developed land.

4.14.10 The colonising vegetation habitat is therefore not considered to represent an important ecological feature.

## 4.15 Amenity Planting

### Description

4.15.1 A small, brick-built raised bed in the south of the May Gurney land supports amenity planting comprising Mexican Orange *Choisya ternata* and Wall Cotoneaster *Cotoneaster horizontalis*. Also recorded was Gorse *Ulex europaeus*, although it is unclear whether this formed part of the amenity planting scheme or is a natural colonist.

### Summary of Habitat Changes Since 2009

4.15.2 The amenity planting is largely unchanged since 2009.

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<sup>22</sup> Chittenden, SJ (2012) Norfolk Biodiversity Action Plan: Open Mosaic Habitats on Previously Developed Land. Norwich City Council. <https://www.norfolkbiobiodiversity.org/assets/Uploads/Open-mosaic-habitats-on-previously-developed-land-HAP2.pdf>

<sup>23</sup> Biodiversity Information and Reporting Group (June 2007) Report on the Species and Habitat Review. JNCC. <https://data.jncc.gov.uk/data/bdd8ad64-c247-4b69-ab33-19c2e0d63736/UKBAP-Species-HabitatsReview-2007.pdf>

### Evaluation

- 4.15.3 The amenity planting covers a very small area, surrounded by hardstanding, which is dominated by non-native species. This habitat is therefore not considered to represent an important ecological feature.

## 4.16 **Hardstanding and Bare Ground**

### Description

- 4.16.1 The majority of the May Gurney land comprises hardstanding in the form of tarmac or concrete roadways and parking areas. Numerous cracks in the hardstanding have been colonised by plant species including abundant Buddleia *Buddleja davidii* and frequent Canadian Fleabane. Also recorded were Garden Parsley *Petroselinum crispum*, Yorkshire Fog, Common Ragwort, Bittercress *Cardamine* sp., Mugwort, Bristly Oxtongue, Spear Thistle, Annual Meadow-grass *Poa annua*, Dandelion *Taraxacum* agg., a Crane's-bill *Geranium* sp., Wild Clematis *Clematis vitalba* and Bramble. In shaded locations various mosses *Bryophyta* were noted.
- 4.16.2 Bare ground was also recorded in the May Gurney land in the form of compacted stone, the outer, vegetated margins of which are described under 'colonising vegetation on previously developed land'. A substantial area of bare earth was also recorded within the grassland in the May Gurney land, apparently formed by repeated movement of tracked vehicles to and from two large bonfires and probably also as a result of intentional clearance of vegetation.
- 4.16.3 Other areas of hardstanding within the May Gurney land include the footprint of recently demolished buildings or part buildings, covered in demolition debris at the time of survey.
- 4.16.4 In the Deal Ground land, a 5 m wide metalled road runs northwards through the survey area from the public road Bracondale, which is in reasonably good condition and is almost entirely devoid of vegetation.

### Summary of Habitat Changes Since 2009

- 4.16.5 Areas of hardstanding have decreased in extent, particularly within the north of the Deal Ground land, where these areas have been recategorized as colonising vegetation on previously developed land. The remaining hardstanding in the May Gurney land appears to have been gradually colonised by vegetation in cracks.

### Evaluation

- 4.16.6 The hardstanding and bare ground habitat is largely devoid of vegetation, albeit vegetation is gradually colonising via cracks in hardstanding. As such, at present this habitat is not considered to represent an important ecological feature.

## 4.17 **Buildings and Structures**

### Description

- 4.17.1 Six buildings or structures were previously recorded within the Deal Ground land, in addition to five within the May Gurney land. Of these, three were recorded to remain standing within Deal Ground, and two within the May Gurney land, during the current survey. These are described in turn below. Building numbers are retained from the previous report.

- 4.17.2 **Building B2** is a small structure of rendered brickwork construction, supporting a flat concrete roof. It was noted to be in a state of disrepair with a number of holes present in the walls with the windows and doors missing. Internally the structure was noted to house pipework and was very light and airy in nature with smooth concrete internal walls.
- 4.17.3 **Building B4** is a historic brick kiln comprising of a conical, vaulted ceiling structure with access gained via a small open porchway/doorway (see Photograph 11). The kiln comprises a double layer cavity wall which extends part way up the structure to a height of 3-4m, continuing as a single thickness wall up to the apex. The kiln was noted to be in a poor state of repair, with numerous large cracks present in the brickwork of the outside walls, which were noted to have been colonised in places by Buddleia scrub. Upon internal inspection no obvious cracks or gaps in the brick work were observed. Nevertheless, it appears that the internal structure is subject to disturbance on occasion by people with rubbish and debris recorded from the base of the kiln.
- 4.17.4 **Building B6 - Coleman's Subway Tunnel** is present adjacent to the northwest of the survey area and forms a now blocked off subway tunnel beneath the Lafage Aggregates supply railway line (see Photograph 12). The tunnel is of a brick and metal girder construction. The brick walls are in moderate condition with very few cracks or crevices present. Supporting metal girders form the tunnel roof and span between the brick walls, with slight gaps forming where heavy corrosion has taken place. The tunnel is relatively dank in nature, however was noted to be moderately well lit with daylight penetrating to a fair depth within the tunnel. At time of the April 2009 survey the tunnel was noted to be flooded with water to a depth of 20cm, however in August 2009 and September 2022 water was noted to be absent.
- 4.17.5 **Building B7**, which lies partly outside of the site (red line) boundary, comprises a two-storey structure of brick construction under a slate-tiles roof. The roof is hipped with multiple ridges. The building has a single-storey extension to the north, appearing to be of similar construction, albeit some elevations have been rendered. The building is no longer in use and, while generally appearing to be in good condition, there has been some vandalism. Windows facing south on to Bracondale Road have been boarded up, but the majority of unboarded windows within and immediately adjoining the site boundary have been broken. The roof very largely appears to be in good condition, with no slipped or raised tiles over most pitches. However, localised damage has occurred within the site, with tiles missing in a number of locations. The building is largely unvegetated but grass, probably Yorkshire-fog, was noted in some of the guttering. Damage to internal ceilings revealed that at least part of the roof structure comprised wooden beams, apparently of relatively recent construction, with wooden boards below the tiles, but no lining.
- 4.17.6 **Building B10** is largely a two-storey structure, with one part being single-storey. It appears to have been constructed as a flat-roofed, brick-built single-storey structure, with a flat-roofed second-storey extension subsequently added to the northern and eastern parts of the building. In places the upper storey extends beyond the lower; where this is the case the upper storey is supported by pillars. The walls of the upper storey are of corrugated panel construction, with a fascia board at the top. Building B10 is also no longer in use and has also been subject to vandalism, with many broken windows. Other than this, the building appeared to be in reasonable condition.
- 4.17.7 In addition, two metal tanks, presumed to have formerly contained oil, are present in the north of the May Gurney land.

### Summary of Habitat Changes Since 2009

- 4.17.8 Five of the 11 buildings or structures remain standing since the previous survey. The three remaining structures in the Deal Ground land remain in similar condition to the previous descriptions. The two remaining buildings within the May Gurney land are deteriorating in condition due to their lack of occupation, exacerbated by vandalism.

### Evaluation

- 4.17.9 The buildings and structures are largely devoid of vegetation and are inherently of negligible ecological value. As such, they do not form important ecological features. Potential for the buildings to support faunal species such as roosting bats and Barn Owl is discussed below in Chapter 5.

## 4.18 Invasive Species

### Description

- 4.18.1 Several stands of Japanese Knotweed were recorded within the survey area. These were located in three parts of woodland W4, to the west of grassland NG1/2, and within woodland W7.
- 4.18.2 Giant Hogweed was recorded as scattered individuals in several parts of the fen, but was primarily associated with tall ruderal vegetation on the banks of the River Yare, particularly the area to the south of woodland W1. Elsewhere within the fen, the species was mainly recorded within ditches with isolated specimens noted elsewhere.
- 4.18.3 Himalayan Balsam was recorded in one part of the survey area, namely fen F15 where it was associated with the bank of the River Yare.

### Summary of Changes Since 2009

- 4.18.4 Japanese Knotweed was recorded in the same locations during the previous survey, but appears to have expanded its range in the area to the west of grassland NG1/2.
- 4.18.5 Giant Hogweed was also recorded during the previous survey work, and its extent appears to be relatively unchanged, albeit it may have slightly encroached further westward into the fen.
- 4.18.6 Himalayan Balsam was not recorded during the previous survey work, although it has been recorded more historically in 2000 and 2003.

### Evaluation

- 4.18.7 Japanese Knotweed, Giant Hogweed and Himalayan Balsam are listed under Schedule 9 Part II of the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to cause to grow in the wild any plant listed on the schedule.

## 4.19 Rare, Scarce and Notable Plants

### Description

- 4.19.1 One plant species of conservation importance was recorded within the survey area, namely Marsh Fern, which was recorded close to the River Wensum in an area of felled woodland (W2), now occupied by colonising vegetation (PDL8). This species is listed as Nationally

Scarce, meaning that it has been recorded in fewer than 100 hectads (10 x 10 km squares) in Britain. In addition, although not listed on the list of Rare and Scarce Plants in Norfolk, the species is included on the older 'Norfolk Rare Plants List', which was obtained from NBIS but is of unknown origin (*pers. comm.*). The species is characteristic of 'open or recently wooded fen or open carr'<sup>24</sup>. Although the species declined prior to 1930 because of drainage, its recent national distribution is noted to be relatively stable. Norfolk is a significant stronghold for Marsh Fern.

- 4.19.2 Another species with a restricted national distribution recorded within the survey area was Green Figwort, which was recorded near the margins of the fen habitat. This species is relatively uncommon nationally, but not enough to warrant a conservation designation (either locally or nationally), and one of its national strongholds is the Norfolk broads. The BRC Online Atlas notes that its status as a native species is uncertain given that it was not recorded in Britain prior to 1840, and appears to be expanding in range<sup>25</sup>.

#### Summary of Changes Since 2009

- 4.19.3 Marsh Fern is not known to have been previously recorded within the survey area. Only a very small quantity was recorded within the survey area, within the former woodland W2, as such it may have either been overlooked or represent a recent colonist.
- 4.19.4 Green Figwort was also recorded during the previous survey work in 2009. On both occasions, the species was recorded in the fen habitat. Its distribution in 2022 was substantially less than in 2009, although it may have been overlooked to some extent in 2022 given the later timing of the survey and the very tall and dense structure of the habitat.
- 4.19.5 The Nationally Scarce species Hoary Mullein was recorded in the survey area in 2009, mainly within areas of tall ruderal vegetation, with smaller quantities in the grassland. This species is also included on the Norfolk Rare Plants List, but is not in the more recent lists of Rare and Scarce Plants in Norfolk. Hoary Mullein was not rerecorded within the survey area in 2022, possibly because much of the areas previously recorded as tall ruderal vegetation has since succeeded to scrub or woodland. Nevertheless, this species could be present within the previously developed land in low numbers, given that it is difficult to distinguish from Great Mullein, which occurred frequently, without close inspection of all specimens.

#### Evaluation

- 4.19.6 Marsh Fern is considered to represent an important ecological feature, on account of its Nationally Scarce status. However, its known extent within the survey area is limited to one small patch, while the species has not previously been recorded within the survey area, such that it is likely to either be a recent colonist or has for some time only occurred as a very small population. As such, this species is considered to be of importance at the local level. Green Figwort, although of some ecological interest, has no conservation designation and is expanding its national range, such that it is not considered to represent an important ecological feature.

## 4.20 Habitat Evaluation Summary

- 4.20.1 On the basis of the above, the following habitats within and adjacent to the survey area are considered to form important ecological features:

<sup>24</sup> BRC plant atlas: <https://plantatlas.brc.ac.uk/plant/thelypteris-palustris>

<sup>25</sup> <https://plantatlas.brc.ac.uk/plant/scrophularia-umbrosa>

**Table 4.5.** Evaluation summary of habitats and species forming important ecological features.

Habitat	Level of Importance
Eutrophic Floodplain Fen	County
Wet Woodland	Local
River Yare	Local to county
Nationally Scarce Plants	Local

4.20.2 Other habitats present within the survey area are not considered to form important ecological features, albeit the presence of invasive plant species should be noted as unfavourable features within the survey area.

