Thameside Ecological Survey 2025

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Introduction

This document has been written to give a brief overview of the ecological surveys that were carried out at Thameside Nature Discovery Park in 2025. As part of the management plan for the site, it is required that breeding bird, grassland and butterfly surveys be carried out annually to provide a snapshot of the health of the reserve as these species are good indicators of habitat condition.

In addition to these mandatory surveys other groups have also been studied to provide a broader picture of what can be found on the reserve. This includes surveys for reptiles, bats, orchids, moths and a general invertebrate survey.

The surveys followed industry best practice methods which will be described in more detail in their respective sections.

Note that some surveys do not require certain species to be recorded and so they are not included in the raw data. That does not mean that the species is absent from the site but that it is not relevant to the survey.

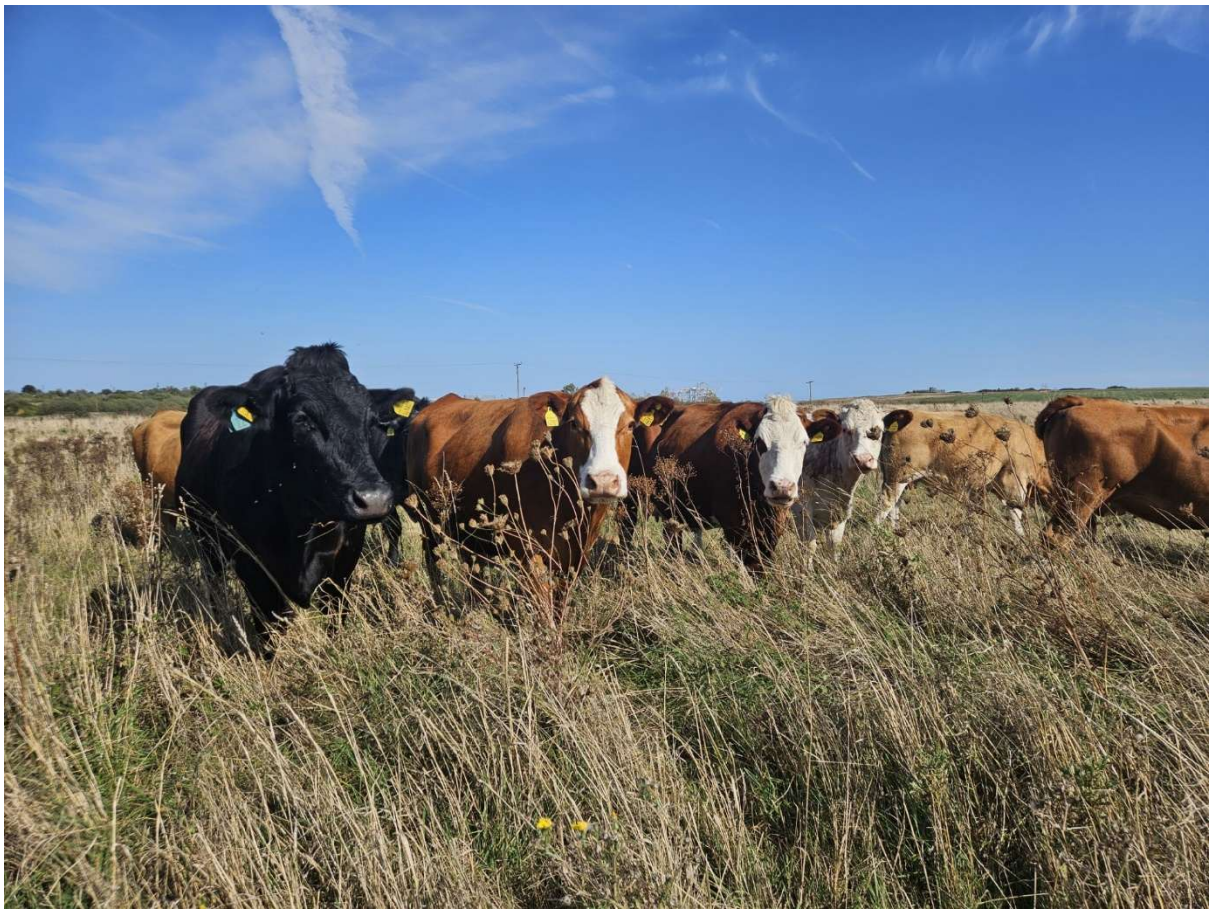

Plate 1. Cattle in Summer Pasture

Birds

Breeding bird surveys were conducted on site during the breeding season. Two visits were made, the first, or early visit in April and the second late visit in late May. The same transect was walked from the NDC along Mucking Creek, through the Summer Pasture towards Golden Gates Lake and East Tilbury. It then ran from the EDL power station and cut across the top of the main landfill site and back up to the NDC. We also carried out our additional survey starting in "Back of Sandpit" which follows its northern boundary before heading north towards the cranes along the river and then returning south to the starting point. The surveys were carried out from 6:30am – 9:30am. During the survey, all birds (excluding juveniles) that were seen or heard and their distance from the transect were recorded. The two transects were carried out on separate days.

The highest count of individual birds on the main transect was **1264** and **61** species were recorded across the reserve (16% and 3% increases respectively from 2024).

Blackbird
Blackcap
Black-headed gull
Blue tit
Buzzard
Canada goose
Carrion crow
Cetti's Warbler
Chaffinch
Chiffchaff
Collared dove
Common gull
Coot
Cormorant
Corn bunting
Cuckoo
Dunnock
Egyptian goose
Goldeneye
Goldfinch
Great tit
Great-crested grebe
Green woodpecker
Greenfinch
Grey heron
Greylag goose
Herring gull
House sparrow
Kestrel
Kingfisher
Lesser whitethroat
Linnet
Little egret
Little grebe
Long-tailed tit
Magpie
Mallard
Meadow pipit
Moorhen
Nightingale
Pheasant
Pochard
Reed bunting
Reed warbler
Ring-necked parakeet
Robin
Rook
Sand martin
Sedge warbler
Shelduck
Skylark
Song thrush
Starling
Stonechat
Swallow
Swift
Tufted duck
Whitethroat
Wigeon
Wood Pigeon
Wren

The Sandpit transect though shorter than the main Thameside transect still presented good species diversity and good numbers, especially for species associated with scrub and reedbeds such as whitethroat, grasshopper warbler, sedge warbler and reed warbler. The highest count of individual birds was **428** and **44** species were recorded. (0.7% increase on numbers and 13% decrease on species from 2024).

Barn Owl	Goldfinch	Pheasant
Blackbird	Grasshopper	Pochard
Blackcap	warbler	Reed bunting
Black-headed gull	Great tit	Reed warbler
Blue tit	Great-crested grebe	Robin
Canada goose	Greylag goose	Rook
Carrion Crow	Kestrel	Sedge warbler
Cetti's warbler	Linnet	Shelduck
Chiffchaff	Little grebe	Shoveler
Collared dove	Magpie	Skylark
Common gull	Mallard	Song thrush
Coot	Marsh harrier	Tufted duck
Cormorant	Moorhen	Whitethroat
Dunnock	Nightingale	Wood Pigeon
Gadwall	Oystercatcher	Wren

Skylark numbers increased again this year with good numbers across the site with the Coronation Meadow supporting **8 birds**, but similarly to 2024 the greatest numbers were in Lease Areas 5 and 6. Works in these areas have slowed down in 2025 which has reduced the amount of disturbance from machinery. Other species such as blackcap, chiffchaff, reed warbler, whitethroat and Cetti's warbler all saw an increase in numbers or remained roughly the same on the main transect. Linnet had a particularly good year, seeing a 205% increase in numbers from 2024 on the main transect!

Though numbers were bolstered by birds recorded on the Sandpit transect and it saw an overall percentage increase in numbers compared to 2024, all the key species saw a slight decrease in numbers. It is possible that this relates to the shift in location of works on this side of the site and an increase in heavy plant activity has deterred several species with whitethroat seeing the greatest decline (56% decrease).

