

Land off Basingstoke Road, Spencers Wood

Further Information: Air Quality

1. INTRODUCTION

- 1.1 This Technical Note provides further information regarding potential air quality effects on the Thames Basin Heaths (TBH) Special Protection Area (SPA) arising from the Proposed Development at Land off Basingstoke Road, Spencers Wood, Wokingham (the 'Site'), in response to consultation comments received from Wokingham Borough Council's (WBC) Ecology Officer in July 2025.
- 1.2 The Hybrid Planning Application currently awaiting determination by Wokingham Borough Council (WBC) is for a mixed-use development comprising up to 420 dwellings; the planning application description is as follows:
- "Hybrid planning application (part outline/ part detailed) comprising: Outline planning permission is sought with all matters reserved for future determination, save for the means of access via Basingstoke Road, for: up to 420 dwellings (Use Class C3), an 80 bed care home (Use Class C2), 0.8ha of employment land (Use Class E(g), primary school (Use Class F1), local centre (Use Classes E(a), (b), (c), (f)), sports pitch and changing facility, public open space and a full application for the proposed Suitable Alternative Natural Greenspace (SANG), associated landscaping/car park."*
- 1.3 The Proposed Development is located 3.6km from the closest edge of the TBH SPA (linear distance) and is therefore within the potential zone of influence for air pollution effects. The Thames Basin Heaths is a network of lowland heathland sites, designated as an SPA in March 2005 for its Internationally important populations of three species of rare bird, Dartford Warbler, Woodlark and Nightjar, all of which are listed in Annex 1 of European Directive 79/409/EEC (the 'Birds Directive') which was transposed into UK law via the Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitats Regulations').
- 1.4 The SPA bird species nest either on or close to the ground and although they are not vulnerable to changes in air quality directly, air pollution has the potential to affect the structure and composition of supporting habitats, and where significant, could alter foraging and breeding success resulting in an adverse effect on site integrity.
- 1.5 This Technical Note sets out an assessment of the potential effects of changes to levels of air pollution generated by development-related traffic (exhaust emissions) during the operational phase of the Proposed Development on the TBH SPA, in order to inform Habitats Regulations Assessment (HRA) of the Proposed Development in lieu of the protection afforded to the SPA by the Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitats Regulations').
- 1.6 This assessment has been informed by traffic data provided by the Hub Transport Planning Ltd., and air quality modelling carried out by BWB Consulting, as reported in their Air Quality Assessment report (October 2025).

2. RELEVANT BACKGROUND INFORMATION

National Air Quality Strategy & Trends

- 2.1 Under the requirements of the Environment Act 1995, the UK government published an Air Quality Strategy (AQS). The AQS sets out the UK's national standards and objectives for ambient air quality, and measures to help achieve the objectives. The overall aim of the AQS is to achieve steady improvement in air quality into the long term. The objectives are transcribed into regulations in the Air Quality (England) Regulations 2000, as amended.
- 2.2 In 2019, the Government published their Clean Air Strategy. The Strategy sets out the measures that the Government intends to take to achieve the legally binding international targets to reduce emissions of key pollutants, including oxidised nitrogen (NO_x, primarily NO₂) and reduced nitrogen (primarily from ammonia – NH₃ and ammonium ions – NH₄⁺) which contribute to total nitrogen deposition via dry and wet deposition.
- 2.3 Under the National Emissions Ceilings Regulations, the UK is legally required to implement measures to reduce emissions of key pollutants, including NH₃ and NO_x, by 8% and 55% respectively by 2029 over 2005 base emissions, and by 16% and 73% respectively post 2030. The UK's National Air Pollution Control Programme (NAPCP), including the Clean Air Strategy in England, is expected to exceed these emission reduction targets such that a 17% decrease in total nitrogen deposition onto protected priority sensitive habitats is expected, with a predicted 18.9% decrease from the 2016 base year. Notwithstanding the implementation, or otherwise, of the Proposed Development, future air quality baseline conditions are therefore expected to improve over the medium to long-term.

Air Quality Standards

Critical Levels and Loads

European CAFE Directive (2008/50/EC) and Air Quality Standards Regulations 2010

- 2.4 The Directive details air quality limit values, target values, and Critical Levels for a number of air pollutants established by the European Parliament and Council for the protection of human health, vegetation and ecosystems. These have been transposed into UK legislation by the Air Quality Standards Regulations 2010 (as amended).

United Nations Economic Commission for Europe Critical Loads

- 2.5 The United Nations Economic Commission for Europe (UNECE) has set Critical Loads for N-Deposition for specific sensitive ecosystems, most recently updated in 2022 (Bobbink et al., 2022).

The Air Pollution Information System (APIS)

- 2.6 The Air Pollution Information System (APIS) is the UK's principal source of information on pollutant levels, including at designated nature conservation sites (SAC/SPA/SSSI) and on the sensitivity of their component habitats, providing a continually updated web-based data resource.

- 2.7 APIS sets out the relevant environmental standards for pollutant types (as defined by the 2010 Regulations and UNECE), which vary by habitat type where nitrogen deposition is concerned. Critical Levels define the environmental standard for airborne gaseous pollutants (Nitrogen oxides - NO_x and Ammonia - NH₃) and Critical Loads define the environmental standard for deposited pollutants (Nitrogen deposition).

- 2.8 Critical Levels and Loads (referred to collectively as the 'CL') are defined as:

Critical Level (ug/m³): "concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge".