## 5 Faunal Use of the Survey Area

### 5.1 Overview

- 5.1.1 Specific survey work was undertaken in 2009 and 2010 for bats, Badger, Water Vole, Otter, breeding birds, Great Crested Newt, reptiles, and invertebrates.
- 5.1.2 During the update survey work in 2022, general observations were made of any faunal use of the survey area with specific attention paid to the potential presence of protected or notable species. Specific update survey work was undertaken in respect of Badgers, bats, and Desmoulin's Whorl Snail.
- 5.1.3 In this section, for each species group, the findings of the 2009 survey work are summarised, followed by an update assessment in 2022 to evaluate any changes in habitat conditions for the relevant species since 2009.
- 5.1.4 Update Phase 2 survey work for bats (activity survey comprising walked transects and static detectors), Badger, Water Vole, Otter, reptiles, and breeding birds, is being undertaken in 2023. The results of these surveys will be reviewed separately when available.

### 5.2 Priority Species

- 5.2.1 Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006 places duties on public bodies to have regard to the conservation of biodiversity in the exercise of their normal functions. In particular, Section 41 of the NERC Act requires the Secretary of State to publish a list of species which are of principal importance for conservation in England. This list is largely derived from the 'Priority Species' listed under the former UK Biodiversity Action Plan (BAP), which continue to be regarded as priority species under the subsequent country-level biodiversity strategies.
- 5.2.2 During the previous survey work undertaken, the Priority Species Soprano Pipistrelle *Pipistrellus pygmaeus*, Noctule *Nyctalus noctula*, Grass Snake *Natrix helvetica*, Cuckoo *Cuculus canorus*, Dunnock *Prunella modularis*, Song Thrush *Turdus philomelos*, Grasshopper Warbler *Locustella naevia*, Linnet *Linaria cannabina*, Bullfinch *Pyrrhula pyrrhula*, and Reed Bunting *Emberiza schoeniclus* were recorded within the survey area, in addition to 16 moth species listed under the UK BAP for research purposes only. The survey area also has potential to support other Priority Species such as Hedgehog *Erinaceus europaeus* and Harvest Mouse *Micromys minutus*, while the rivers adjacent to the survey area could support Priority Species of fish such as Brown Trout *Salmo trutta* and Smelt *Osmerus eperlanus*. This is discussed further below.

### 5.3 Bats

- 5.3.1 **Legislation.** All British bats are classed as European Protected Species under the Conservation of Habitats and Species Regulations 2017 (as amended) and are also listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). As such, both bats and their roosts (breeding sites and resting places) receive full protection under the legislation (see Annex 6592/6 for detailed provisions). If proposed development work is likely to result in an offence a licence may need to be obtained from Natural England which would be subject to appropriate measures to safeguard bats. Given all bats are protected species, they are considered to represent important ecological features. A number of bat species are also considered S41 Priority Species.

**5.3.2 Background Records.** No specific records of bats from within the survey area were returned from the desktop study. The closest 6-figure or greater resolution bat records were located from Whitlingham Lane Tunnel (also known as Trowse Tunnel), which is located approximately 50 m east of the survey area boundary. This is a known hibernation roost with records of Daubenton's Bat *Myotis daubentonii*, Natterer's Bat *Myotis nattereri*, and Brown Long-eared Bat *Plecotus auritus*. Other bat species recorded in the local area include Barbastelle *Barbastella barbastellus* (auditory records only), Serotine *Eptesicus serotinus* (auditory records only), and Nathusius' Pipistrelle *Pipistrellus nathusii*.

### 5.3.3 Survey Results and Evaluation

#### Buildings

##### *Summary of previous surveys*

5.3.4 Eleven built structures were previously identified within the survey area in 2009, named B1 to B11. No evidence of roosting bats was found in any of the structures following external and internal inspection surveys. Buildings B1 to B3, B5 and B9 to B11 were assessed as having negligible to low value for roosting bats. Buildings B4 (the former kiln) and B6 (former Colemans Subway Tunnel) were assessed as having an increased likelihood of bat use, with potential to be of moderate value for roosting bats including for hibernation. Building B7 was considered to have low bat potential, while B8 had low to moderate bat potential.

5.3.5 Further dusk/dawn survey work was undertaken in July and August 2010 to assess the presence or likely absence of roosting bats in Buildings B4, B6, and B7. These comprised two dusk surveys plus a dawn survey at Building B4, a single dusk with dawn survey at Building B6, and a dawn survey at Building B7. Building B8 was not subject to further survey because this had been previously demolished in relation to the consented development of the May Gurney offices.

5.3.6 One *Myotis* bat was recorded returning to Building B7 on the dawn survey of 19<sup>th</sup> August 2010, specifically to a masonry gap on the southern aspect of the building (outside of the red-line boundary). No further evidence of roosting bats was recorded in any of the buildings.

##### *2022 update*

5.3.7 As described in Section 4 above, the 2022 survey identified that buildings B1, B3, B5, B8, B9 and B11 have since been demolished. The remaining buildings B2, B4, B6, B7 and B10 were inspected and re-assessed for any evidence of, or potential for, roosting bats.

5.3.8 Building B2 is a small structure in a state of advanced disrepair, with a light and airy interior lacking any suitable sheltered opportunities for roosting bats. As such, building B2 was considered to have negligible potential for roosting bats.

5.3.9 Building B4 comprises the former kiln previously identified as having potential for roosting bats. The 2022 survey confirmed this, and the building was recorded to be in similar condition to that reported in 2010, with numerous cracks in the exterior brickwork. The cavity wall was identified as continuing to offer potential for roosting bats, while the surrounding habitat, comprising woodland, represents favourable foraging and commuting habitat. The building is however subject to disturbance from unauthorised public use, with much graffiti and a makeshift camp recorded within. As such, this building is considered to offer moderate potential for roosting bats.



- 5.3.10 Building B6 comprises the former Colemans Subway Tunnel. Although the tunnel appears to be in sound condition, potential opportunities for bats are present in cavities where horizontal girders adjoin the supporting walls. These cavities are likely to remain cool year-round, and as such are unlikely to offer potential for maternity roosts, but could present opportunities for hibernating bats. However, the structure is subject to significant disturbance from the rail line above, which is in regular use and creates loud noise and heavy vibration when trains are passing. Overall, the structure is considered to have moderate potential for roosting bats.
- 5.3.11 Building B7 offers some opportunities for bats in the form of access to roof voids either at locations where the roof has been damaged by vandalism or, less probably through broken windows and access via a damaged ceiling. A boarded window on the southern elevation of B1, outside the red-line boundary, also offers minor roosting potential behind the boarding due to a small gap between the two boards which have been put in place. The portion of this building outside of the red-line boundary is considered to have high potential for roosting bats, on the basis of the previous *Myotis* roost recorded in 2010, while the remainder of the building has low potential.
- 5.3.12 Building B10 was noted to have a small hole which could provide access to a potential roosting site in the fascia of the upper storey, on the western elevation near the southwestern corner. In addition, a ventilation grill high on an eastern elevation may also offer a potential access opportunity for bats. These features are considered to represent low potential for roosting bats.

## Trees

### *Summary of previous surveys*

- 5.3.13 The previous survey work identified seven trees with roosting bat potential within the survey area, in addition to two tree groups which supported dense ivy cover. All of the trees were assessed as having low or moderate potential, except for one (T4) which had high potential.
- 5.3.14 Further dusk/dawn survey work was undertaken in July and August 2010 to assess the presence or likely absence of roosting bats in trees T1 and T2. These comprised two dusk surveys plus a dawn survey. Possible evidence of roosting bats was recorded at tree T1, comprising a possible Soprano Pipistrelle emergence in July 2010, with at least five Soprano Pipistrelle possibly emerging in August 2010. No evidence of roosting bats was recorded at tree T2.

### *2022 update*

- 5.3.15 The 2022 survey produced similar findings to the previous survey, albeit two of the willow trees previously identified as having bat potential (T5 and T6) have since collapsed and now offer negligible potential. One additional tree and one additional tree group were identified which were not reported in the previous survey. The update results of the tree assessment work undertaken at the survey area are illustrated on Plan 6592/ECO5 and summarised in Table 5.1 below:

**Table 5.1.** Tree inspection results (see Plan 6592/ECO5, tree numbers are consistent with the previous survey work undertaken for the outline planning application).

Tree No.	Species	Age	Potential Roost Features	Suitability
T1	White Poplar	Semi-mature	Dense covering of Ivy	High (given previous potential roost record)
T2	Ped. Oak	Mature/Dying	Dense covering of Ivy	Low
T3	White Willow	Semi-mature	Woodpecker and rot holes	Medium
T3a	White Willow	Semi-mature	Lifting bark	Medium
T4	Crack Willow	Mature	Collapsed trunk, large splits, broken limbs, rot holes	High
T7	Sycamore	Semi-mature	Hollows and dense covering of Ivy	Medium
G1	Horse Chestnut	Mature	Covering of Ivy	Low
G2	Horse Chestnut	Mature	Covering of Ivy	Low
G3	Sycamore	Semi-mature	Dense covering of Ivy	Low

- 5.3.1 Subsequent update tree survey work in June 2023 has recorded that trees T7 and G3 have since been felled.

#### Foraging and Commuting

##### *Summary of previous surveys*

- 5.3.2 A series of six transect activity survey visits were undertaken at the Deal Ground land in August 2009, July 2010, and August 2010. These six visits comprised four dusk surveys and two dawn surveys. The survey work recorded a moderate level of foraging activity, attributable to Common Pipistrelle, Soprano Pipistrelle, Noctule, and *Myotis* species including Daubenton's Bat. Soprano Pipistrelle and Common Pipistrelle were the most frequently recorded species. The greatest levels of activity were associated with the River Yare corridor along the eastern margin of the survey area, which provides connectivity to the adjacent Whitlingham Country Park, where known roosts are present. Groups of trees and scrub around the fen margins were also subject to regular use. More occasional activity was recorded in the fen habitat and along the River Wensum.

##### *2022 update*

- 5.3.3 Since the previous survey work, tree and scrub cover has generally increased across the survey area, particularly around the margins of the fen including along the River Yare corridor. As such, this riparian corridor is likely to remain the area of highest value for bats within the survey area. Areas of wet woodland around the margins of the fen are similarly likely to be of relatively higher value for bats in the context of the survey area. Otherwise, there is unlikely to be any significant change in bat activity patterns across the survey area. The previously developed land in the northern parts of the survey area remain exposed and with scarce plant cover, such that these areas are unlikely to support more than sporadic bat activity, while the River Wensum corridor remains in similar condition and is unlikely to be of high significance to foraging bats given its open and exposed nature.

## 5.4 Badger

5.4.1 **Legislation.** Badger receive legislative protection under the Protection of Badgers Act 1992 (see Annex 6592/6 for detailed provisions), and as such should be assessed as an important ecological feature. The legislation aims to protect the species from persecution, rather than being a response to an unfavourable conservation status, as the species is in fact common over most of Britain. It is the duty of planning authorities to consider the conservation and welfare impacts of development upon Badger and issue permissions accordingly.

5.4.2 Licences can be obtained from Natural England for development activities that would otherwise be unlawful under the legislation. Guidance on the types of activity that should be licensed is laid out in the relevant best practice guidance.<sup>26, 27</sup>

5.4.3 **Background Records.** No specific records of Badger were returned within the survey area, with the closest records at 6-figure or greater resolution recorded approximately 500 m from the survey area boundary.

### 5.4.4 Survey Results and Evaluation

#### *Summary of previous surveys*

5.4.5 Previous surveys recorded no evidence of Badger within the survey area, albeit suitable habitats were present including for setts within the numerous earth embankments.

#### *2022 update*

5.4.6 No evidence of Badger, such as setts, latrines, or foraging activity, was recorded during the 2022 update survey. However, suitable habitat remains present particularly in the form of steep embankments which are particularly prominent along the western margin of the fen and around the margins of woodland W4. The lack of Badger activity could be explained by the isolation of the survey area, being surrounded by rivers and areas of built development, which limits opportunities for colonisation by this species.