Overall, the surveys recorded **39 skylarks** on the main transect and **16** on sandpit**, 4 corn bunting** on the main transect, **43 whitethroat** on the main transect and **23** on sandpit and **58 linnet** on the main transect and **6** on sandpit among others. **Nightingale** numbers remained low again this year on the survey (**2 singing males**) but saw an increase in Stanford Warren. There were two additional singing males recorded outside of the survey. The Coronation Meadow grasshopper warblers were absent this year and sadly only one was recorded during the Sandpit survey. The Sandpit survey once again showed concentrated groups of **reed** and **sedge warbler** around the Twin Lakes as well as a **marsh harrier** in the same place as 2024 which may be the same bird. The Main Transect recorded **3 cuckoo** again for the fourth year in a row, all in the same locations as previous years which gives us a fascinating glimpse into the loyalty these birds have to territory despite the thousands of miles they travel each year.

As always there are birds using the reserve that are not picked up on our surveys. There have been regular sightings of several species of raptor including **kestrel**, **buzzard, red kite** and **hobby**. **Marsh harrier** are becoming increasingly common and are likely to be breeding on site and although still rare, both male and female **hen harrier** are appearing every year. **Barn** and **short eared owl** appeared more frequently this year with the latter showing nicely over the Summer Pasture and Coronation Meadow shortly before returning to mainland Europe to breed. **Barn owls** were confirmed to be using the Creek View box this year, though it is unclear yet whether this was to breed or just as a roost. **Peregrines**

have been seen throughout the year, but breeding was unconfirmed. Interestingly a pair of **Raven** were recorded sporadically throughout the year using the cranes also which could suggest that the peregrines were unsuccessful this year.

The autumn migration appeared quieter than previous years though we did record transient species such as **wheatear** and **whinchat** passing through as well as bolstered numbers of waders such as **black-tailed godwit**, **avocet**, **grey plover** and **sandpipers**. There were reports later in the autumn that large numbers of **brent goose** had been spotted upriver along with **common scoter** and **gannet** possibly owing to the strong easterly winds we were experiencing**.**

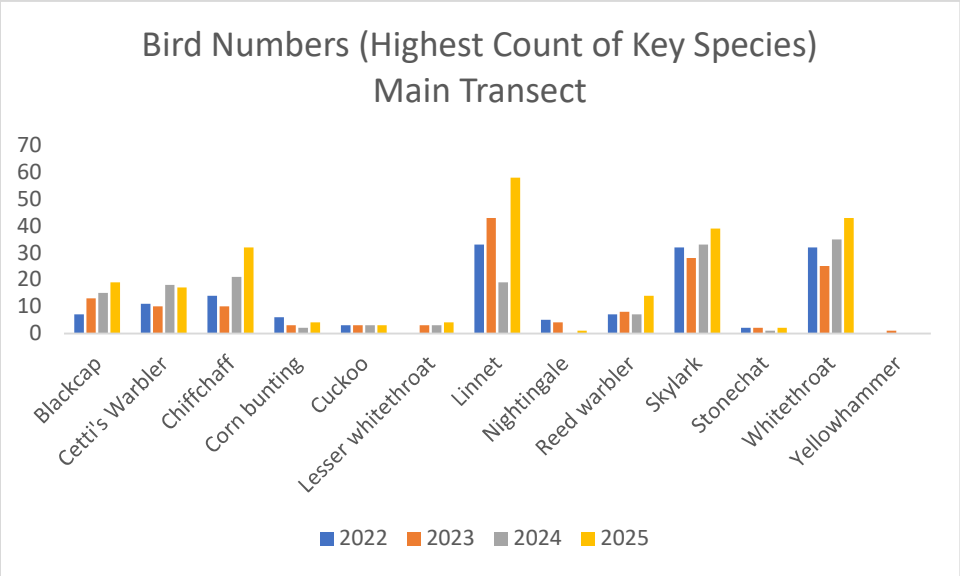

Figure 1. Highest count of key bird species between 2022 and 2025 for the main transect

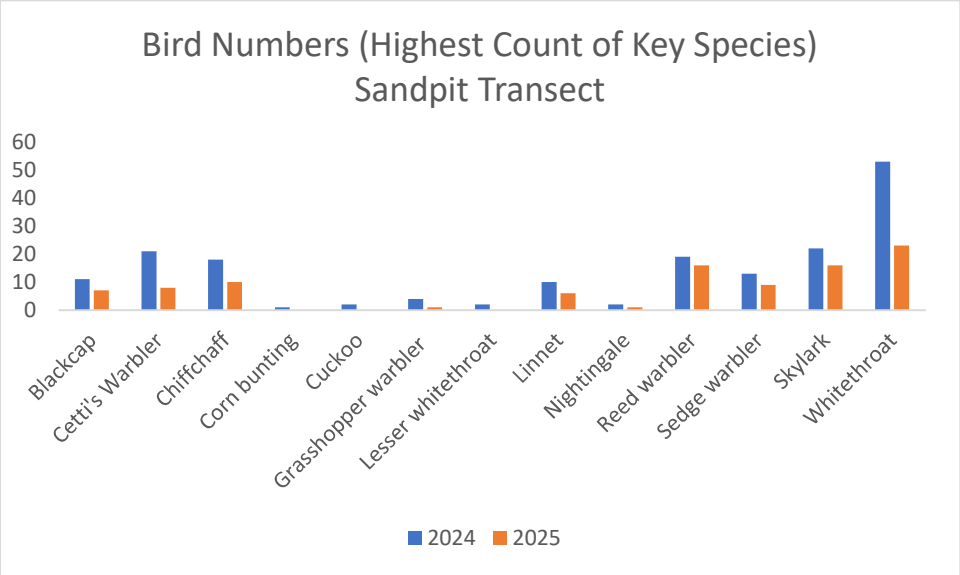

Figure 2. Highest count of key bird species between 2024 and 2025 for the Sandpit transect

Grassland and Meadows

Four surveys were conducted on the reserve over the course of the season using the Rapid Grassland Assessment (RGA) method. The site was divided up into sections (in this case by fields) and 20 points were plotted in a "W" shape through each field. At each stop data was collected about the length of the sward, the percentage cover of herbs, bare ground and scrub cover. As well as this, the presence of a list of positive and negative indicator species were recorded which were used to help determine the health of the field being surveyed.

The survey areas were the Thames Slope, Summer Pasture (North and South), Coronation Meadow and Thousand Orchid.

The below list of positive indicators remained the same as previous years as they are good indicators of healthy neutral grassland. Species present on site have been highlighted in **bold**.

Agrimony
Bee Orchid
Betony
Bird's-foot Trefoil
Black Knapweed
Bugle
Burnet-saxifrage
Common Spotted Orchid
Cowslip
Cuckoo Flower
Devil's-bit Scabious
Field Scabious
Goat's-beard
Grass Vetchling
Green-winged Orchid
Harebell
Lady's Bedstraw
Meadow Vetchling
Meadowsweet
Milkwort sp.
Ox-eye Daisy
Pepper Saxifrage
Pignut
Ragged Robin
Red Clover
Salad Burnet
Selfheal
Tormentil
Yellow Rattle

At each stopping point on the transect the surveyor would scan the surrounding area and mark yes or no as to whether any of these species were present. The threshold for a floristically healthy field is that at least 50% of the stops have one or more positive indicators.

In the Coronation Meadow, which is our most floristically diverse field, 18 stops had at least one of these species. The most abundant from the list were **yellow rattle, ox-eye daisy** and **red clover.** The herb ratio in the Coronation Meadow remained largely the same across the transect. With the average herb coverage being around 47% - marginally lower than 2024.

The Summer Pastures were surveyed as one in 2025. They displayed a much lower level of diversity with an overall herb coverage of 33% but continued to support good numbers of species of moths and butterflies such as **small/Essex skipper**, **meadow brown, small heath, Marbled White** and **cinnabar moth** due to the ruderal species of plant that grow there (e.g. Spear thistle, ragwort etc).

Thousand Orchid showed similar results to that of 2024, where 14 of the 20 stops had at least one positive indicator species. The most abundant from the list were **ox-eye daisy**, **goat's-beard** and **betony**.