Critical Load (kg N/ha/yr): "a quantitative estimate of exposure to one or more pollutants, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge."

- 2.9 For NO_x the Critical Level for all habitats is a concentration of 30µg/m³.
- 2.10 For NH₃ the Critical Level for lower plants habitats, including those supporting sensitive lichens and bryophytes, is 1 µg/m³. The CL for all higher plant habitats is a concentration of 3µg/m³.
- 2.11 For N deposition the Critical Load is habitat specific, with lower and upper ends of a CL range cited for application in different circumstances (for example differing hydrological or management regimes); in practice there is rarely sufficient information to justify use of anything but the lower CL.
- 2.12 When pollutant loads (or concentrations) exceed the CL, it is considered that there is a risk of harmful effects. A value in excess of the CL is termed the 'exceedance'. A larger exceedance is often considered to represent a greater risk of damage, although other factors also influence this.

Natural England's Approach to Air Quality Assessment

- 2.13 Natural England's guidance to local planning authorities regarding air quality assessment and HRA (Natural England, 2018) takes account of case law of relevance to air quality assessment and describes the screening threshold for Appropriate Assessment as follows:

"widely accepted Environmental Benchmarks for imperceptible impacts are set at 1% of the critical load or level" [our emphasis].

- 2.14 Natural England's (2018) guidance advocates the following stepwise approach to assessing the potential for likely significant effects from air pollution:

- 1) Does the proposal give rise to emissions which are likely to reach a European site?
- 2) Are the qualifying features of sites within 200m of a road sensitive to air pollution?
- 3) Could the sensitive qualifying features of the site be exposed to emissions?
- 4) Application of screening thresholds:

- 4a) Apply the threshold alone - consider the contributions of the project alone and whether they could exceed 1% of the CL or a change of more than 1,000 Average Annual Daily Trips (AADT) (or 200 Heavy Duty Vehicles, HDV);
- 4b) Apply the threshold in-combination with emissions from other plans and projects - consider the contributions of the project in addition to other live plans and projects (but see further below) and whether collectively they could exceed 1% of the CL or a change of more than 1,000 AADT (or 200 HDV);
- 5) Advise on the need for Appropriate Assessment where thresholds are exceeded, either alone or in-combination:
 - If step 4 (a and b) does not result in exceedance of the screening threshold, then the potential for likely significant effects either alone or in combination can be screened out, and further investigation as part of an Appropriate Assessment is not required;
 - If step 4 (a and/or b) results in exceedance of the screening threshold, then the need for Appropriate Assessment is triggered. This is because the development either alone or in combination is predicted to contribute pollutants to a site at a level above which harm could occur, irrespective of whether background levels already exceed the CLs. The guidance provides further advice on the information that should be considered as part of an Appropriate Assessment, which includes, amongst a plethora of factors, the potential for areas subject to air quality exceedance to coincide with sensitive qualifying features, and the specific conservation objectives for the sites concerned and how these relate to existing, and future predictions of, background levels of pollutants.

Natural England's Standing Advice on the Impacts of Air Pollution on Protected Sites

- 2.15 In October 2025 Natural England released new 'standing advice' to local planning authorities on how to assess sector-specific planning applications that could affect air quality on a protected site, including SSSIs, SACs, SPAs and Ramsar sites. The advice covers agricultural and industrial proposals, and proposals creating road traffic. The advice sets out a stepwise approach which includes:
- 1) Check if emissions will reach a protected site.
 - 2) Check relevant 'Critical Loads' and 'Critical Levels'.
 - 3) Check if agricultural developments can use an emissions reduction approach.
 - 4) Consider the proposal in combination with other projects.
 - 5) Complete a detailed air quality assessment.
- 2.16 For proposals creating additional road traffic, likely significant effects can be screened out where affected roads are further than 200m from a protected site.

- 2.17 This latest advice requires the 'process contribution' (or PC, pollution generated by the proposal) to be calculated for each pollutant type (which for road projects is confirmed as being ammonia NH₃, NO_x and nitrogen deposition), and for this to be compared as a percentage to the relevant CLs both alone and in combination with other projects.
- 2.18 If the PC is less than 1% of the CL alone and in combination, likely significant effects can be screened out. If the PC exceeds 1% of the CL, then detailed air quality assessment is required, and the advice sets out how this should be undertaken, with reference to the 'predicted environmental contribution' (PEC) for each pollutant.

Assessment Methodology

Screening for Likely Significant Effects

- 2.19 The methodology used to assess the potential for significant effects from air quality changes impacting upon the SPA during the operational phase is based, as a first stage assessment, on predicted trip generation. Traffic data in the vicinity of ecological receptors were sourced from Department for Transport (DfT) traffic count data.
- 2.20 Parts of the TBH SPA within 200m of an 'affected road', a road where increases of more than 1,000 AADT (or 200 HDV) are predicted, were defined as 'sensitive receptors' that could be affected by airborne NO_x and NH₃ emissions arising from the additional traffic generated by the Proposed Development, and subsequent nitrogen deposition from air to the ground. 200m is set as the potential zone of influence for air pollution impacts because traffic-generated pollutant levels drop off significantly within the first 50m from the roadside and concentrations approach background levels by 200m (Laxen & Marner, 2008; Ricardo-AEA, 2016).
- 2.21 Sites exceeding the AADT threshold were then taken forward for air dispersion modelling and consideration of PCs for NO_x, NH₃ and nitrogen deposition against the relevant 1% CL screening threshold.
- 2.22 Full details of the air dispersion modelling methodology are set out in the BWB report (October 2025). Modelling carried out using ADMS Roads considered the following scenarios:
- 2022 Verification Year;
 - 2024 Base Year;
 - 2026 Opening Year without development (Do Minimum); and
 - 2026 Opening Year with development (Do Something).
- 2.23 The Critical Levels and Loads to be applied for assessment of the TBH SPA are shown in **Table 1** below.
- 2.24 Sites exceeding the 1% screening threshold were then taken forward for further consideration of adverse effects as part of an Appropriate Assessment.