## 5.5 Water Vole

5.5.1 **Legislation.** Water Vole is fully protected under the Wildlife and Countryside Act 1981 (as amended). Water Vole is also a S41 Priority Species. As such, this species is considered to represent an important ecological feature. The legislation affords protection to individuals of the species and their breeding sites and places of shelter (see Annex 6592/6 for detailed provisions). There is no provision under the Act for licensing what would otherwise be offences for the purpose of development. Such activities must be covered by the defence in the Act that permits otherwise illegal actions if they are the incidental result of a lawful operation and could not reasonably be avoided.

5.5.2 If, despite all reasonable efforts, properly authorised development will adversely affect Water Vole and there are no alternative habitats nearby, Natural England may issue a licence to trap and translocate Water Vole for the purpose of conservation. To issue such a licence, Natural England would need to be assured there is no reasonable alternative to the development and that there are no other practical solutions that would allow Water Vole to be retained at the same location. NE would also require assurance that the actions would make a positive contribution to Water Vole conservation.

<sup>26</sup> English Nature (2002) 'Badgers and Development'

<sup>27</sup> Natural England (2011) 'Badgers and Development: A Guide to Best Practice and Licensing', Interim Guidance Document

**5.5.3 Background Records.** Two records of Water Vole were recorded along the River Yare at the eastern boundary of the survey area, dated 2005 and 2007. No further information is available for these records, aside of the location 'Trowse Meadows'. It is therefore likely that these records relate to Trowse Meadows CWS, which forms part of Whitlingham Country Park and flanks the eastern side of the River Yare. All other 6-figure or greater resolution Water Vole records were located at least 1 km from the survey area boundary.

#### **5.5.4 Survey Results and Evaluation**

##### *Summary of previous surveys*

**5.5.5** Survey work for Water Vole was undertaken along the river banks and within the ditches in the fen in the Deal Ground land in 2009. No evidence of this species was recorded, which is consistent with previous surveys undertaken in 2000 and 2003. The apparent absence of this species was explained by the limited open water in ditches within the survey area, and the scarcity of grass cover along the river banks.

##### *2022 update*

**5.5.6** The fen ditches within the survey area remain of similar or lower quality for Water Vole compared with 2009, and likely support less water. Indeed, during the update survey work in 2022, the ditches were completing lacking in open water. Furthermore, the ephemeral pond within woodland W1 was completely dry during the 2022 survey. In terms of the riverbanks, the River Wensum remains unsuitable for Water Vole because of its built canalised banks. The River Yare offers some opportunities for Water Vole, albeit its banks are likely to be suboptimal given that the ground vegetation is either sparse below a dense tree canopy cover, or comprises dense tall ruderal vegetation with a negligible component of emergent vegetation. Where the River Yare abuts the May Gurney land, much of the banks are constructed of stone or sheet piling, which is unsuitable for burrowing by this species. Overall, the survey area is considered to be of value to Water Voles at a negligible or local value.

## **5.6 Otter**

**5.6.1 Legislation.** Otter is fully protected under the Wildlife and Countryside Act 1981 (as amended) and is a European Protected Species under the Conservation of Habitats and Species Regulations 2017 (as amended). Such legislation affords protection to individuals of the species and their breeding sites and places of rest (see Annex 6592/6 for detailed provisions). Otter is also a S41 Priority Species. On this basis, Otter is considered to represent an important ecological feature.

**5.6.2 Background Records.** The closest specific record of Otter relates to the River Yare adjacent to the south of the survey area, dated 2012 and with a location description 'just east of Trowse'. The species has been recorded in various locations further afield, particularly within Whitlingham Great Broad some 400 m north-east of the survey area, and along the River Wensum, including further west into Norwich.

#### **5.6.3 Survey Results and Evaluation**

##### *Summary of previous surveys*

**5.6.4** Survey work in 2009 for Otter along the banks of the River Yare and River Wensum within the survey area found no evidence of use by Otter, although the dense vegetation along the River Yare corridor was identified as potentially suitable habitat for Otter. The species was

considered unlikely to occur elsewhere within the survey area, e.g. within the fen, because of the lack of year-round standing water.

#### *2022 update*

- 5.6.5 The 2022 assessment concluded that the potential for Otter to occur within the survey area remains similar to 2009, with potential habitat limited to the dense undisturbed vegetation along the River Yare corridor. The interior of the fen is unlikely to be regularly used by Otter given the lack of year-round standing water. The River Wensum banks remain of poor suitability for this species given their built nature. As such, the survey area is considered to be of negligible to local value for Otter, with any interest likely focussed on the River Yare and its banks.

## 5.7 Other Mammals

- 5.7.1 **Legislation.** A number of other UK mammal species do not receive direct legislative protection relevant to development activities but may receive protection against acts of cruelty (e.g. under the Wild Mammals (Protection) Act 1996). In addition, a number of these mammal species are S41 Priority Species and should be assessed as important ecological features.

- 5.7.2 **Background Records.** No specific records of other mammals were returned from within or adjacent to the survey area. A number of records of Hedgehog *Erinaceus europaeus* (Priority Species) was returned from the search area, the closest located approximately 0.4 km south-east of the survey area. One record of the Priority Species Polecat *Mustela putorius* was returned from the search area, located 50 m west of the survey area within Carrow Works, in 2015. Other Priority Species of mammal recorded further afield comprised single records of Harvest Mouse and Brown Hare *Lepus europaeus*.

### 5.7.3 Survey Results and Evaluation

#### *Summary of previous surveys*

- 5.7.4 The survey work in 2009-2010 recorded no evidence of other protected or Priority Species of mammal. However, the survey area was considered to have some potential to support the Priority Species Harvest Mouse within the fen habitat and Hedgehog *Erinaceus europaeus* within marginal areas of scrub and woodland.

#### *2022 update*

- 5.7.5 The update habitat assessment concurred with the previous assessment, in that the survey area is likely to support a range of common mammal species, while the Priority Species Harvest Mouse could be present within the fen habitat and Hedgehog could utilise the drier parts of the woodland and scrub habitats. Polecat has also been recorded in the local area and could use the drier woodland and scrub habitats. The previous assessment for the survey area is considered to remain appropriate, i.e. the survey area is of value to other mammals at the local level.

## 5.8 Amphibians

- 5.8.1 **Legislation.** All British amphibian species receive a degree of protection under the Wildlife and Countryside Act 1981 (as amended). Great Crested Newt is protected under the Act and is also classed as a European Protected Species under the Conservation of Habitats and Species Regulations 2017 (as amended). As such, both Great Crested Newt and habitats

utilised by this species are afforded protection (see Annex 6592/6 for detailed provisions). Great Crested Newt is also a S41 Priority Species, as are Common Toad *Bufo bufo*, Natterjack Toad *Epidalea calamita*, and Pool Frog *Pelophylax lessonae*. As such, these species should be assessed as important ecological features.

**5.8.2 Background Records.** The only amphibian species returned from the NBIS data search comprised Common Frog *Rana temporaria*, which was recorded from the fen habitat within the survey area in 2015 (peak count 1). No records of Great Crested Newt were returned by NBIS for the search area.

### 5.8.3 Survey Results and Evaluation

#### *Summary of previous surveys*

**5.8.4** Pond P1 and sections of the ditch system within the fen habitat were subject to presence / absence survey for Great Crested Newt in spring 2009. No evidence of Great Crested Newts was recorded, while amphibian records were limited to Common Frog.

#### *2022 update*

**5.8.5** No standing water was recorded within the survey area during the 2022 survey, although the pond and the ditches within the fen are expected to support water seasonally and potentially for long enough to support early breeding species such as Common Frog. Even in early spring, the waterbodies are all small in size and therefore suboptimal for Great Crested Newt, while this species was not previously recorded during specific surveys. As such, the presence of breeding Great Crested Newt within the survey area is considered unlikely.

**5.8.6** A review of OS maps and aerial imagery identified one additional waterbody within 250 m of the survey area, comprising Whitlingham Little Broad, located some 80 m east of the survey area. This is a large lake which has a high likelihood of fish presence. Furthermore, the waterbody is separated from the survey area by the River Yare, which is likely to represent a dispersal barrier to Great Crested Newt. As such, it is considered unlikely that Great Crested Newt would enter the survey area from this pond. Therefore, the survey area is considered to be of negligible value to Great Crested Newt, while the presence of common amphibian species is of negligible interest.

## 5.9 Reptiles

**5.9.1 Legislation.** All six species of British reptile are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), which protects individuals against intentional killing or injury. Sand Lizard *Lacerta agilis* and Smooth Snake *Coronella austriaca* receive additional protection under the Conservation of Habitats and Species Regulations 2017 (as amended); refer to Annex 6592/6 for detailed provisions. All six reptile species are also S41 Priority Species. As such, all reptile species should be assessed as important ecological features.

**5.9.2 Background Records.** Information returned from NBIS included two species of reptile, namely Common Lizard *Zootoca vivipara* and Grass Snake. Grass Snake was recorded within the fen habitat within the survey area in 2015, with a peak count of 1. The closest Common Lizard records are located approximately 0.6 km north-east of the survey area, within Carey's Meadow on the north side of the River Wensum.

### 5.9.3 Survey Results and Evaluation

#### *Summary of previous surveys*

- 5.9.4 Survey work undertaken in April to August 2009 recorded a low population of Grass Snake in grassland and fen habitat across both the Deal Ground and May Gurney land, although the population was considered to represent a good size within the fen habitat. No other reptile species were recorded.

#### *2022 update*

- 5.9.5 The survey area remains of similar suitability for reptiles since the 2009 survey. In addition to Grass Snake, suitable habitat remains present for other common reptile species such as Common Lizard and Slow-worm. However, the likelihood of colonisation is limited by the isolation of the survey area, including river barriers to the east and north and a busy public road to the south.
- 5.9.6 Favourable habitat for Grass Snake remains centred on the fen habitat, given that this species is particularly associated with wetland habitat. The gradual drying out of the fen and encroachment of woodland and scrub since the previous survey work suggests that the habitat may have slightly declined in quality for this species, albeit much remains highly suitable. Overall, the previous evaluation is considered to remain appropriate, with the survey area of low to moderate value for reptiles in the local context.

## 5.10 Birds

- 5.10.1 **Legislation.** All wild birds and their nests receive protection under Section 1 of the Wildlife and Countryside Act 1981 (as amended) in respect of killing and injury, and their nests, whilst being built or in use, cannot be taken, damaged or destroyed. Species included on Schedule 1 of the Act receive greater protection and are subject to special penalties (see Annex 6592/6 for detailed provisions).
- 5.10.2 **Conservation Status.** The conservation importance of British bird species is categorised based on a number of criteria including the level of threat to a species' population status<sup>28</sup>. Species are listed as Green, Amber or Red. Red Listed species are considered to be of the highest conservation concern being either globally threatened and or experiencing a high/rapid level of population decline (>50% over the past 25 years). A number of birds are also S41 Priority Species. Red and Amber listed species and priority species should be assessed as important ecological features.
- 5.10.3 **Background Records.** No specific records of birds were returned from within the survey area boundary. A high number of bird records were returned from the surrounding area, many of which were waterfowl species recorded within Whitlingham Country Park to the east. A number of species potentially associated with fen and associated wet scrub and woodland were recorded in the local area, including Marsh Harrier *Circus aeruginosus*, Sparrowhawk *Accipiter nisus*, Cetti's Warbler *Cettia cetti*, Grasshopper Warbler, Willow Warbler *Phylloscopus trochilus*, Reed Bunting, and Nightingale *Luscinia megarhynchos*.

<sup>28</sup> Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015) 'Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man' British Birds 108, pp.708-746

#### 5.10.4 Survey Results and Evaluation

##### *Summary of previous surveys*

- 5.10.5 Breeding bird survey undertaken at the Deal Ground land in 2009 recorded a total of 53 species, of which 26 were considered to be breeding or probably breeding within the survey area, and 7 possibly breeding. The remaining 20 species were observed flying over or foraging at the survey area, but presumed to be breeding elsewhere. A good density of breeding birds was recorded within the survey area overall, with the fen habitat in particular supporting a significant assemblage of birds, in contrast to the drier areas of woodland, scrub, ruderal and grassland habitats which supported a much reduced diversity of species.
- 5.10.6 Notable species recorded within the fen included the Schedule 1 species Cetti's Warbler and the RSPB red-listed species Grasshopper Warbler and Cuckoo, while the red-listed species Linnet was recorded within scrub. In addition, the Schedule 1 species Barn Owl *Tyto alba* and Kingfisher *Alcedo atthis* were recorded as non-breeding individuals, recorded hunting over the fen and along the River Yare, respectively. Amber-listed species included Sedge Warbler *Acrocephalus schoenobaenus*, Willow Warbler and Reed Bunting, all of which were recorded in the fen habitat.