Thames slope is more species rich than it initially appears where despite only 9 stops having positive indicators, the overall average herb coverage was 47%. This combined with its interesting vegetation structure due to rabbit grazing make this compartment particularly valuable to invertebrates.

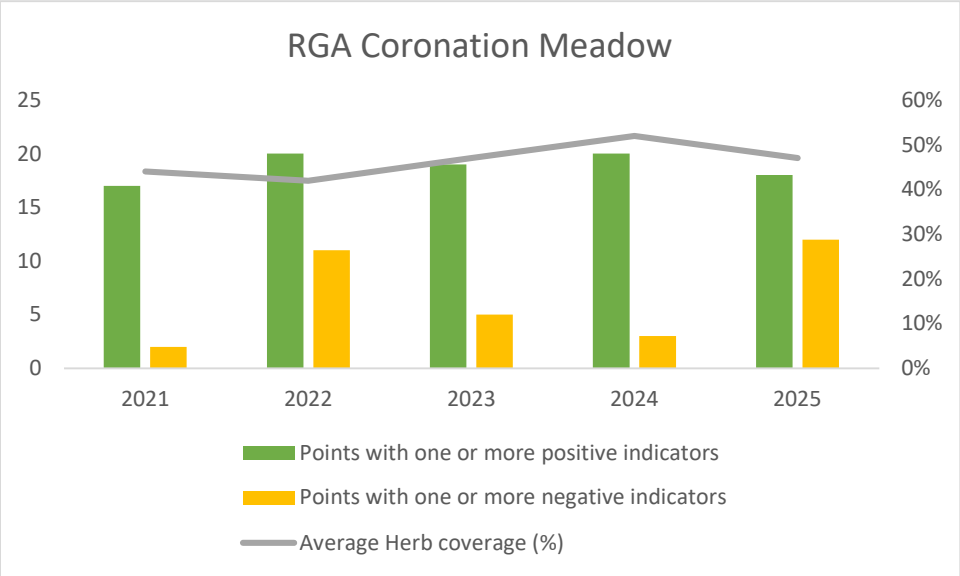

Figure 3. Indicator abundance and percentage herb coverage in Coronation Meadow (2021-2025)

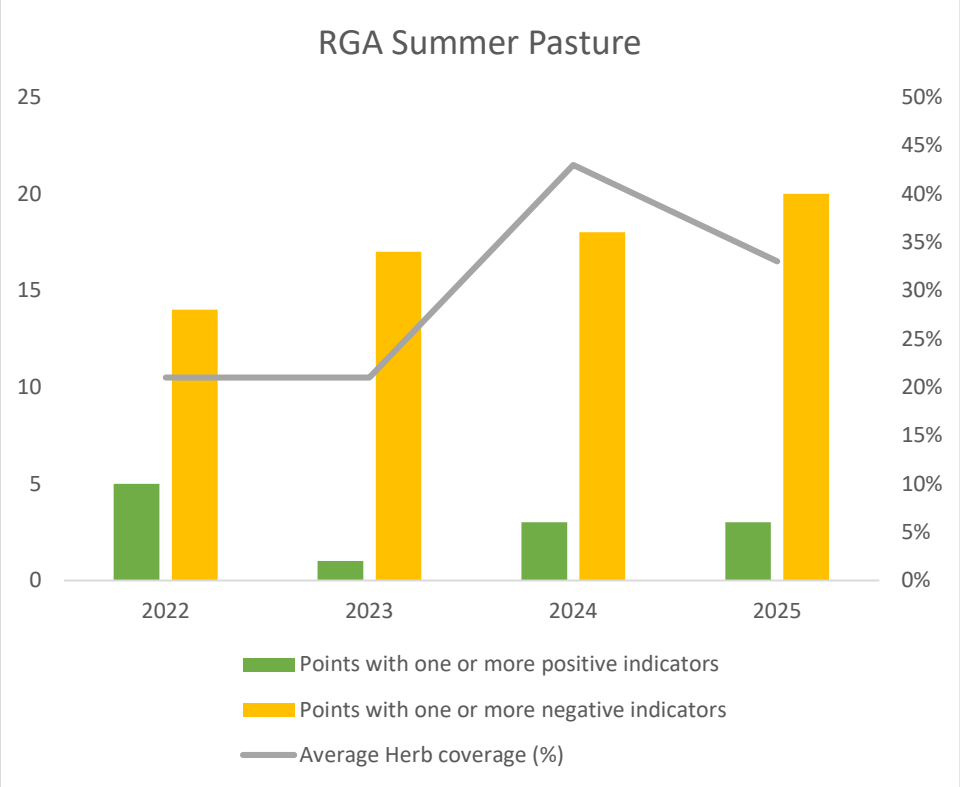

Figure 4. Indicator abundance and percentage herb coverage in Summer Pasture (2022-2025)

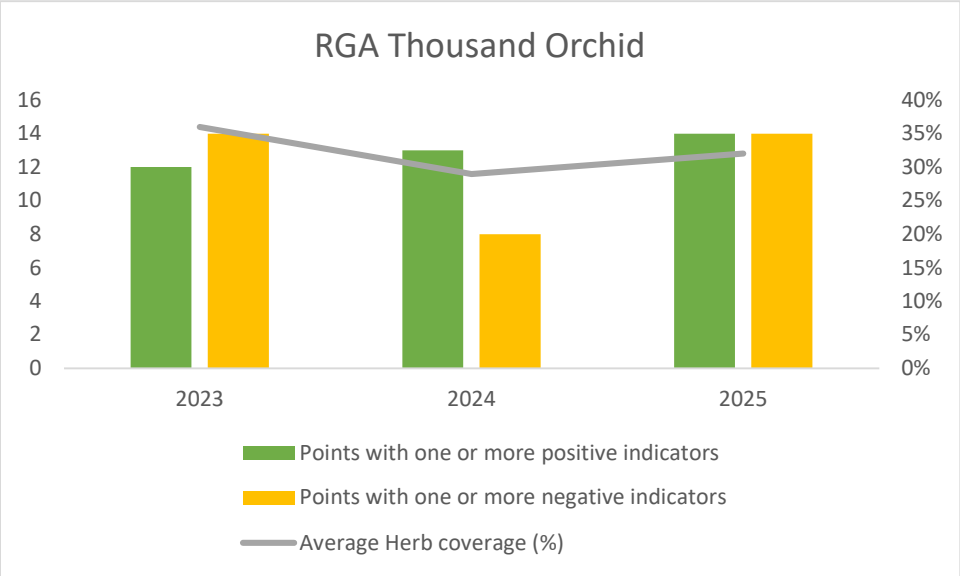

Figure 5. Indicator abundance and percentage herb coverage in Thousand Orchid (2023-2025)

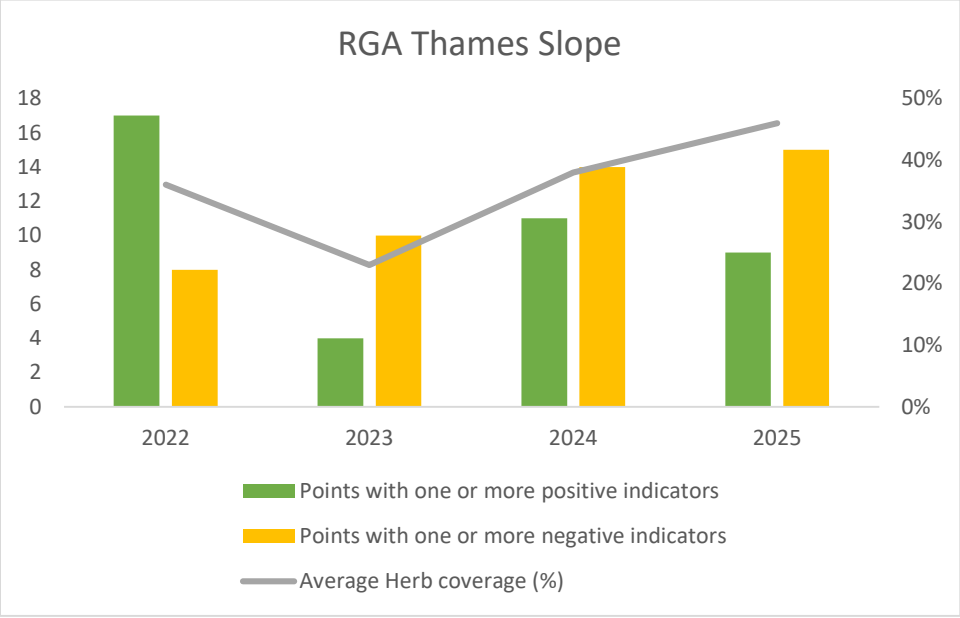

Figure 6. Indicator abundance and percentage herb coverage in Thame Slope (2022-2025)

Orchids

Following the success of the last year, we elected to repeat the process of carrying out dedicated orchid counts across the site to cover as much of the Thameside lease areas as we could. Anecdotal sightings were still recorded.