Table 1: Summary of Critical Levels and Loads for TBH SPA, from APIS

Feature	Broad Habitat Type (CL class)	Is species sensitive to air pollution impacts on broad habitat?	NOx CL $\mu\text{g}/\text{m}^3$	NH ₃ CL $\mu\text{g}/\text{m}^3$	N deposition Lower CL (kg N/ha/yr)
<i>Caprimulgus europaeus</i> - European nightjar (A224)	Temperate continental Pinus sylvestris forest	No	-	-	-
	Dry heaths	Yes	30	3	5
<i>Lullula arborea</i> - Woodlark (A246)	Temperate continental Pinus sylvestris forest	Yes	30	3	5
	Dry heaths	Yes	30	3	5
<i>Curruca undata</i> - Dartford warbler (A302)	Dry heaths	Yes	30	3	5

Appropriate Assessment

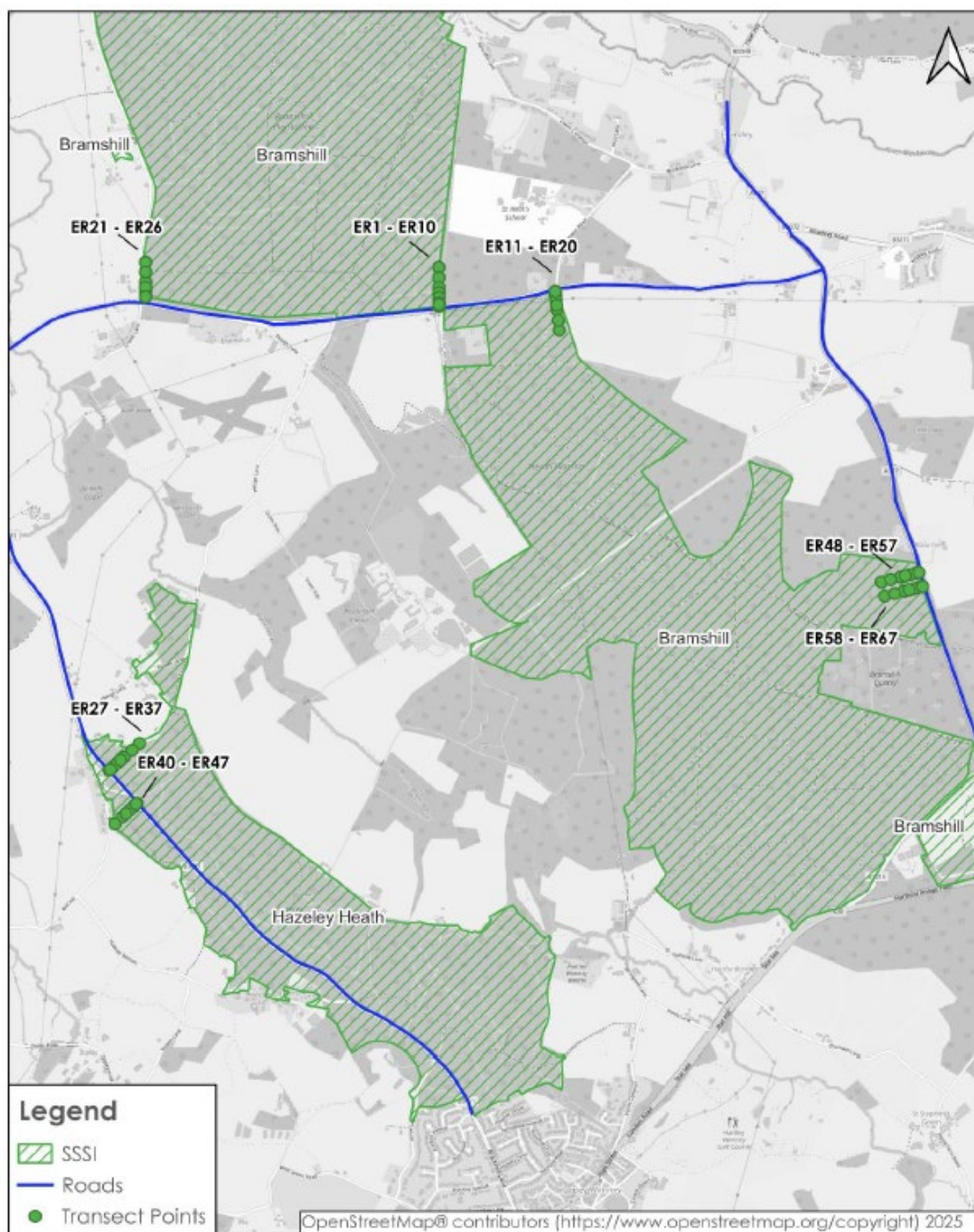
2.25 In line with Natural England guidance, Appropriate Assessment considered the following contextual information:

- the PCs in the context of the PEC;
- scale of pollution impact and whether impacts coincide with the distribution of interest features and therefore the functionality of supporting habitat - Annex 1 bird territory data was obtained from 2J's Ecology, who carry out annual SPA bird monitoring across the TBH SPA on behalf of the Thames Basin Heaths Partnership;
- existing condition of site habitats; and
- trends in background air quality.