##### *2022 update*

- 5.10.7 Habitats within the survey area remain in similar condition for breeding birds. The increase in woodland habitat at the expense of tall ruderal and fen may have slightly improved the condition of the survey area for woodland bird species, however these are likely to be focussed on common species given the young nature of the woodland with poor structural diversity. The survey area remains suitable for species recorded breeding in the fen such as Cetti's Warbler, Grasshopper Warbler and Cuckoo. The fen habitat is considered to remain the area of greatest interest for birds within the survey area.
- 5.10.8 The buildings within / adjacent to the survey area also represent opportunities for nesting birds, including the subway tunnel (B6) which contained old Swallow or House Martin nests on the supporting steel girders. The remaining buildings in the May Gurney land (B7 and B10) have been vandalised which presents opportunities for birds to access these for nesting, potentially including Swallow and House Martin.
- 5.10.9 Overall, the previous evaluation is considered to remain appropriate, i.e. the assemblage of breeding birds associated with the fen is of high value at the local level, while the assemblage associated with the remainder of the survey area is of low to moderate value at the local level.

#### 5.11 Fish

- 5.11.1 **Legislation.** A number of fish species are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Some fish species are listed on Annex 2 of the Habitats Directive, which means the conservation of these species require the designation of Special Areas of Conservation to protect their most important habitats. A number of fish species are also S41 Priority Species. Where such species are present, they should be assessed as important ecological features.
- 5.11.2 **Background Records and Assessment.** No data on fish was returned for the search area by NBIS. A previous search of fisheries data held by the Environment Agency for the Rivers Yare and Wensum in the vicinity of the survey area found records of Bullhead *Cottus gobio* upstream along the River Yare, but no other protected or red data book species, for records



dated between 1994 and 2008. This search was updated in 2022, to cover the period between 2008 and 2022.

- 5.11.3 The closest EA sample point on the River Wensum was New Mills Yard, located approximately 2.4 km north-west of the survey area (upstream). Nine species of fish have been recorded at this sample point since 2008, including the UK Priority Species Brown Trout *Salmo trutta* and Smelt *Osmerus eperlanus*.
- 5.11.4 The closest EA sample location on the River Yare comprised Cooper Lane, located approximately 2.0 km south-west of the survey area (upstream). Twelve species have been recorded at this location, including the UK Priority Species European Eel *Anguilla anguilla* and the Annex 2 species Bullhead. This species is also a qualifying feature of the River Wensum SAC, which lies approximately 5.4 km north-west of the survey area.
- 5.11.5 As such, the Rivers Wensum and Yare adjacent to the survey area have potential to support these Priority Species and Annex 2 species of fish, and as such are considered to be of local level to fish.

## 5.12 Desmoulin's Whorl Snail

- 5.12.1 **Legislation and Conservation Status.** Desmoulin's Whorl Snail is listed on Annex 2 of the Habitats Directive, which means the conservation of this species requires the designation of Special Areas of Conservation. As such, for species listed under Annex 2 it is the conservation of their supporting habitat that is the principal factor determining their survival, with the protection and management of sites considered to be the most appropriate action to maintain habitat suitable to support the species and hence maintain the favourable conservation status of the species.
- 5.12.2 In the UK, SAC sites have been selected to represent the population strongholds of Desmoulin's Whorl Snail, whereby the selected sites represent the largest populations present under a range of ecological conditions, including floodplain and wetlands. Indeed, The Broads SAC, located approximately 5.4 km east of the survey area, has been designated for supporting the main stronghold population of Desmoulin's Whorl Snail in East Anglia, while the River Wensum SAC located 5.4 km upstream (north-west) of the survey area has Desmoulin's Whorl Snail listed as a secondary reason for designation.
- 5.12.3 In this regard, smaller populations of this species are known to exist outside SACs where this species has been identified as being present, have often been designated as local conservation sites, as is the case within the survey area in the form of Carrow Abbey Marsh CWS.
- 5.12.4 Desmoulin's Whorl Snail is also listed as Nationally Scarce and a Priority Species.
- 5.12.5 **Background Records.** No records of Desmoulin's Whorl Snail were returned by NBIS for the search area.
- 5.12.6 **Survey Results and Evaluation**
- Summary of previous surveys*
- 5.12.7 Survey work for invertebrates undertaken in 2009 recorded the presence of Desmoulin's Whorl Snail in sedge-dominant vegetation and the ditches within the fen habitat.

### 2022 update

- 5.12.8 Update survey work was undertaken in October 2022 for Desmoulin's Whorl Snail, to evaluate the current distribution of this species within the fen habitat. The species was recorded at 40 of the 78 samples taken. The distribution of the species was patchy within the fen, and concentrated on the south-central part of the fen (see Plan 6592/ECO6).
- 5.12.9 Moisture levels varied across the survey area with patches of drier and damp ground (Levels 1 and 2), characterised by patches of Common Nettle and Water Mint which are indicators of the drying of marsh habitat, and wetter ground (Levels 4 and 5) with standing water in ditches, characterised by the hydrosere vegetation. Desmoulin's Whorl Snail was found in highest abundance in samples with higher moisture levels (between levels 3 and 5). There was a dramatic decrease in abundance when the moisture levels were between 1 and 2.
- 5.12.10 Given the relatively high population of this species, albeit patchily distributed within the fen, which is associated with the County Wildlife Site, the survey area is considered to be of value to this species at the county level.

## 5.13 Other Invertebrates

5.13.1 **Legislation.** A number of invertebrate species are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). In addition, Large Blue Butterfly *Maculinea arion*, Fisher's Estuarine Moth *Gortyna borellii lunata* and Lesser Whirlpool Ram's-horn Snail *Anisus vorticulus* receive protection under the Conservation of Habitats and Species Regulations 2017 (as amended); refer to Annex 6592/6 for detailed provisions. A number of invertebrates are also S41 Priority Species. Where such species are present, they should be assessed as important ecological features.

5.13.2 **Background Records.** Two invertebrate records were returned by NBIS adjacent to the survey area. Firstly, Bulrush Veneer Moth *Calamotropha paludella* (Nationally Scarce) was recorded adjacent to the east of the survey area, within Trowse Meadow, dated 2014. The Cinnabar Moth *Tyria jacobaeae* was recorded adjacent to the south of the survey area, which is a common species listed on the UK BAP for research purposes only. The next nearest invertebrate records relate to moth light-trapping undertaken in Trowse Churchyard, approximately 130 m south-east of the survey area. These comprise a number of UK Priority Species. Further afield, a number of Nationally Rare and Nationally Scarce species have been recorded within Carey Meadow and in parks within Norwich to the north-west of the survey area, primarily comprising Hymenoptera species.

### 5.13.3 Survey Results and Evaluation

#### *Summary of previous surveys*

5.13.4 Survey work for terrestrial invertebrates undertaken at the Deal Ground land in 2009 identified a total of 592 species of invertebrates. This assemblage included 17 Priority Species, one Nationally Rare RDB3 species (Twin-spotted Wainscot Moth *Archana geminipuncta*, associated with reedbeds), 14 Nationally Notable species, and 30 Nationally Local species. These species of conservation interest were primarily associated with wetland and ruderal habitats, which supported 40% and 42% of the species of conservation interest within the survey area, respectively. Woodland habitat was of comparatively lower interest, supporting 26% of the species of conservation interest within the survey area. Accordingly, the previous assessment concluded that the fen and its marginal scrub habitats, together with the ruderal habitats along the northern and western margins of the fen, represented the areas of greatest invertebrate interest within the survey area.

### 2022 update

- 5.13.5 During the Desmoulin’s Whorl Snail survey, all additional mollusc species were recorded and showed a depauperate mollusc community, with between zero and four mollusc species found at each sample location. Other than Desmoulin’s Whorl Snail, a total of nine mollusc species were found across the whole fen.
- 5.13.6 In terms of other invertebrates, the European Chinch Bug *Ischnodemus sabuleti* was found in very high abundance throughout the survey area, with thousands of individuals turning up in each sample. This species does not have any conservation designation and is commonly encountered in high numbers in wetland habitat.
- 5.13.7 The condition of habitats for invertebrates remains similar to the situation in 2009, albeit a gradual drying of the fen appears to have taken place at the expense of floristic diversity, while the area of open fen has slightly decreased because of tree and scrub encroachment (as described in Section 4 above). As such, any change in the invertebrate community associated with the fen is likely to represent an overall slight decline in conservation interest.
- 5.13.8 The ruderal habitats have substantially declined since the previous survey work, most notably the area to the north of the fen which now largely comprises closed-canopy woodland (albeit update tree survey work in June 2023 identified that much of this has been recently felled, which could allow tall ruderal vegetation to regenerate). However, tall ruderal habitat was recorded at a greater extent along the eastern and southern margins of the fen, adjacent to the River Yare. These areas are likely to be of particular importance for invertebrates, along with the fen and associated wet scrub and wet woodland habitats. Overall, the evaluation for invertebrates is considered to be unchanged from the previous assessment, i.e. the woodland assemblage is of value at the local level, the ruderal assemblage of value at the local to county level, and the wetland assemblage of value at the county level.

## 5.14 Summary

- 5.14.1 On the basis of the above, a summary of the evaluation of fauna is provided below:

**Table 5.2.** Evaluation summary of fauna forming important ecological features.

Species / Group	Supported by or associated with the survey area	Level of Importance
Bats – Roosting	Potential habitat in the form of trees and buildings	Local
Bats – Foraging / Commuting	Confirmed presence within survey area	Local
Water Vole	Could occur sporadically along River Yare	Negligible to Local
Otter	Could occur sporadically along River Yare	Negligible to Local
Other mammals	Potential for Harvest Mouse, Hedgehog and Polecat	Local
Reptiles	Confirmed presence within survey area	Local
Birds	Confirmed presence of species of conservation interest within survey area	Local
Fish	Potential for Priority Species adjacent to survey area	Local
Desmoulin’s Whorl Snail	Confirmed presence within survey area	County

<b>Species / Group</b>	<b>Supported by or associated with the survey area</b>	<b>Level of Importance</b>
Other Invertebrates	Confirmed presence of species of conservation interest within survey area	Woodland assemblage – Local Ruderal assemblage – Local to County Wetland assemblage - County

5.14.2 Other fauna supported by the survey area include non-priority species of mammals and non-protected amphibian species. These species do not form important ecological features.