Green winged orchids appeared in the same two locations as they have done previously. Although their numbers increased again this year from **5 to 8 spikes**, they don't appear to be spreading further through their associated compartments. They were not recorded in any other parts of the site.

Pyramidal orchids had a disastrous year with a massive decline in numbers from last year's 4000+ to less than 100 in 2025. We think that for the most part, this is due to the exceptionally dry weather we experienced through spring and summer. In Thousand Orchid, it was noted that large numbers of basal leaves appeared at the beginning of the year but only a small portion of these went on to produce flower spikes.

Bee orchids also suffered in the drought showing a 77% decrease across the site. 64 spikes were recorded, most of which were found in the Coronation Meadow and Thames Slope. Though numbers were primarily the common variety, there were a few records of the less common variety "flavescens" which has a much paler appearance caused by a hypochromatic mutation resulting in reduced pigmentation.

Finally, 2 spikes of **common spotted orchid** were recorded in the area immediately adjacent to the Nature Discovery Centre. This area has since been brought into our Mini Meadow project in the hope to increase botanical diversity here and increase numbers of common spotted orchid.

It is important to note that our understanding of orchid lifecycles is limited, and new research would suggest that these plants are significantly more complex than we initially thought. This could also be a contributing factor to the significant reduction in flower spikes this year.

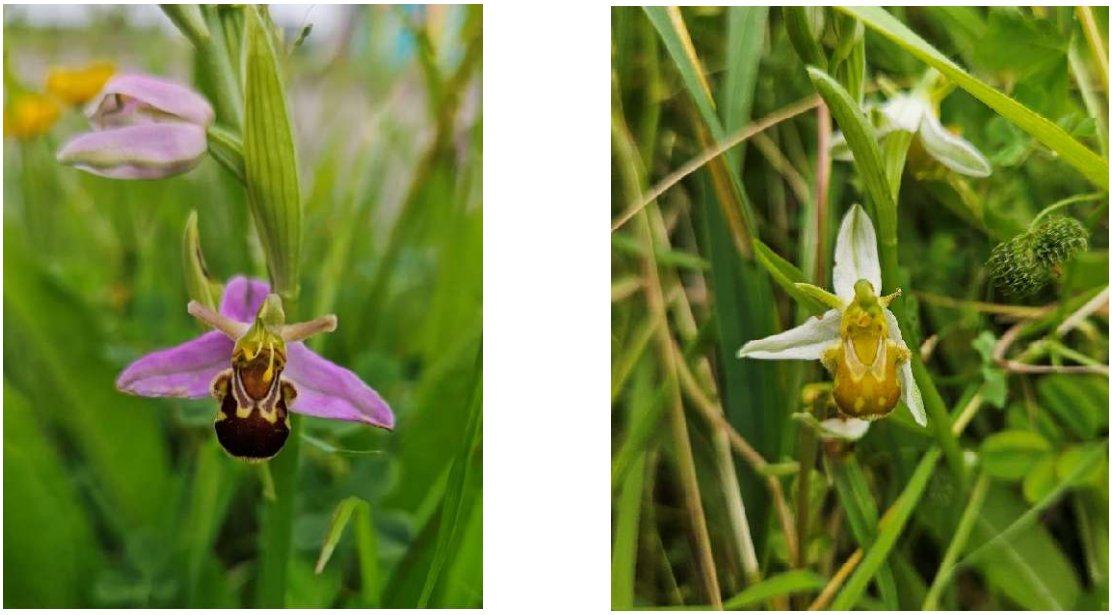

Plate 2. Common bee orchid, Ophrys apifera (left and hypochromatic variety, Ophrys apifera var. flavescens (right)

Butterflies

Butterflies were recorded using the standard UKBMS methodology which is similar in structure to that of the breeding bird survey whereby a transect was set up and then divided into sections. We divided the transect up using natural changes in habitat or fabricated changes across the site such as boundaries between fields etc.

A survey was completed every week between April and September where we recorded any species of butterfly that was observed while walking the transect. The surveys were ideally carried out in suitable weather conditions i.e., light wind, warm temperatures and no rain and at appropriate times of day (between 11am and 3pm). During the peak of summer, surveys were conducted earlier in the day as we found that exceptionally high temperatures seemed to reduce numbers also.

The list below shows the species that were observed throughout the survey season:

Small skipper
Essex skipper
Large skipper
Clouded yellow
Brimstone
Large white
Small white
Green-veined white
Orange tip
Green hairstreak
Purple hairstreak
Small copper
Brown argus
Common blue
Holly blue
Red admiral
Painted lady
Small tortoiseshell
Peacock
Comma
Speckled wood
Wall
Marbled white
Gatekeeper
Meadow brown
Ringlet
Small heath

The sum of the highest counts of all species was **1332** butterflies, and a total of **27** species were recorded across the season. Butterflies had a resurgence in 2025 following a difficult year previously which saw reductions in invertebrate numbers across the country. Thameside even recorded a new species – the **purple hairstreak**!

The most frequently recorded species during the 2025 survey were **gatekeeper**, **Essex/Small skipper**, and **marbled white**. Of particular note, the **wall brown** (endangered) and **small heath** (vulnerable) were observed in record numbers across the site. Several other species, including **brown argus**, **holly blue**, and **gatekeeper**, exhibited greater abundance compared with 2024 records.

Purple hairstreak were recorded for the first time on site, associated with the developing stands of oak around Golden Gates Lake. This species is entirely dependent on oak, with all life stages occurring within the canopy of its host tree. Adults typically remain within the upper canopy, making them difficult to detect; however, females descend to lower branches to lay their eggs. Eggs overwinter on twigs and hatch in early spring, synchronising larval emergence with the flush of new oak foliage upon which the larvae feed.

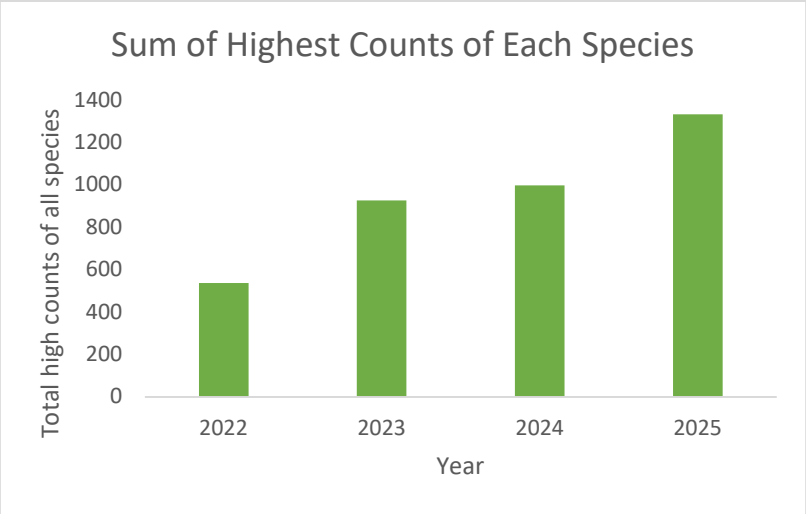

Figure 7. Annual trend in overall butterfly numbers at TNP (2022-2025)