Assessment of Likely Significant Effects

2.26 As per the methodology outlined above, the screening stage assessment identified the road links predicted to experience an increase in traffic flows of more than 1,000 AADT (or 200 HDV). Component Sites of Special Scientific Interest (SSSI) located within 200m of affected roads taken forward for further detailed air quality modelling against the 1% CL screening criteria included Bramshill SSSI and Hazeley Heath SSSI. Seven receptor transects extending up to 200m from the A327, B3011 and Bramshill Road, were subject to modelling, as shown on Figure 3.2 of the BWB report and extracted below at **Plate 1**.

2.27 With reference to **Table 2** below, the change in NOx concentration was at or below 1% of the CL at all locations and total concentrations of NOx (the PEC) were predicted to be below the CL of 30 $\mu\text{g}/\text{m}^3$ in all scenarios considered. A likely significant effect from airborne NOx can therefore be excluded.



0 0.5 1 km

Figure 3.2: Existing Receptor Locations – Ecology

Drawn by: HL
Date: 14/10/2025



Plate 1: Ecological receptor locations included in air quality modelling carried out by BWB

Table 2: Results of NOx modelling

Receptor	Location	Max predicted NOx concentration (µg/m³)			Max change as % of CL
		2026 DM	2026 DS	Change	
T1 (ER1-10)	Bramshill SSSI N	15.95	16.08	0.13	0.4
T2 (ER11-20)	Bramshill SSSI N	13.51	13.59	0.08	0.3
T3 (ER21-26)	Bramshill SSSI N	12.63	12.69	0.06	0.2
T4 (ER27-37)	Hazeley Heath SSSI NW	22.50	22.71	0.20	0.7
T5 (ER38-47)	Hazeley Heath SSSI NW	15.49	15.58	0.09	0.3
T6 (ER48-57)	Bramshill SSSI SE	15.60	15.62	0.02	0.1
T7 (ER58-67)	Bramshill SSSI SE	15.79	15.82	0.02	0.1

- 2.30 Exactly the same conclusion can be reached for ammonia as with NOx. With reference to **Table 3** below, the predicted change was below 1% of the CL in all locations and in all scenarios the total NH₃ concentration was below the CL of 3µg/m³. A likely significant effect from airborne ammonia can therefore be excluded.

Table 3: Results of NH₃ modelling

Receptor	Location	Max predicted NH ₃ concentration (µg/m³)			Max change as % of CL
		2026 DM	2026 DS	Change	
T1 (ER1-10)	Bramshill SSSI N	1.74	1.75	0.02	0.5
T2 (ER11-20)	Bramshill SSSI N	1.43	1.44	0.01	0.3
T3 (ER21-26)	Bramshill SSSI N	1.37	1.38	0.01	0.2
T4 (ER27-37)	Hazeley Heath SSSI NW	2.62	2.65	0.02	0.8
T5 (ER38-47)	Hazeley Heath SSSI NW	1.76	1.77	0.01	0.4
T6 (ER48-57)	Bramshill SSSI SE	1.57	1.57	0.00	0.1
T7 (ER58-67)	Bramshill SSSI SE	1.57	1.57	0.00	0.1

- 2.32 **Table 4** shows that the maximum predicted change in nitrogen deposition rate exceeds 1% of the CL at transects 1 to 5. Likely significant effects from nitrogen deposition cannot therefore be screened out and further consideration is required via Appropriate Assessment.

Table 4: Results of nitrogen deposition modelling

Receptor	Location	Max predicted nitrogen deposition rate (kg/n/ha/yr)			Max change as % of CL
		2026 DM	2026 DS	Change	
T1 (ER1-10)	Bramshill SSSI N	29.56	29.70	0.14	2.7
T2 (ER11-20)	Bramshill SSSI N	26.85	26.93	0.08	1.7
T3 (ER21-26)	Bramshill SSSI N	26.43	26.49	0.06	1.2
T4 (ER27-37)	Hazeley Heath SSSI NW	37.83	38.05	0.22	4.4
T5 (ER38-47)	Hazeley Heath SSSI NW	30.20	30.30	0.09	1.9

Receptor	Location	Max predicted nitrogen deposition rate (kg/n/ha/yr)			Max change as % of CL
		2026 DM	2026 DS	Change	
T6 (ER48-57)	Bramshill SSSI SE	28.69	28.72	0.02	0.5
T7 (ER58-67)	Bramshill SSSI SE	28.71	28.73	0.02	0.5