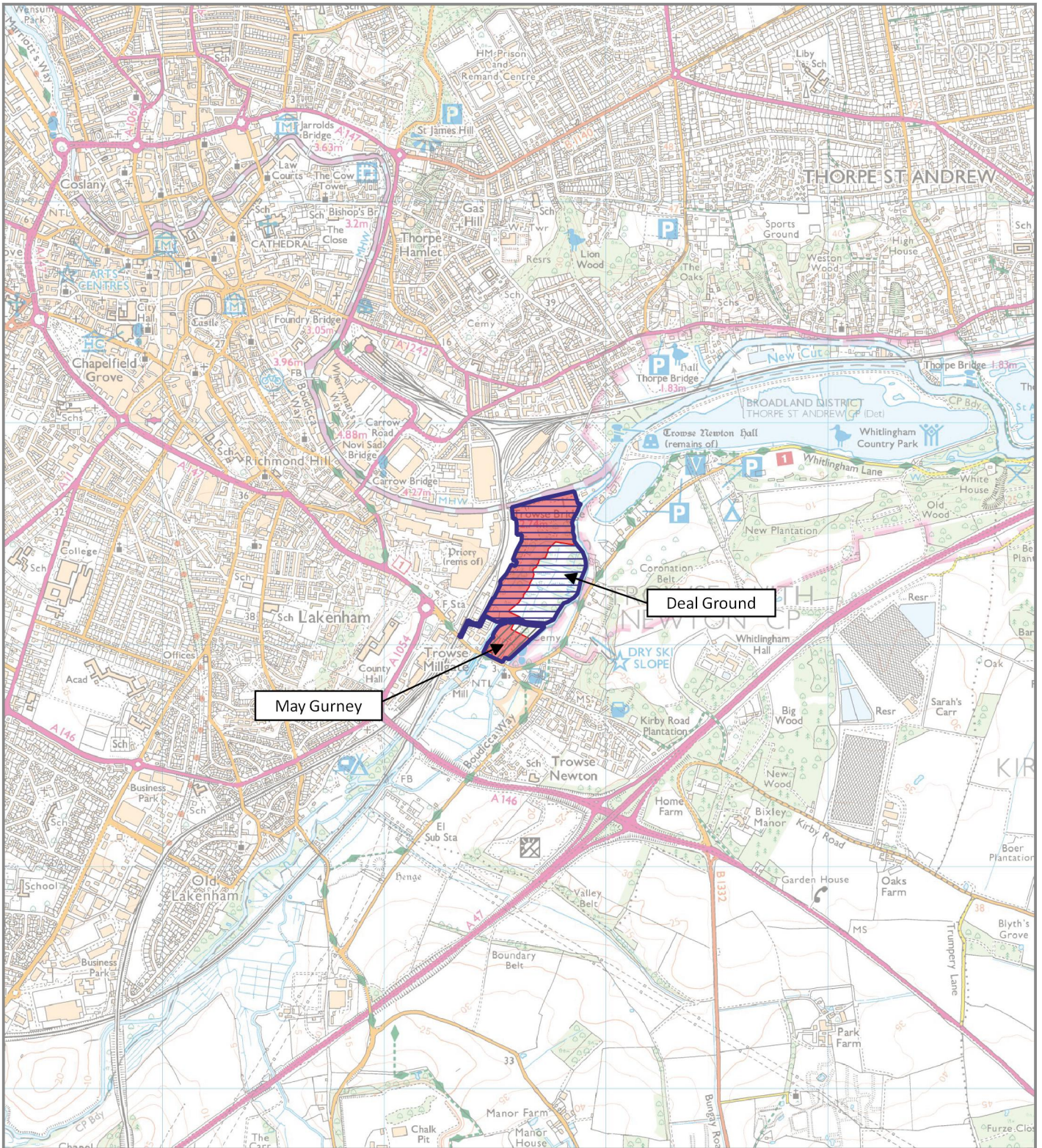
## 6 Conclusions

- 6.1.1 Aspect Ecology has carried out a Baseline Ecological Appraisal of the survey area, based on the results of a desktop study, Phase 1 habitat survey and a number of protected species surveys.
- 6.1.2 A number of statutory ecological designations are present in the vicinity of the survey area, most notably The Broads SAC / Broadland SPA, which lies approximately 5.4 km east of the survey area.
- 6.1.3 Part of the survey area itself is designated as a non-statutory CWS, named 'Carrow Abbey Marsh'. The CWS is designated for its tall fen and tall herb vegetation with young woodland and willow carr, and for the presence of Desmoulin's Whorl Snail *Vertigo moulinsiana*.
- 6.1.4 The Phase 1 habitat survey confirmed that the survey area supports a number of Priority Habitats of ecological importance, namely, eutrophic floodplain fen irreplaceable habitat and wet woodland, in addition to the River Yare which lies adjacent to the east of the survey area. The Nationally Scarce species Marsh Fern was recorded in one small location within the survey area, while Hoary Mullein (also Nationally Scarce) was previously recorded in tall ruderal vegetation and could remain present.
- 6.1.5 The habitats within the survey area remain suitable for a range of protected species previously recorded within the survey area, including Grass Snake and breeding birds, while certain features within the survey area have potential to support roosting bats, Water Vole, and Otter. Desmoulin's Whorl Snail was recorded within the fen habitat, while the overall invertebrate assemblage associated with the fen is considered to be of county value.

## Plan 6592/ECO1:

Site Location

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**Key:**

-  Site Boundary
-  Survey Area
-  Deal Ground
-  May Gurney



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**Deal Ground, Norwich**

Site Location

6592/ECO1

B/BG

December 2022

PROJECT	
TITLE	
DRAWING NO.	
REV	
DATE	

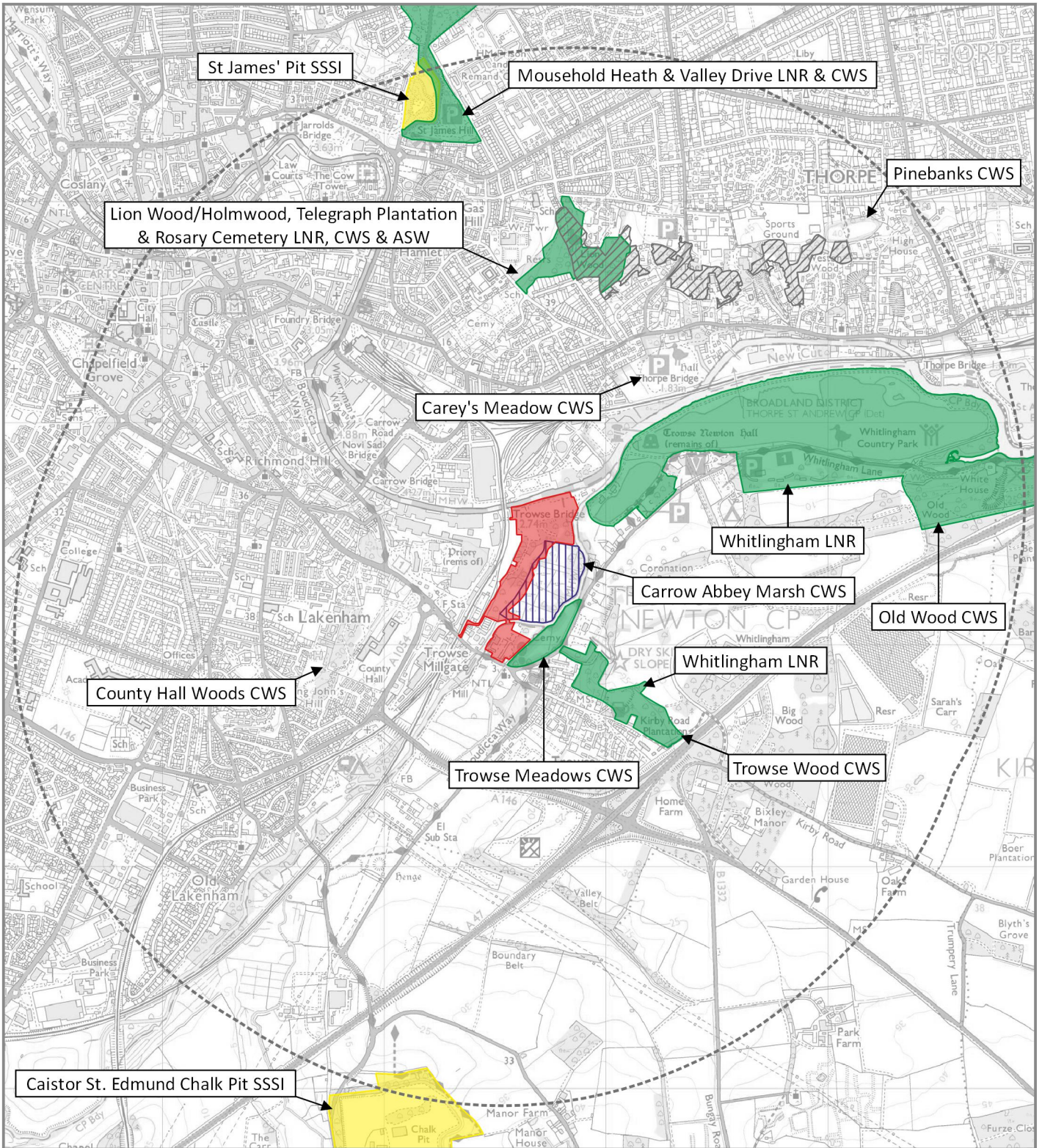


## **Plan 6592/ECO2:**

Ecological Designations

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**Key:**

- Site Location
- Site of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)
- County Wildlife Site (CWS)
- Ancient Semi Natural Woodland (ASW)
- 2km Study Area



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**Land at Deal Ground and  
 May Gurney  
 Ecological Designations**

6592/ECO2

B/JP

June 2023

PROJECT  
 TITLE  
 DRAWING NO.  
 REV  
 DATE



## **Plan 6592/ECO3:**

Habitats and Ecological Features

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**Key:**

- Site Boundary
- Survey Area
- County Wildlife Site
- Bramble
- Building/Structure
- Fen
- Hardstanding
- Japanese Knotweed
- Neutral Grassland
- Pond
- Previously Developed Land
- Scattered Japanese Knotweed
- Scrub
- Tall Ruderal
- Dry Woodland
- Wet Woodland
- Other Structure
- Amenity Planting
- Line of Trees
- Watercourse
- Ditch
- \* Scattered Scrub
- Tree
- Recently Felled Tree

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<p><b>Land at Deal Ground and May Gurney</b> Habitats and Ecological Features</p>	<p>PROJECT</p> <p>TITLE</p> <p>DRAWING NO.</p> <p>REV</p> <p>DATE</p>
<p>6592/ECO3</p> <p>D/AM</p> <p>June 2023</p>	<p>PROJECT</p> <p>TITLE</p> <p>DRAWING NO.</p> <p>REV</p> <p>DATE</p>

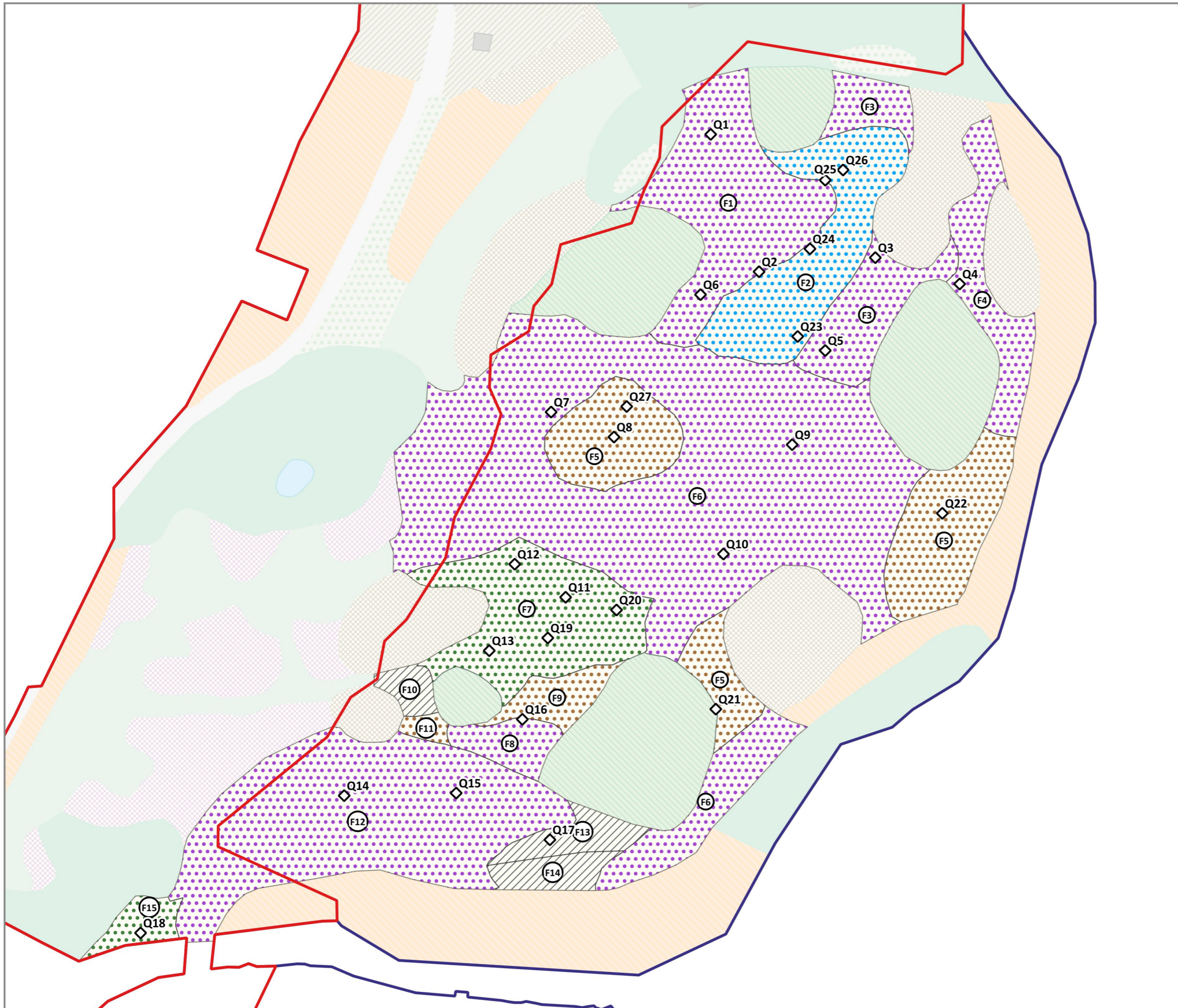


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## **Plan 6592/ECO4:**

NVC Survey Plan

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- Key:
- Site Boundary
  - Wider Survey Area
  - Quadrat Location
- NVC communities**
- S5 *Glyceria maxima* swamp
  - S6 *Carex riparia* swamp
  - S26 *Phragmites australis-Urtica dioica* tall-herb fen
  - S28 *Phalaris arundinacea* tall-herb fen
  - Non-swamp communities