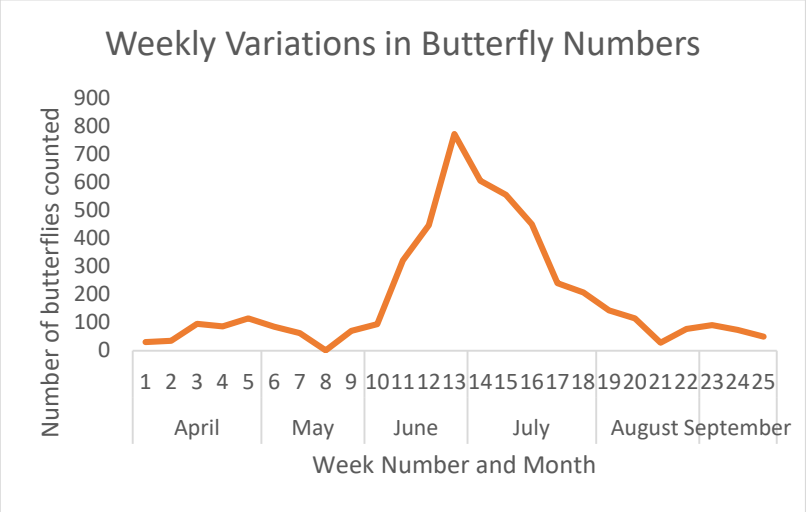

Figure 8. Weekly variation in the abundance of butterflies throughout the observation period

Plate 3. Purple hairstreak

Reptiles

Reptile numbers decreased slightly from 2024 based on the total number of sightings of animals decreasing from 114 to 86 records.

Corrugated bitumen sheets and corrugated tin sheets were put out across the site in March and allowed to 'bed in' for a month before the surveys began.

Surveys were carried out monthly from April – June and in September and October. It is standard practice not to include July and August simply because the refugia warm up to quickly and the reptiles move off into the undergrowth far earlier in the day which could result in inaccurate data.

Ideally surveys were carried out on mild days with broken cloud and little to no wind. The best temperature for surveying is between 10 and 18 degrees as this is when reptiles are more likely to use refugia to thermoregulate.

The trend in abundance remains the same, with slow worms being the most recorded, followed by common lizard, adder and finally grass snake.

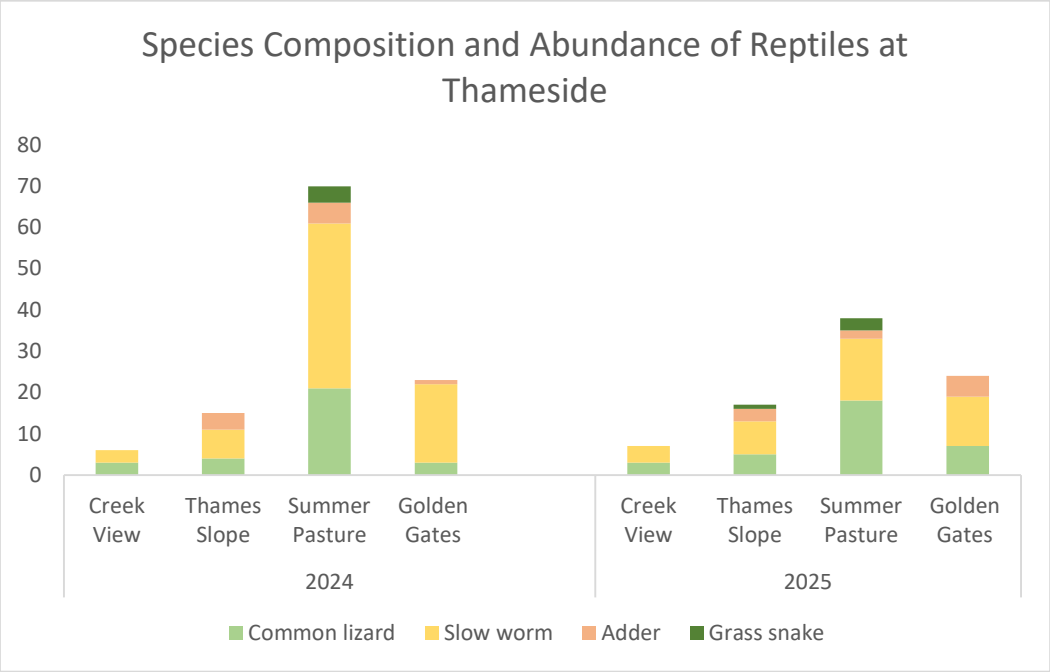

Figure 9. Abundance of four reptile species (common lizard, slow worm, adder, grass snake) recorded across four survey areas (Creek View, Thames Slope, Summer Pasture, Golden Gates) during consecutive years (2024 and 2025). Data illustrate interannual variation.

Adder Identification

We continued to document any sightings of adder across the site and took photographs of them to attempt to identify individuals. These photos were cross referenced with images captured in previous years to see if any of the same animals were being picked up year on year. 12 individual snakes were photographed, one of which we think was recorded in the same location for three years running.

Plate 4. Images of the adders that were documented across the site in 2025

The images below show how the diamond pattern on adders can be used to identify individuals. The pattern is much like a fingerprint and so is unique to each individual. This male has been recorded in the northern Summer Pasture for three consecutive years all within a few meters.

As this project evolves, we are learning that there are several challenges in positively identifying individual animals through pattern alone. Though we are confident that the below images are of the same animal, the position in which the animal is sitting can distort the patterns on the skin causing them to become stretched or compressed which makes it difficult to be completely accurate.

Moving forward, we plan to take more detailed photographs that will enable us to use scale structure as well as pattern resulting in more accurate identification.

Plate 5. Male adder found in Summer Pasture. This individual presents a dark and blocky pattern. The images also highlight the challenges we encountered caused by animal movements and positioning resulting in distortion to the pattern.

Moths

2025 was the fourth year moth species diversity was recorded.

Most of these species are nocturnal and were recorded after a trap was set up. The others are day flying moths and were recorded incidentally while working on site or surveying for other species such as butterflies etc. We used a Heath Trap using a low light actinic bulb which was placed in the Wilder Learning Area and left on overnight. Egg boxes were placed in the trap to provide places for captured moths to roost. The trap was then checked in the morning and the results recorded.

A total of **57** species were recorded.

Agriphila straminella
Anchara sp.
Barred straw
Bird cherry ermine
Bright-line brown-eye
Buff-tip
cherry bark tortrix
Cinnabar
Clouded drab
Cochylinchora atricapitana
Common footman
Common rustic
Common wainscot
Coronet
Dark strawberry tortrix
Dingy footman
Dot moth
Double square spot
Dusky sallow
Dwarf cream wave
Epinotia nisella
Fen wainscot
Fiery clearwing
Flame shoulder
Flax tortrix
Fruit tree leafroller
garden grass veneer
Green oak tortrix
Hebrew character
Large yellow underwing
Lesser broad-bordered yellow underwing
Lesser spotted pinion
Lime-speck pug
long-legged tabby
Oak eggar
Obscure wainscot
Orange swift
Pale prominent
Pebble prominent
Phycitodes binaevella
Poplar hawkmoth
Red underwing
Ringed china mark
Ruby tiger
Rusty dot pearl
Sandy longhorn
Scalloped oak
Scarce footman
setaceous hebrew character
Small grey
Snout
Southern wainscot
The spectacle
The uncertain
Toadflax brocade
Turnip moth
twin barred knot horn

Plate 6. Red underwing moth exhibiting its highly effective camouflage against the bark of a hawthorn tree.

Bats

4 species were recorded: **common pipistrelle**, **soprano pipistrelle**, **Daubenton's** and **noctule**.

The transect began on Crown Green and went to the northern tip of Golden Gates Lake before returning to the start point. The survey was carried out in August when sunset was at approximately 20:00.

Conditions on the evening of the survey were good and we recorded excellent numbers of common pipistrelle along the entirety of the transect. Activity was focused on the lake end around a group of trees including a large eucalyptus which we suspect the bats are using as a roost. Though not native, the eucalyptus has naturally flaky bark which provides an ideal shelter for these tiny mammals which weigh in at approximately 5 grams!