Information for Appropriate Assessment

- 2.34 Initial screening against the 1% CL criterion showed that the threshold was exceeded at the roadside locations for transects 1 to 5, relating to the northern parts of Bramshill Plantation SSSI in proximity of Bramshill Road and at the northwestern corner of Hazeley Heath SSSI on the B3011. At all these locations, total nitrogen deposition rates (the PEC) significantly exceed the LCL of 5 kg/n/ha/yr in all scenarios. However, the potential for this to result in an adverse effect on site integrity alone or in combination with other development can be discounted for the following reasons.
- 2.35 Both Bramshill SSSI and Hazeley Heath SSSI are reported by Natural England as being in favourable condition across the totality of the site (99.9% and 100% respectively).
- 2.36 Air pollutant contributions that cannot automatically be screened out as insignificant relate to only immediate roadside locations, as shown on **Figures 1-7**, with rates falling to at or below 1% of the CL within around 25m at transects 1, 3 and 4, and within 5-10m at transects 2 and 5. These areas of exceedance therefore cover an extremely small and insignificant proportion of total SPA habitat.
- 2.37 The majority of the immediately adjacent roadside habitat is woodland, and woodland is known to provide a 'shelterbelt' effect, intercepting pollution and reducing levels and rates experienced further into sites. This means that predicted deposition rates, including the distance into sites where 1% of the CL is exceeded, may be overestimated.
- 2.38 With reference to the survey data provided by 2Js Ecology (provided at **Annex 1**), parts of the SPA receiving additional nitrogen pollution are distant from the SPA bird territories and therefore unlikely to adversely affect supporting habitat, therefore site conservation objectives would not be undermined.
- 2.39 As noted above, under the National Emissions Ceilings Regulations the UK is legally required to implement measures to reduce emissions of key pollutants, including NH₃ and NO_x, where the UK's National Air Pollution Control Programme (NAPCP), including the Clean Air Strategy in England, is expected to exceed targets and bring about a material decrease in total nitrogen deposited onto protected priority sensitive habitats in the short-term (pre- and post-2030). Improvements to air quality are therefore expected to outpace the rate of potential change to habitat structure and composition, even where this were to be material to achieving the conservation objectives for a site.

Conclusion

- 2.40 It is the conclusion of this assessment that the Proposed Development will not result in likely significant effects from airborne NO_x and ammonia either alone or in combination with other



plans and projects, and that an adverse effect on site integrity due to nitrogen deposition will not arise, either alone or in combination with other plans and projects.

- 2.41 In view of the above, in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended), Wokingham Borough Council should be able to safely conclude that the proposals will not have an adverse effect on the integrity of the Thames Basin Heaths SPA alone or in combination with other plans and projects, and that consequently an Appropriate Assessment of the proposals can be passed.