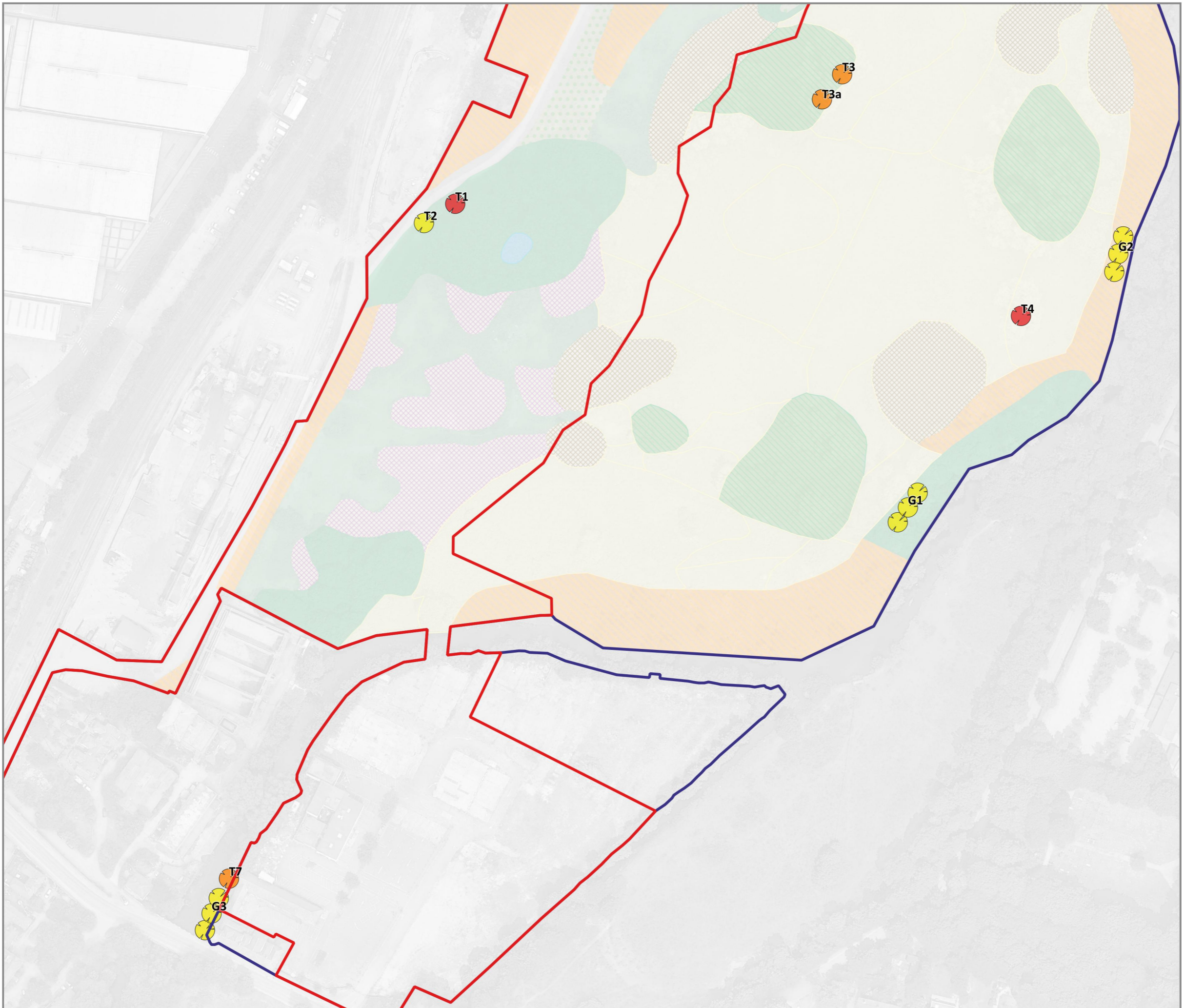
Deal Ground, Norwich	PROJECT
NVC Survey Plan	TITLE
6592/ECO4	DRAWING NO.
B/JP	REV
January 2023	DATE



## **Plan 6592/ECO5:**

Trees With Bat Potential

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- Key:
- Site Boundary
  - Wider Survey Area
  - Tree with Low Bat Roosting Potential
  - Tree with Moderate Bat Roosting Potential
  - Tree with High Bat Roosting Potential

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Deal Ground, Norwich	PROJECT
Trees with Bat Potential	TITLE
6592/EC05	DRAWING NO.
A/JP	REV
January 2023	DATE

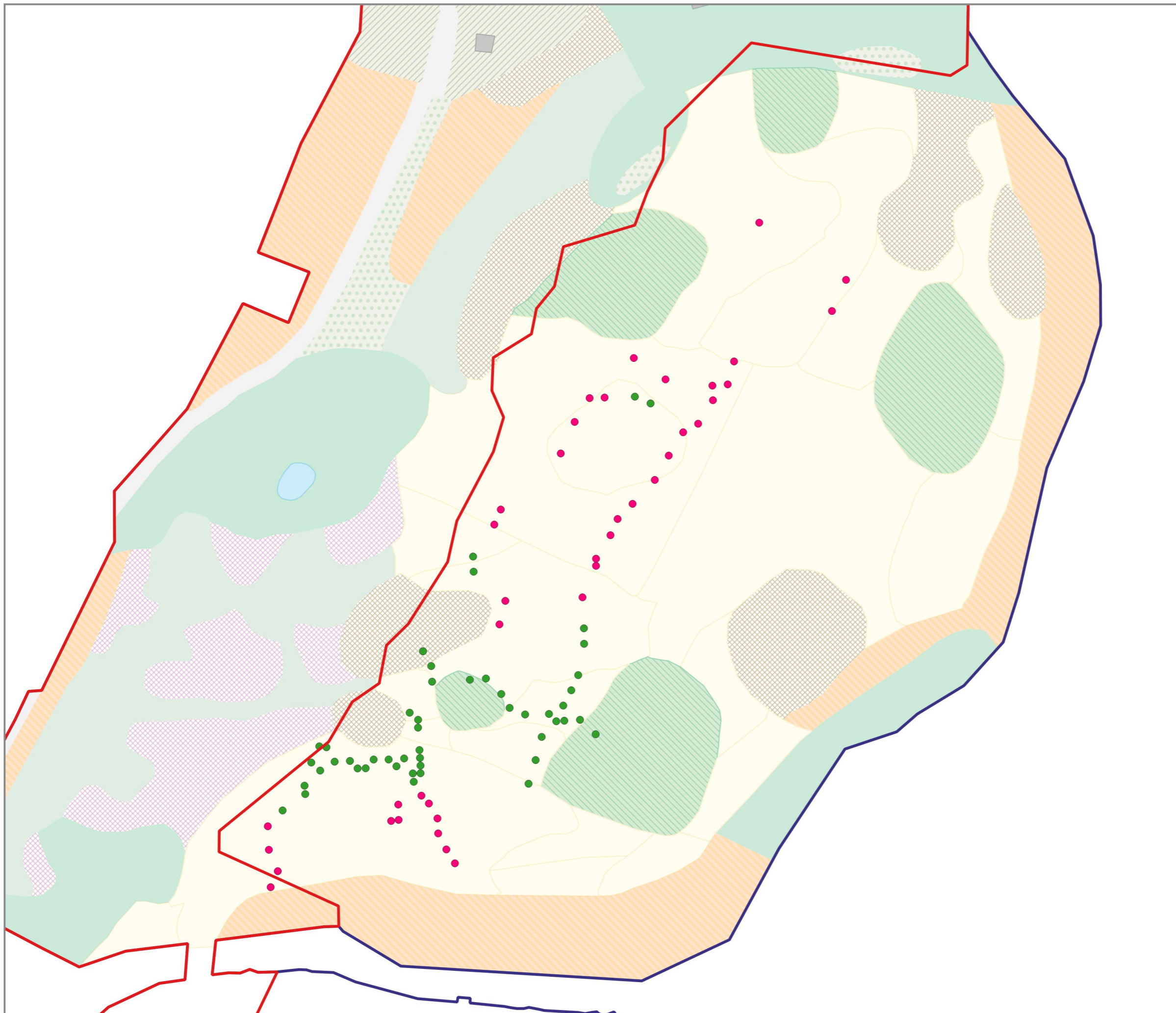


## **Plan 6592/ECO6:**

Desmoulin's Whorl Snail Survey

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- Key:
- Site Boundary
  - Wider Survey Area
  - Vertigo moulinsiana Present
  - Vertigo moulinsiana Absent



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Deal Ground, Norwich PROJECT

Demoulin's Whorl Snail Survey TITLE

6592/ECO6 DRAWING NO.

B/JP REV

January 2023 DATE



## Photographs

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Photograph 1: A typical view of the central fen (F6)



Photograph 2: Drier part of the fen in the south (F13)



Photograph 3: Neutral grassland (NG1)



Photograph 4: Tall ruderal with scattered tree cover along River Yare



Photograph 5: Dry woodland (W4)



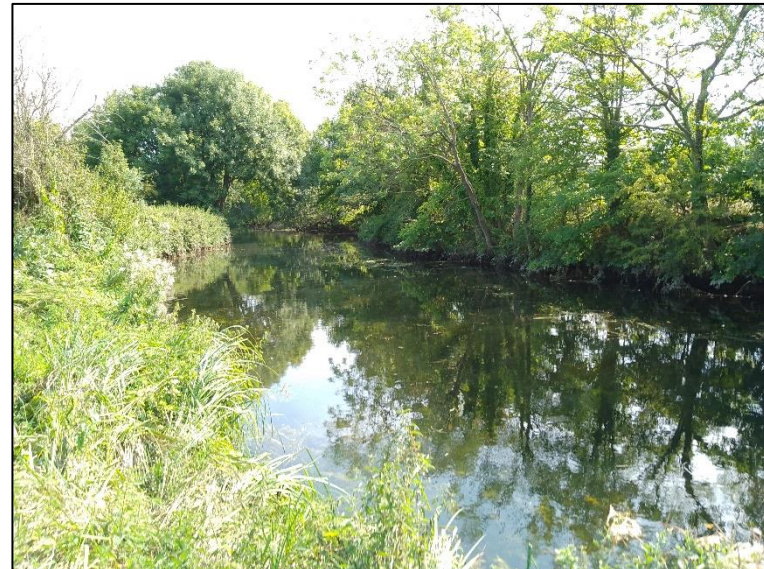
Photograph 6: Wet woodland (W10)



Photograph 7: River Wensum, looking east



Photograph 8: River Yare, looking east at the south margin of Deal Ground



Photograph 9: Well vegetated previously developed land (PDL8)



Photograph 10: Sparsely vegetated ground (PDL2)



Photograph 11: The old kiln (B4)



Photograph 12: Former Colemans Subway Tunnel (B6)



## **Annex 6592/1:**

Evaluation Methodology

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## Evaluation Methodology

1. The evaluation of ecological features and resources is based on professional judgement whilst also drawing on the latest available industry guidance and research. The approach taken in this report is based on that described by the Chartered Institute of Ecology and Environmental Management (CIEEM) 'Guidelines for Ecological Impact Assessment in the UK and Ireland' (2018)<sup>1</sup>.