The second most abundant species was the noctule which was detected at the village end of the transect. Noctules are Britain's largest species of bat weighing anywhere between 18 to 40 grams. They favour woodland habitats and so it is likely that they are using Mucking Wood to roost and hunt.

A variety of different detectors were used to ID the bats. A traditional detector which only gave out the frequency of the echo location was used along with an ID chart as well as a more modern plug-in detector which works in conjunction with an app called the EchoMeter. The EchoMeter provides real-time identification as well as an amplified playback setting which allows surveyors to hear the bat's echo location calls while they walk the transect.

Invertebrates

Invertebrate populations and assemblages can tell us a lot about the health and current state of an ecosystem. This year in addition to sweep netting the ranger team have been using pitfall traps to assess invertebrate assemblage. The benefit of pitfall traps being that they capture ground-dwelling species such as beetles, that are often missed when sweep netting.

The pitfall traps were left out over a 24-hour period in 4 locations (Thousand orchid, Thames slope, Summer Pasture and Coronation Meadow). Samples were collected monthly from May to August and identified by order and at species level when possible.

Out of the 151 samples ~85% of the invertebrate population was comprised of just 5 orders: Coleoptera, Araneae, Hymenoptera, Hemiptera and Diptera. The high number of beetles (Coleoptera) represented is likely due to the sampling method, although it also suggests that beetle numbers are well-established and abundant at Thameside. A rich beetle community is an indicator of habitat variety as they are an incredibly specialised group with individual species being tied to specific plants decaying wood and dung. Araneae (spiders) being the second most recorded order suggests healthy predator populations and therefor an abundance of prey species on site.

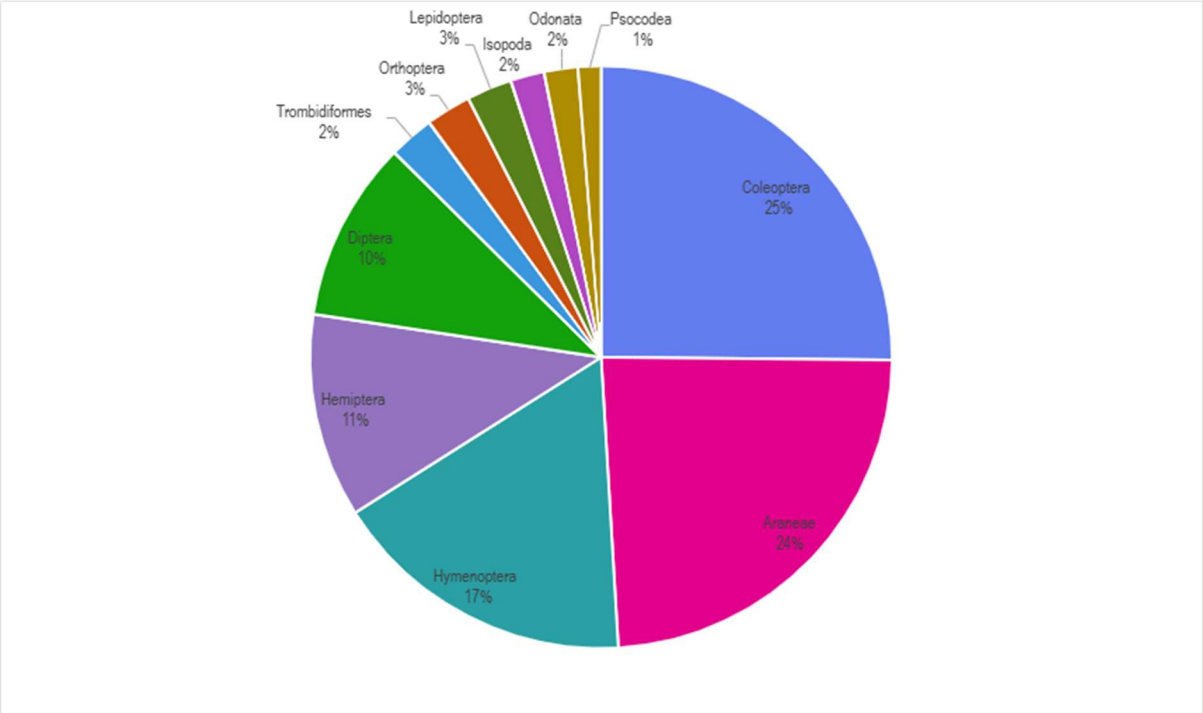

Figure 10. Chart showing the weighting of the invertebrate assemblage at TNP. Coleoptera being the most abundant followed by Araneae and Hymenoptera.

By submitting our species list to Pantheon, we were able to analyse the relationships between the invertebrates we recorded and the habitats they depend on. Thameside is predominantly grassland and this was reflected in our results: 42 species were associated with tall sward and scrub (the dominant habitat type), while 15 species were linked to short sward and bare ground (including two near scarce and one nationally scarce species). We also recorded several species associated with woodland and wetland habitats, further highlighting the site's overall habitat diversity.

Although this provides some valuable insight into invertebrate assemblage at Thameside, to obtain a more accurate picture further and more in-depth surveys are required. In 2026 we will aim continue pitfall trap surveys but pair them with more regular sweep netting which will help to reduce sampling bias.

Plate 7. A late instar of a tortoise shieldbug, a scarce species that favours brownfield sites (left) and a flame-shouldered blister beetle, which is a new record for Essex (right).