Dr Brookbank MCIEEM

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February 2026

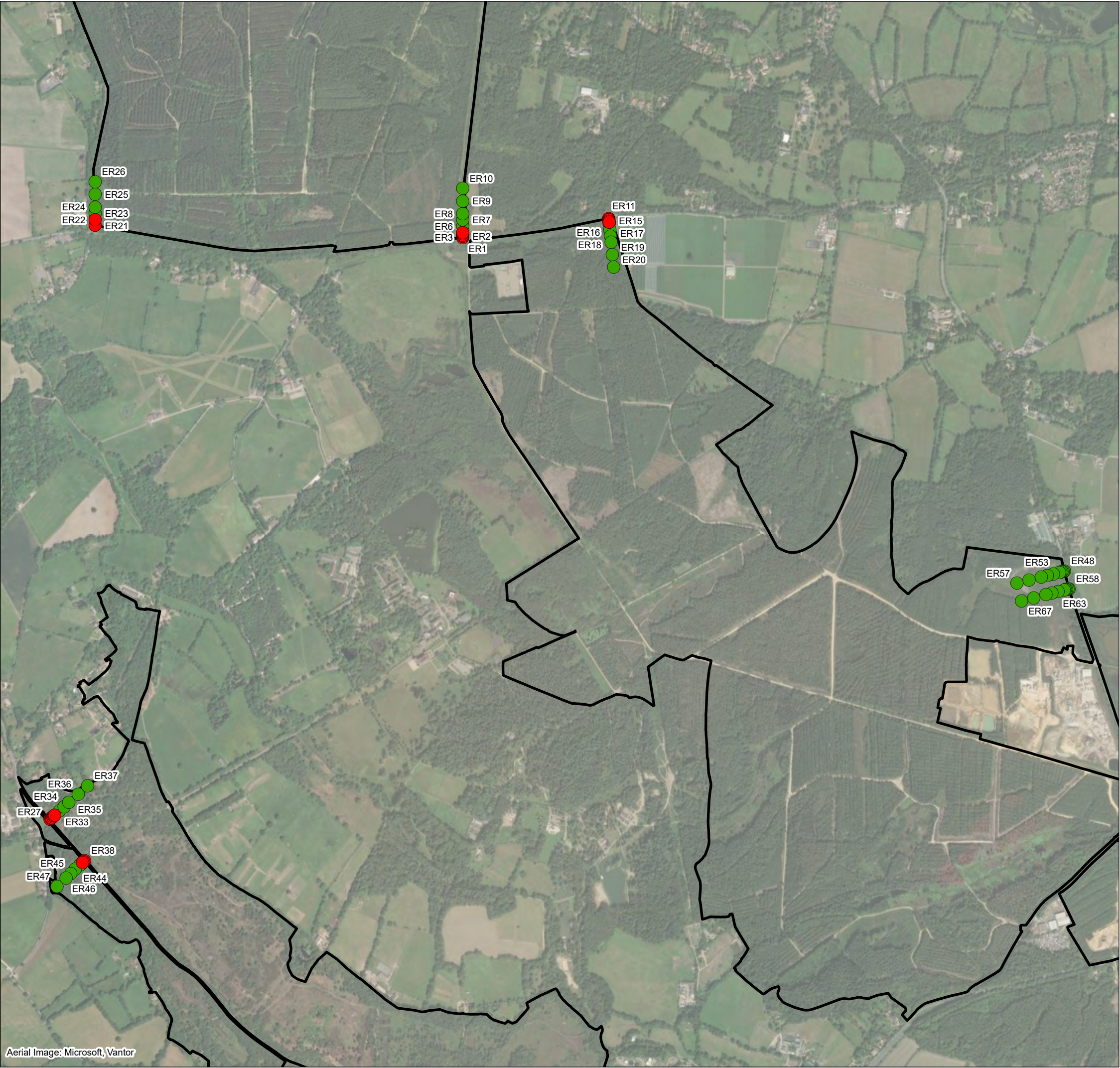


Figure 1 Air Quality - Nitrogen Deposition

KEY

Nitrogen Deposition

- <1% of Critical Loads
- >1% of Critical Loads

Thames Basin Heaths Special Protection Area (SPA)

SCALE: 1:15,000 at A3

0 200 400 600 800 1,000 Metres

N



CLIENT: Richborough

PROJECT: Land of Basingstoke Road, Spencers Wood

DATE: 08 December 2025



Aerial Image: Microsoft, Vantor

Figure 2 Air Quality - Nitrogen Deposition

KEY

Nitrogen Deposition

- <1% of Critical Loads
- >1% of Critical Loads

Thames Basin Heaths Special Protection Area (SPA)

SCALE: 1:1,000 at A3

0 10 20 30 40 50 Metres



CLIENT: Richborough

PROJECT: Land of Basingstoke Road, Spencers Wood

DATE: 08 December 2025



Aerial Image: Microsoft, Vantor

Figure 3 Air Quality - Nitrogen Deposition

KEY

Nitrogen Deposition

- <1% of Critical Loads
- >1% of Critical Loads

Thames Basin Heaths Special Protection Area (SPA)

SCALE: 1:1,000 at A3

0 10 20 30 40 50 Metres



CLIENT: Richborough

PROJECT: Land of Basingstoke Road, Spencers Wood

DATE: 08 December 2025



Aerial Image: Microsoft, Vantor

Figure 4 Air Quality - Nitrogen Deposition

KEY

Nitrogen Deposition

- <1% of Critical Loads
- >1% of Critical Loads

Thames Basin Heaths Special Protection Area (SPA)

SCALE: 1:1,000 at A3

0 10 20 30 40 50 Metres



CLIENT: Richborough

PROJECT: Land of Basingstoke Road, Spencers Wood

DATE: 08 December 2025



Aerial Image: Microsoft, Vantor

Figure 5 Air Quality - Nitrogen Deposition

KEY

Nitrogen Deposition

- <1% of Critical Loads
- >1% of Critical Loads

Thames Basin Heaths Special Protection Area (SPA)

SCALE: 1:1,000 at A3

0 10 20 30 40 50 Metres



CLIENT: Richborough

PROJECT: Land of Basingstoke Road, Spencers Wood

DATE: 08 December 2025



Figure 6 Air Quality - Nitrogen Deposition

KEY

Nitrogen Deposition

- <1% of Critical Loads
- >1% of Critical Loads

Thames Basin Heaths Special Protection Area (SPA)

SCALE: 1:1,000 at A3

0 10 20 30 40 50 Metres



CLIENT: Richborough

PROJECT: Land of Basingstoke Road, Spencers Wood

DATE: 08 December 2025



Aerial Image: Microsoft, Vantor

Figure 7 Air Quality - Nitrogen Deposition

KEY

Nitrogen Deposition

- <1% of Critical Loads
- >1% of Critical Loads

Thames Basin Heaths Special Protection Area (SPA)