### Importance of Ecological Features

2. Ecological features within the site/study area have been evaluated in terms of whether they qualify as 'important ecological features'. In this regard, CIEEM guidance states that *"it is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable"*.
3. Various characteristics contribute to the importance of ecological features, including:
  - Naturalness;
  - Animal or plant species, sub-species or varieties that are rare or uncommon, either internationally, nationally or more locally, including those that may be seasonally transient;
  - Ecosystems and their component parts, which provide the habitats required by important species, populations and/or assemblages;
  - Endemic species or locally distinct sub-populations of a species;
  - Habitat diversity;
  - Habitat connectivity and/or synergistic associations;
  - Habitats and species in decline;
  - Rich assemblages of plants and animals;
  - Large populations of species or concentrations of species considered uncommon or threatened in a wider context;
  - Plant communities (and their associated animals) that are considered to be typical of valued natural/semi-natural vegetation types, including examples of naturally species-poor communities; and
  - Species on the edge of their range, particularly where their distribution is changing as a result of global trends and climate change.
4. As an objective starting point for identifying important ecological features, European, national and local governments have identified sites, habitats and species which form a key focus for biodiversity conservation in the UK, supported by policy and legislation. These are summarised by CIEEM guidance as follows:

### *Designated Sites*

- Statutory sites designated or classified under international conventions or European legislation, for example World Heritage Sites, Biosphere Reserves, Wetlands of International Importance (Ramsar sites), Special Areas of Conservation (SAC), Special Protection Areas (SPA);

<sup>1</sup> 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

- Statutory sites designated under national legislation, for example Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Local Nature Reserves (LNR);
- Locally designated wildlife sites, e.g. Local Wildlife Sites (LWS).

#### *Biodiversity Lists*

- Habitats and species of principal importance for the conservation of biodiversity in England and Wales (largely drawn from UK BAP priority habitats and priority species), often referred to simply as Priority Habitats / Species;
- Local BAP priority species and habitats.

#### *Red Listed, Rare, Legally Protected Species*

- Species of conservation concern, Red Data Book (RDB) species;
- Birds of Conservation Concern;
- Nationally rare and nationally scarce species;
- Legally protected species.

5. In addition to this list, other features may be considered to be of importance on the basis of local rarity, where they enable effective conservation of other important features, or play a key functional role in the landscape.

#### Assigning Level of Importance

6. The importance of an ecological feature should then be considered within a defined geographical context. Based on CIEEM guidance, the following frame of reference is used:
  - International (European);
  - National;
  - Regional;
  - County;
  - District;
  - Local (e.g. Parish or Neighbourhood);
  - Site (not of importance beyond the immediate context of the site).
7. Features of 'local' importance are those considered to be below a district level of importance, but are considered to appreciably enrich the nature conservation resource or are of elevated importance beyond the context of the site.
8. Where features are identified as 'important' based on the list of key sites, habitats and species set out above, but are very limited in extent or quality (in terms of habitat resource or species population) and do not appreciably contribute to the biodiversity interest beyond the context of the site, they are considered to be of 'site' importance.
9. In terms of assigning the level of importance, the following considerations are relevant:



### *Designated Sites*

10. For designated sites, importance should reflect the geographical context of the designation (e.g. SAC/SPA/Ramsar sites are designated at the international level whereas SSSIs are designated at the national level). Consideration should be given to multiple designations as appropriate (where an area is subject to differing levels of nature conservation designations).

### *Habitats*

11. In certain cases, the value of a habitat can be measured against known selection criteria, e.g. SAC selection criteria, 'Guidelines for the selection of biological SSSIs' and the Hedgerows Regulations 1997. However, for the majority of commonly encountered sites, the most relevant habitat evaluation will be at a more localised level and based on relevant factors such as antiquity, size, species-diversity, potential, naturalness, rarity, fragility and typicalness (Ratcliffe, 1977). The ability to restore or re-create the habitat is also an important consideration, for example in the case of ancient woodland.
12. Whether habitats are listed as priorities for conservation at a national level in accordance with Sections 41 and 42 of the Natural Environment and Rural Communities Act (NERC) 2006, so called 'Habitats of Principal Importance' or 'Priority Habitats', or within regional or local Biodiversity Action Plans (BAPs) is also relevant, albeit the listing of a particular habitat under a BAP does not in itself imply any specific level of importance.
13. Habitat inventories (such as habitat mapping on the MAGIC database) or information relating to the status of particular habitats within a district, county or region can also assist in determining the appropriate scale at which a habitat is of importance.

### *Species*

14. Deciding the importance of species populations should make use of existing criteria where available. For example, there are established criteria for defining nationally and internationally important populations of waterfowl. The scale within which importance is determined could also relate to a particular population, e.g. the breeding population of common toads within a suite of ponds or an otter population within a catchment.
15. When determining the importance of a species population, contextual information about distribution and abundance is fundamental, including trends based on historical records. For example, a species could be considered particularly important if it is rare and its population is in decline. With respect to rarity, this can apply across the geographic frame of reference and particular regard is given to populations where the UK holds a large or significant proportion of the international population of a species.
16. Whether species are listed as priorities for conservation at a national level in accordance with Sections 41 and 42 of the Natural Environment and Rural Communities Act (NERC) 2006, so called 'Species of Principal Importance' or 'Priority Species', or within regional or local Biodiversity Action Plans (BAPs) is also relevant, albeit the listing of a particular species under a BAP does not in itself imply any specific level of importance.
17. Species populations should also be considered in terms of the potential zone of influence of the proposals, i.e. if the entire species population within the site and surrounding area were to be affected by the proposed development, would this be of significance at a local, district, county or wider scale? This should also consider the foraging and territory ranges of individual species (e.g. bats roosting some distance from site may forage within site whereas other species such as invertebrates may be more sedentary).

## **Annex 6592/2:**

CWS Citation

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**County Wildlife Site  
(Ref No: 1455)**

**Site Name: Carrow Abbey Marsh**

**District: Norwich**

**Grid Reference: TG 247073**

**Area: 7.9 ha**

**Site Description:**

This site comprises a mosaic of mainly tall fen and tall herb vegetation, with large areas of young woodland and willow carr. The site lies within a meander of the River Yare and there are a number of derelict drains crossing the marsh.

The fen vegetation is largely composed of reed sweet-grass (*Glyceria maxima*) and meadowsweet (*Filipendula ulmaria*) with some reed canary-grass (*Phalaris arundinacea*), great willowherb (*Epilobium hirsutum*), angelica (*Angelica sylvestris*) and marsh woundwort (*Stachys palustris*). Water forget-me-not (*Myosotis scorpioides*) and water chickweed (*Myosoton aquaticum*) were also noted growing near the drainage ditches.

The ditches themselves are choked with reed sweet-grass. Some contain bulrush (*Typha latifolia*), greater pond-sedge (*Carex riparia*), bittersweet (*Solanum dulcamara*), brooklime (*Veronica beccabunga*) and water-cress (*Nasturtium officinale*). Desmoulin's whorl snail (*Vertigo moulinsiana*) is known to occur in some of these ditches.

The areas of tall herb are mainly composed of nettles (*Urtica dioica*) and great willow-herb.

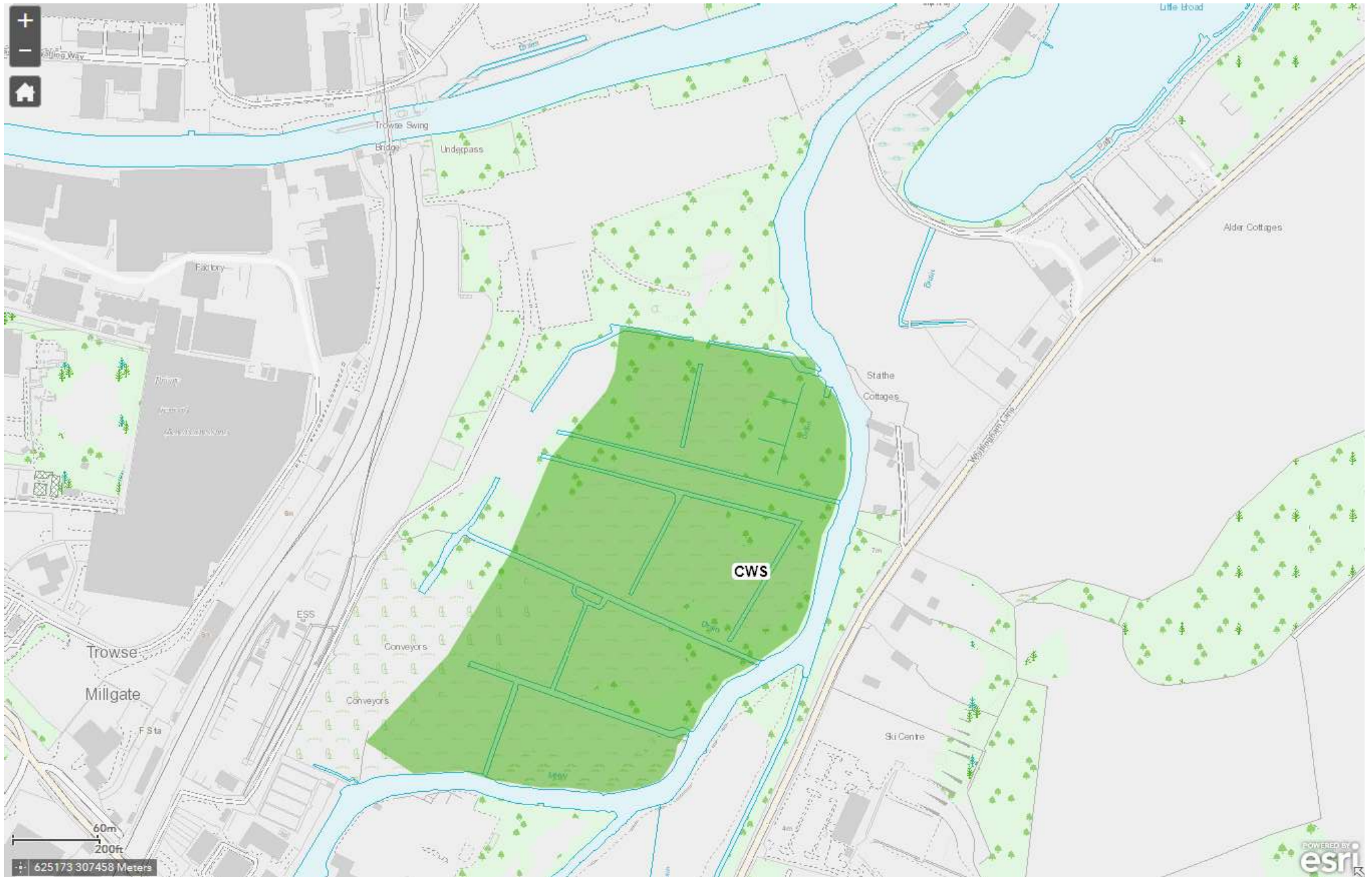
To the north of the site is a block of scrub, composed mainly of crack willow (*Salix fragilis*), sallow (*Salix cinerea*), occasional hawthorn (*Crataegus monogyana*) and some alder (*Alnus glutinosa*). This area also includes a derelict brick furnace. Where the land is drier and had been more disturbed in the past, elder (*Sambucus nigra*), silver birch (*Betula pendula*) and downy birch (*Betula pubescens*) occur, with thickets of bramble (*Rubus* spp.). Open areas are dominated by reed sweet grass, hoary willow-herb and nettles. Green figwort (*Scrophularia umbrosa*) is also known to occur in this area.