Site maps and Transects

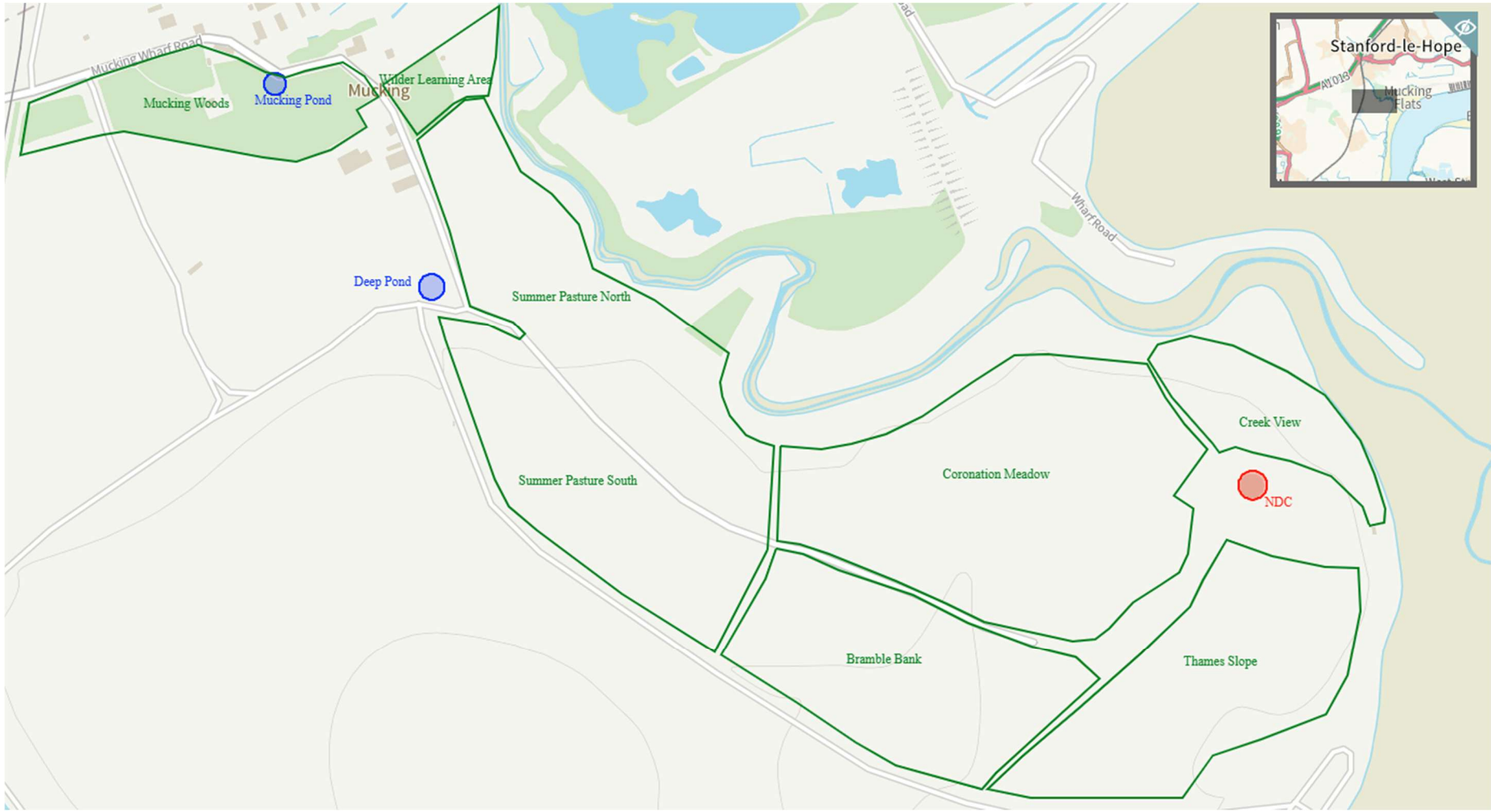

Figure 11. Map of the north site

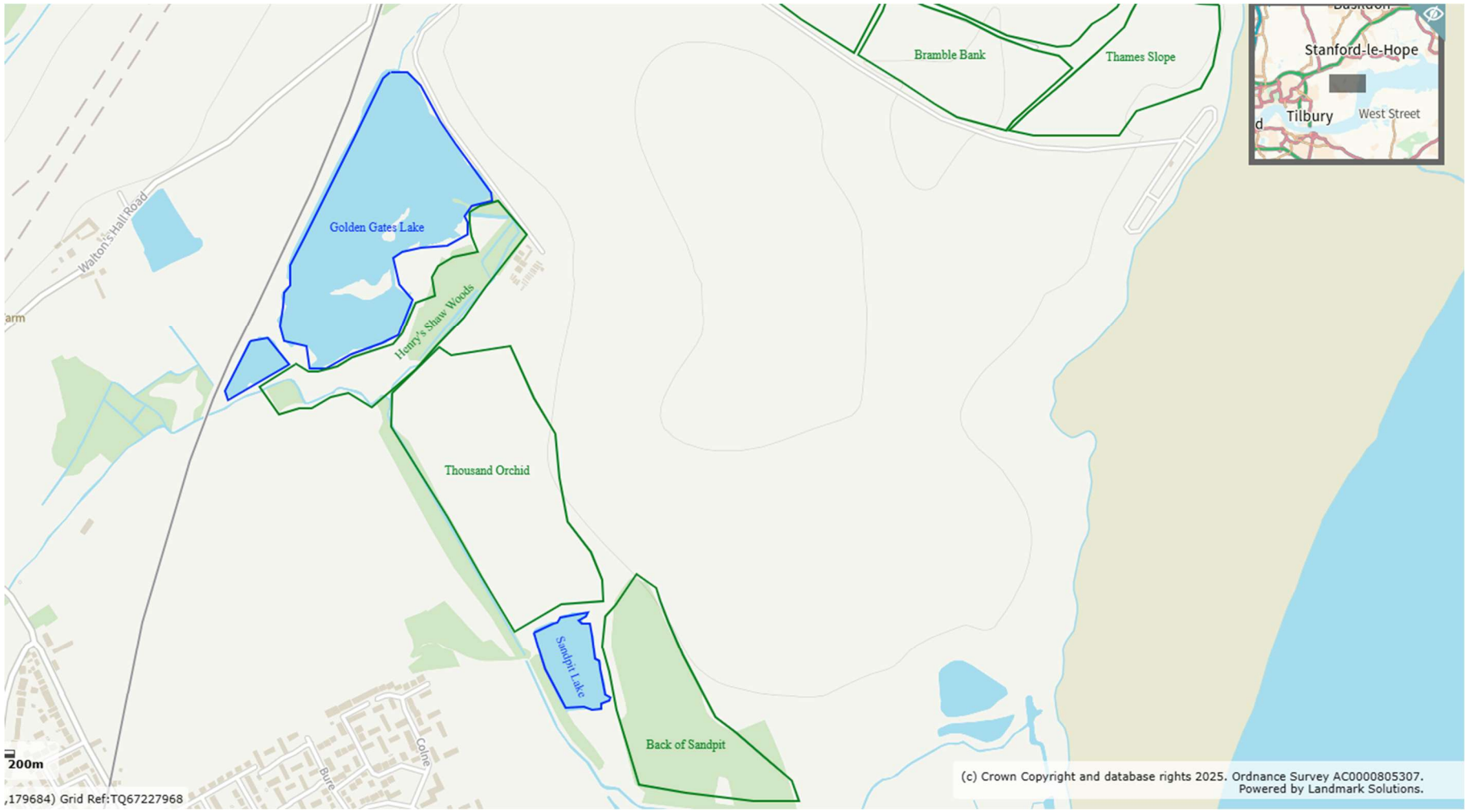

Figure 12. Map of the south site

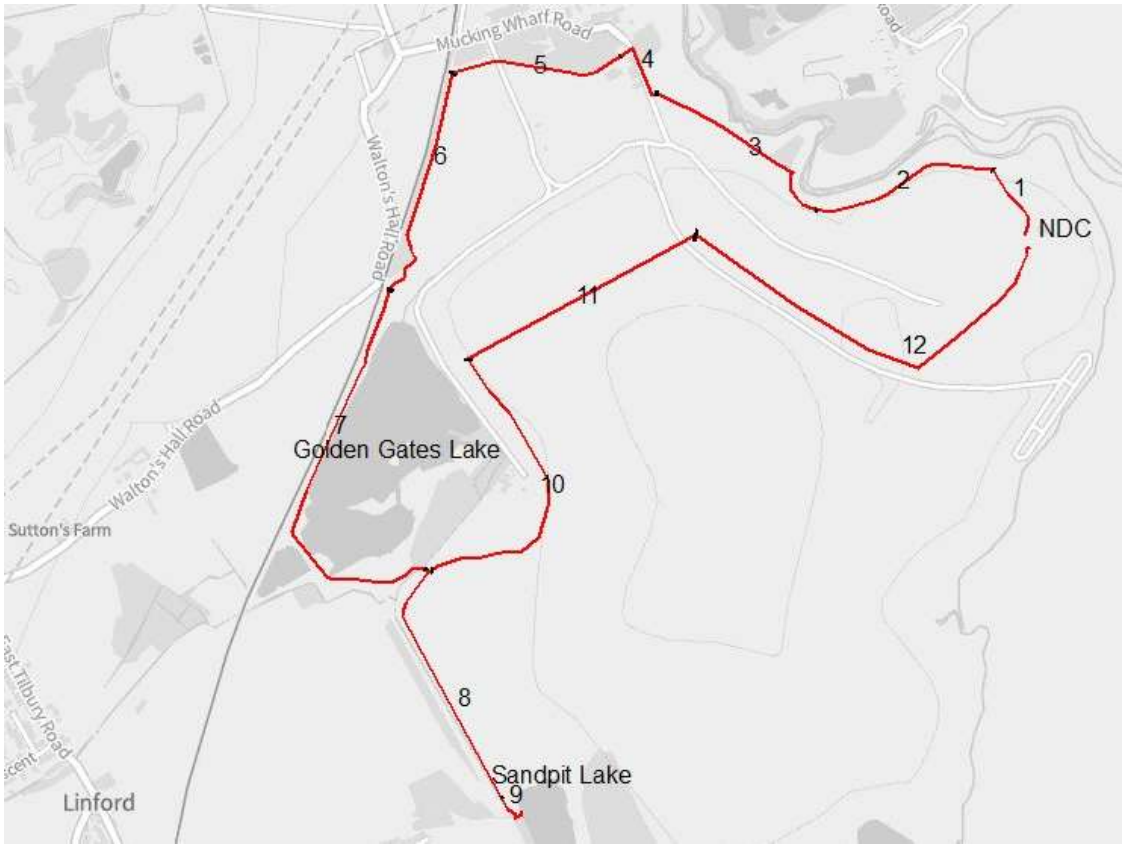

Figure 13. BBS transect (Main)