SCALE: 1:1,000 at A3

0 10 20 30 40 50 Metres



CLIENT: Richborough

PROJECT: Land of Basingstoke Road, Spencers Wood

DATE: 08 December 2025

Annex 1

SPA Bird Data, 2025, Supplied by 2J's Ecology

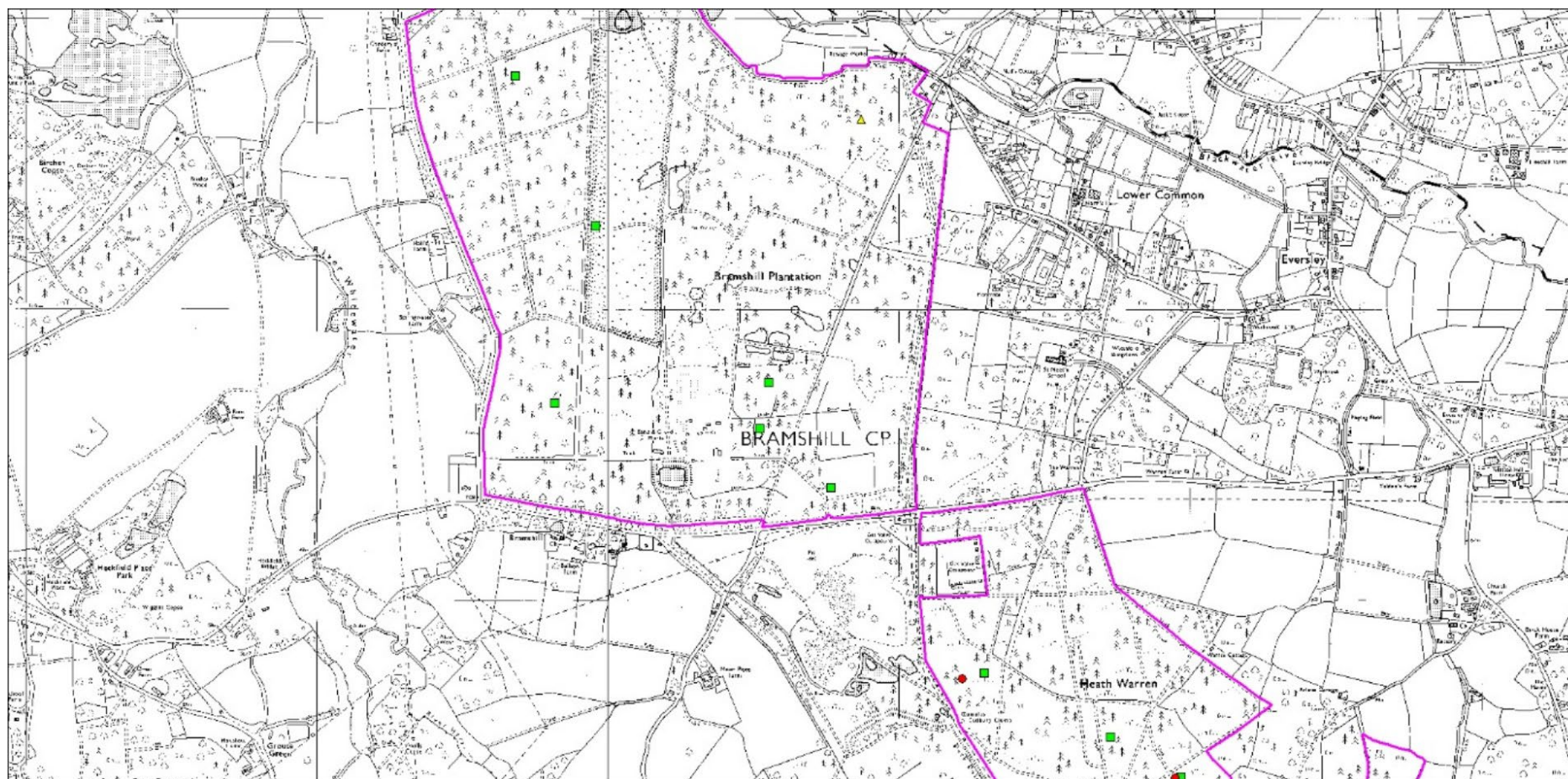