There are a few willow (*Salix* spp) and hawthorn bushes scattered throughout the site. An area of willow, sycamore (*Acer pseudoplatanus*) and elder borders the river in places.

## **Annex 6592/3:**

CWS Boundary (Norwich Local Plan)

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## **Annex 6592/4:**

NVC Quadrat Data

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Quadrat data from NVC survey undertaken in 2022. Numbers for each species represent percentage cover. 'Fen area' refers to Plan 6592/ECO3. Quadrats are colour coded according to their NVC community.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27
Grid reference (preceded by TG)	24757 07428	24776 07374	24805 07384	24844 07372	24802 07343	24753 07365	24701 07314	24719 07309	24789 07306	24762 07263	24700 07246	24680 07259	24670 07225	24613 07168	24657 07169	24683 07198	24693 07157	24533 07114	24693 07230	24720 07241	24759 07202	24848 07279	24796 07347	24796 07383	24802 07410	24809 07414	24724 07321
Sward height (cm)	90	90	90	110	90	120	170	70	90	110	180	0	190	120	100	70	70	180	180	190	160	150	170	150	150	150	120
Fen area	F1	F2	F3	F4	F3	F1	F6	F5	F6	F6	F7	F7	F7	F12	F12	F9	F13	F15	F7	F7	F5	F5	F2	F2	F2	F2	F5
Main NVC community	S6	S28	S6	S6	S6	S6	S6	S5	S6	S6	S26	S26	S26	S6	S6	S5	Not classified	S26	S26	S26	S5	S5	S28	S28	S28	S28	S5
Ellenberg value wetness	7.9	8.0	8.1	7.4	8.1	8.1	8.3	9.8	8.0	8.3	9.6	9.6	9.5	8.4	8.2	9.6	7.1	8.4	9.8	9.6	9.9	9.6	8.1	8.2	8.2	8.0	9.9
Angelica sylvestris		5							5								2						2				
Calystegia sepium				2					10	10				20				5									
Carex riparia	80	5	90	65	85	75	90		70	60		20		65	60					20			10	20	5	15	
Cirsium arvense	5			2				1									60						5			2	
Epilobium hirsutum						5		1																	1		
Equisetum palustre													10	10		1	30										
Eupatorium cannabinum	10	1	5		5	5				2	1			2	2		30						5				
Filipendula ulmaria	1		1	1			10	10	5	2					1					1	1		1			1	2
Galium aparine																											1
Glyceria maxima								85								90			2		90	90					90
Humulus lupulus											10		5									1					1
Impatiens capensis												1															
Lycopus europaeus									5																		
Lythrum salicaria														5		2											
Persicaria amphibia		5	5		5	5	20	10	5	25	10	10		20	10	5			5	20	5	5	10	10	10	5	10
Phalaris arundinacea		90		5		15									5	15							80	70	90	80	
Phragmites australis											80	80	95					60	95	70							
Rumex conglomeratus																	5										
Scrophularia auriculata																					1						
Scutellaria galericulata																5											
Solanum dulcamara												5											1				
Stachys palustris	5	2	5		5	1	5		15	2	5		5		15	5	5				5	2	10	5		5	
Thalictrum flavum			1	1					5							1				2							
Urtica dioica		3		30	2				2	10							5	40	5			10				2	
Vicia cracca			2																							2	
Number of species	5	7	7	7	5	6	4	5	9	7	5	4	5	6	7	7	7	3	5	4	5	6	8	4	4	8	5

## **Annex 6592/5:**

NVC MAVIS Output

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MAVIS output for all quadrats and subsets of quadrats according to their NVC community categorisation. For each category, the top ten communities are presented along with their percentage score.

Area categorised as:	All quadrats		S5		S6		S26		S28	
Top 10 matching communities / sub-communities	OV26	58.82	S5	64.79	S6	53.97	S26	51.99	S6	50.08
	S26	58.47	S5a	52.52	S5	45.61	S4	51.84	S28	48.35
	S6	56.85	S26	46.13	M27b	44.67	S4a	49.72	S28b	45.45
	OV26b	54.05	OV26	45.45	OV26b	44.23	S26d	49.38	S28a	42.96
	S5	53.18	S26d	42.9	S26	43.72	S5	47.17	S26	40.25
	S26d	51.22	S6	38.06	OV26	43.37	S6	40.82	OV26	40.11
	M27b	49.16	S5b	37.89	S26a	40.69	S26a	40.57	M27b	38.89
	OV26d	47.01	S28	36.12	S26d	38.3	S26b	40.07	S5	37.19
	S26b	43.64	S4	35.23	S26b	38.04	OV26	39.1	S26b	35.93
	S4	42.43	OV26b	35.09	OV26d	37.95	S4b	38.1	OV26d	34.57

## **Annex 6592/6:**

### Legislation Summary

## LEGISLATION SUMMARY

1. In England and Wales primary legislation is made by the UK Parliament, and in Scotland by the Scottish Parliament, in the form of Acts. The main piece of legislation relating to nature conservation in the UK is the Wildlife and Countryside Act 1981 (as amended).
2. Acts of Parliament confer powers on Ministers to make more detailed orders, rules or regulations by means of secondary legislation in the form of statutory instruments. Statutory instruments are used to provide the necessary detail that would be too complex to include in an Act itself<sup>1</sup>. The provisions of an Act of Parliament can also be enforced, amended or updated by secondary legislation.
3. In summary, the key pieces of legislation relating to nature conservation in the UK are:
  - Wildlife and Countryside Act 1981 (as amended)
  - Protection of Badgers Act 1992
  - Hedgerows Regulations 1997
  - Countryside and Rights of Way (CROW) Act for England and Wales 2000
  - Natural Environment and Rural Communities Act 2006
  - Conservation of Habitats and Species Regulations 2017
4. A brief summary of the relevant legislation is provided below. The original Acts and instruments should be referred to for the full and most up to date text of the legislation.
5. **Wildlife and Countryside Act 1981 (as amended)**. The WCA Act provides for the notification and confirmation of Sites of Special Scientific Interest (SSSIs) identified for their flora, fauna, geological or physiographical features. The Act contains strict measures for the protection and management of SSSIs.
6. The Act also refers to the treatment of UK wildlife including protected species listed under Schedules 1 (birds), 5 (mammals, herpetofauna, fish, invertebrates) and 8 (plants).
7. Under Section 1(1) of the Act, all wild birds are protected such that it is an offence to intentionally:
  - Kill, injure or take any wild bird;
  - Take, damage or destroy the nest of any wild bird whilst in use\* or being built;
  - Take or destroy an egg of any wild bird.

\* The nests of birds that re-use their nests as listed under Schedule ZA1, e.g. Golden Eagle, are protected against taking, damage or destruction irrespective of whether they are in use or not.
8. Offences in respect of Schedule 1 birds are subject to special, i.e. higher, penalties. Schedule 1 birds also receive greater protection such that it is an offence to intentionally or recklessly:
  - Disturb any wild bird included in Schedule 1 while it is building a nest or while it is in, on or near a nest containing eggs or young;
  - Disturb dependent young of such a bird.

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<sup>1</sup> <http://www.parliament.uk/business/bills-and-legislation/secondary-legislation/statutory-instruments/>

9. Under Section 9(1) of the Act, it is an offence to:
  - Intentionally kill, injure or take any wild animal included in Schedule 5.
10. In addition, under Section 9(4) it is an offence to intentionally or recklessly:
  - Obstruct access to, any structure or place which any wild animal included in Schedule 5 uses for shelter or protection; or
  - Disturb any wild animal included in Schedule 5 while occupying a structure or place which it uses for that purpose.
11. Under Section 13(1) it is an offence:
  - To intentionally pick, uproot or destroy any wild plant listed in Schedule 8; or
  - Unless the authorised person, to intentionally uproot any wild plant not included in Schedule 8.
12. The Act also contains measures (S.14) for preventing the establishment of non-native species that may be detrimental to native wildlife, prohibiting the introduction into the wild of animals (releases or allows to escape) and plants (plants or causes to grow) listed under Schedule 9.
13. **Protection of Badgers Act 1992.** The Act aims to protect the species from persecution, rather than being a response to an unfavourable conservation status, as the species is in fact common over most of Britain. It should be noted that the legislation is not intended to prevent properly authorised development. Under the Act it is an offence to:
  - Wilfully kill, injure, take, possess or cruelly ill-treat\* a Badger, or attempt to do so;
  - To intentionally or recklessly interfere with a sett# (this includes disturbing Badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it).

\* the intentional elimination of sufficient foraging area to support a known social group of Badgers may, in certain circumstances, be construed as an offence

# A sett is defined as “any structure or place which displays signs indicating current use by a Badger”. Natural England advice (June 2009) is that a sett is protected so long as such signs remain present, which in practice could potentially be for some time after the last actual occupation by Badger. Interference with a sett includes blocking tunnels or damaging the sett in any way
14. Licences can be obtained from the Statutory Nature Conservation Organisation (SNCO) for development activities that would otherwise be unlawful under the legislation, provided there is suitable justification. The SNCO for England is Natural England.
15. **Hedgerows Regulations 1997.** ‘Important’ hedgerows (as defined by the Regulations) are protected from removal (up-rooting or otherwise destroying). Various criteria specified in the Regulations are employed to identify ‘important’ hedgerows for wildlife, landscape or historical reasons.
16. **Countryside and Rights of Way (CRoW) Act for England and Wales 2000.** The CRoW Act provides increased measures for the management and protection of SSSIs and strengthens wildlife enforcement legislation. Schedule 12 of the Act amends the species provisions of the WCA 1981, strengthening the legal protection for threatened species. The Act also introduced a duty on Government to have regard to the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted, in accordance with the Convention on Biological Diversity.

17. **Natural Environment and Rural Communities Act 2006.** Section 41 of the NERC Act requires the Secretary of State to publish a list of habitats and species that are of principal importance for the conservation of biodiversity in England. The S41 list is used to guide decision-makers such as local planning authorities, in implementing their duty under Section 40 of the Act, to have regard to the conservation of biodiversity in England, when exercising their normal functions. 56 habitats and 943 species of principal importance are included on the S41 list. These are all the habitats and species in England that were identified as requiring action in the UK Biodiversity Action Plan (BAP).
18. **Conservation of Habitats and Species Regulations 2017 (as amended).** The Regulations enact the European Union's Habitats Directive (92/43/EEC) in the UK. The Habitats Directive was designed to contribute to the maintenance of biodiversity within member states through the conservation of sites, known in the UK as Special Areas of Conservation (SACs), containing habitats and species selected as being of EC importance (as listed in Annexes I and II of the Habitats Directive respectively). Member states are required to take measures to maintain or restore these natural and semi-natural habitats and wild species at a favourable conservation status.
19. The Regulations also require the compilation and maintenance of a register of European sites, to include SACs and Special Protection Areas (SPAs)<sup>2</sup> classified under Council Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive). These sites constitute the Natura 2000 network. The Regulations impose restrictions on planning decisions likely to significantly affect SPAs or SACs.
20. The Regulations also provide protection to European Protected Species of animals that largely overlaps with the WCA 1981, albeit the provisions are generally stricter. Under Regulation 43 it is an offence, *inter alia*, to:
  - Deliberately capture, injure or kill any wild animal of a European Protected Species;
  - Deliberately disturb any wild animals of any such species, including in particular any disturbance likely to impair their ability to survive, to breed or reproduce, to rear or nurture their young, to hibernate or migrate, or which is likely to affect significantly their local distribution or abundance;
  - Deliberately take or destroy the eggs of such an animal;
  - Damage or destroy a breeding site or resting place of such an animal.
21. Similar protection is afforded to European Protected Species of plants, as detailed under Regulation 47.
22. The Regulations do provide a licensing system that permits otherwise illegal activities in relation to European Protected Species, subject to certain tests being fulfilled.

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<sup>2</sup> Special Protection Areas (SPAs) are protected sites classified in accordance with Article 4 of the EC Directive on the Conservation of Wild Birds (79/409/EEC) (aka the Birds Directive), which came into force in April 1979. SPAs are classified for rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly occurring migratory species.

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