Figure 14. BBS transect (Sandpit)

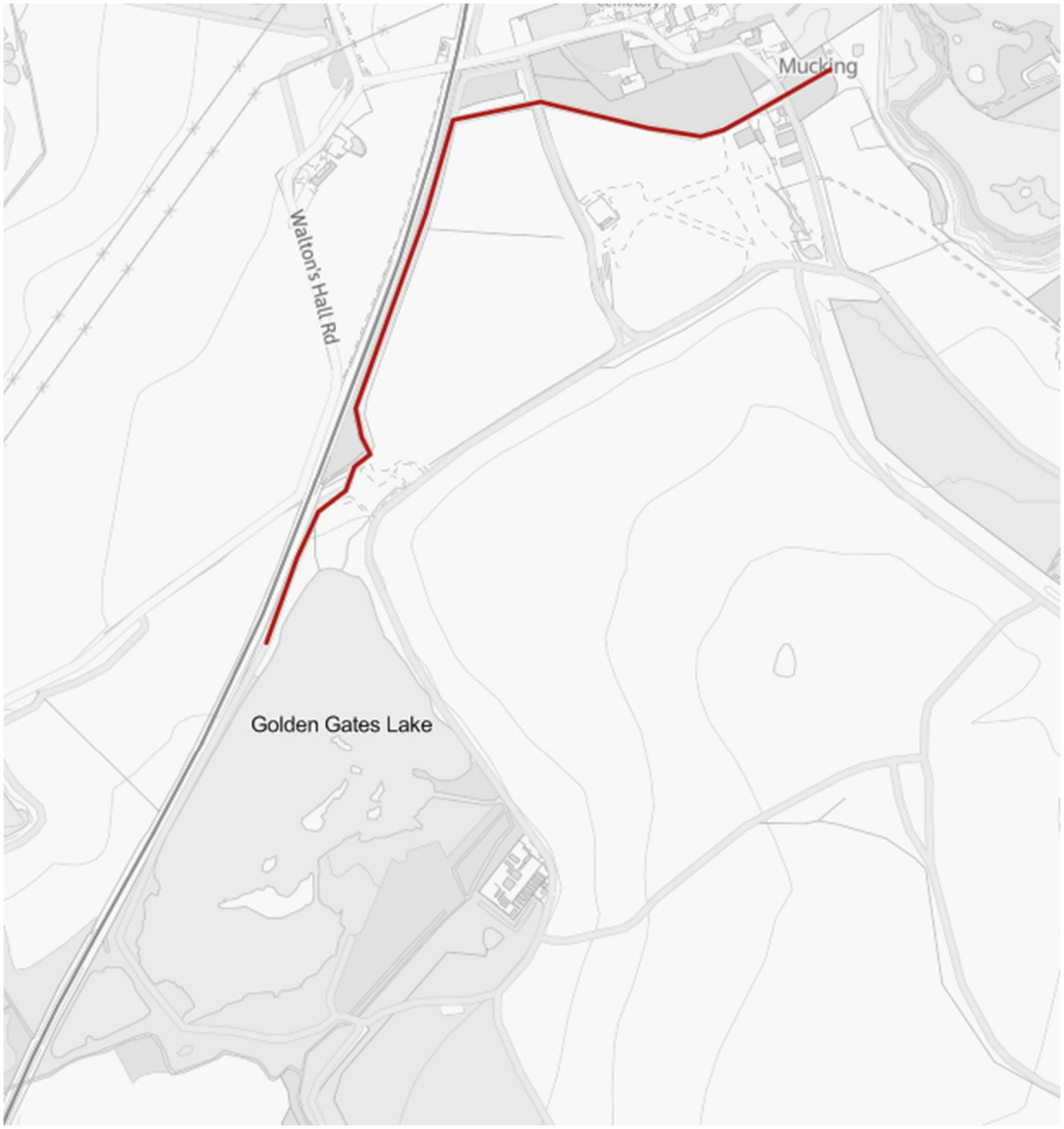

Figure 15. Bat transect

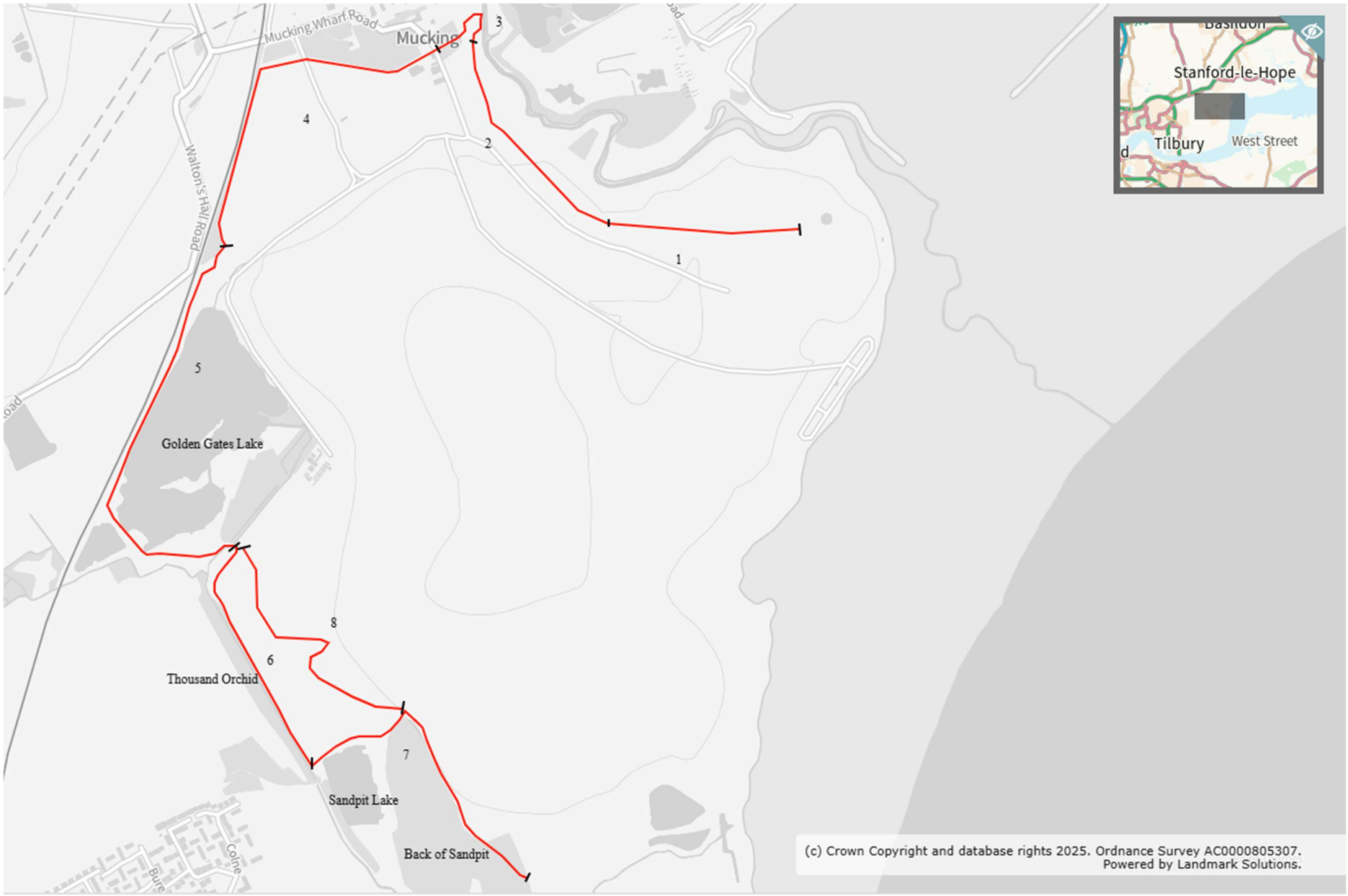

Figure 16. UKBMS Transect