Figure 1.1: Bramshill SSSI north, relating to transects 1, 2 and 3

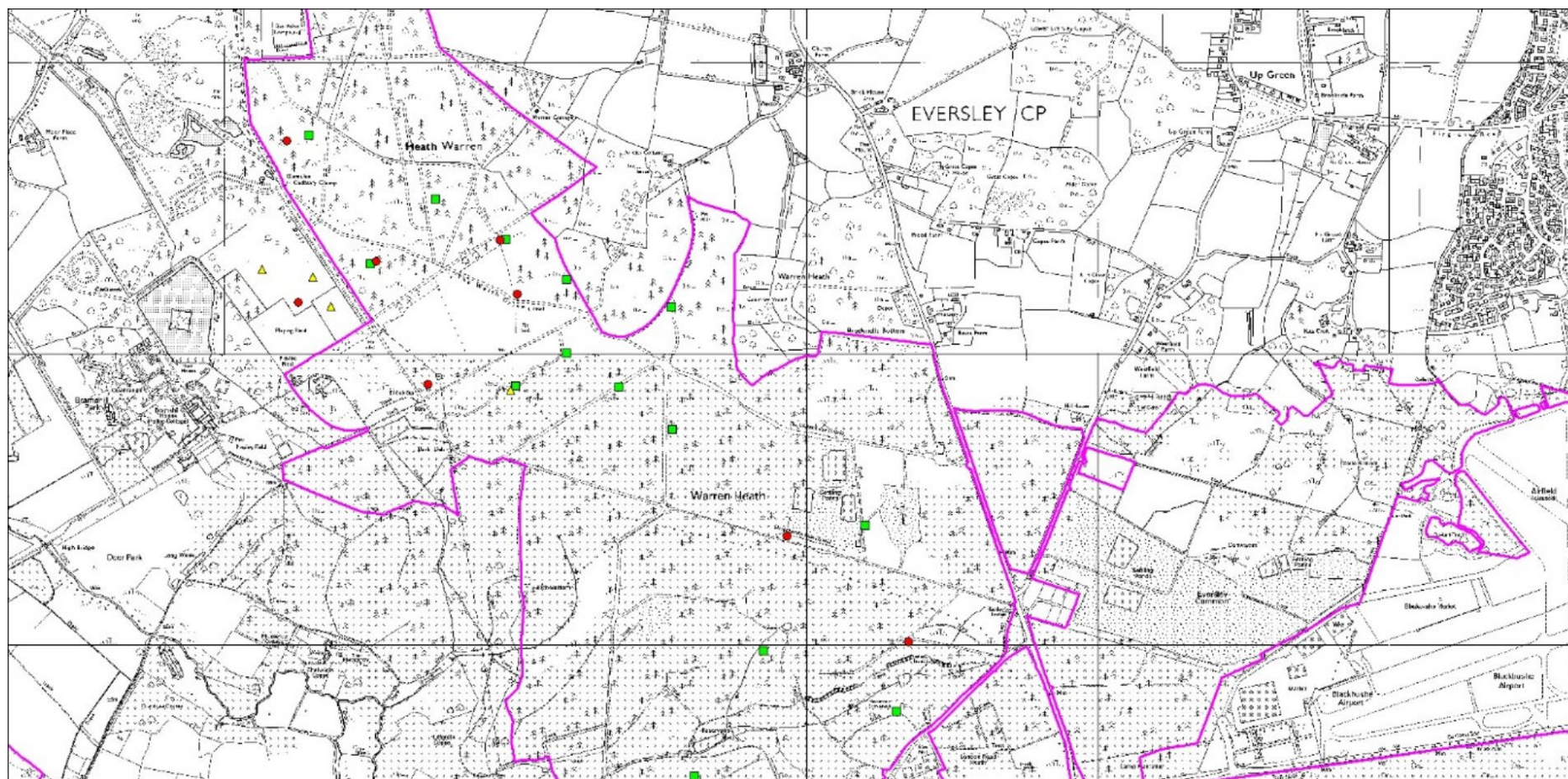


Figure 1.2: Bramshill SSSI southeast, relating to transects 6 and 7

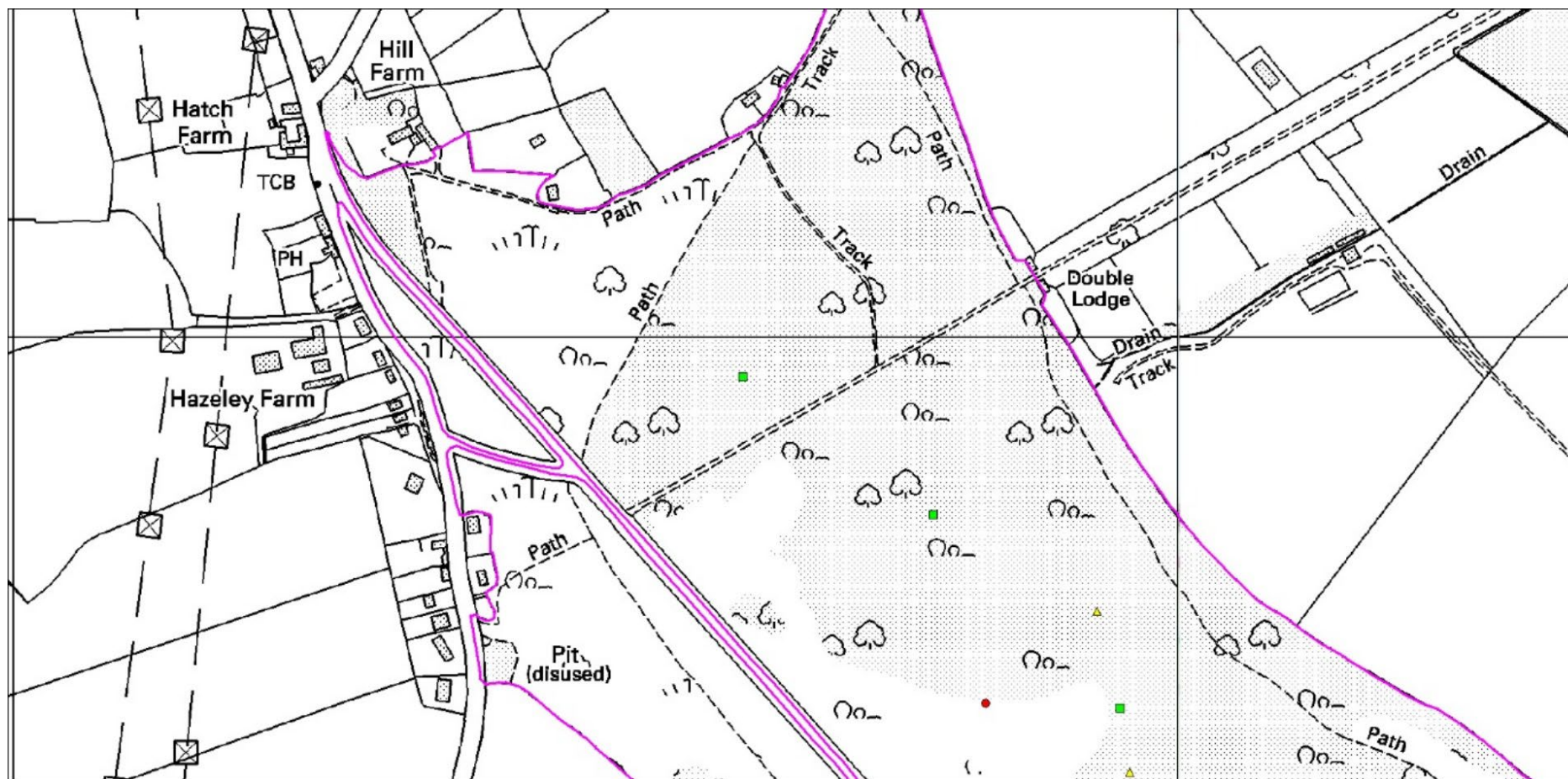


Figure 1.3: Hazeley Heath SSSI northwest, relating to transects 5 and 6