Habitats Regulations Assessment of the Newcastle-under-Lyme Publication Draft Local Plan 2020 - 2040

Interpretation of Air Quality Modelling Data for components of the Midland Meres and Mosses (Phase 2) Ramsar Site

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LEPUS CONSULTING
LANDSCAPE, ECOLOGY, PLANNING & URBAN SUSTAINABILITY

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Cover Photo: Lowland fen habitat

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Acronyms & abbreviations

AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
A-dep	Acid Deposition
APIS	Air Pollution Information System
CLes	Critical Levels
CLos	Critical Loads
DMRB	Design Manual for Roads and Bridges
FCS	Favourable Condition Status
HDV	Heavy Duty Vehicle
HRA	Habitat Regulations Assessment
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
NH_3	Ammonia
N-dep	Nitrogen Deposition
NO_x	Nitrogen Oxides
NPPF	National Planning Policy Framework
NUL	Newcastle-under-Lyme
SSSI	Sites of Special Scientific Interest

Executive Summary

Introduction

E1. Newcastle-under-Lyme Borough Council is currently preparing a new Local Plan to set out a vision and provide a framework for meeting identified needs and priorities. This will provide a framework for Newcastle-under-Lyme's growth until 2040.

E2. To date, the Council has undertaken three consultation exercises as part of the plan making process (as listed below). The responses to these consultations have informed the development of the Local Plan which was submitted for examination on 20th December 2024.

- Issues and Strategic Options (November 2021 – February 2022)[1]
- First Draft Local Plan (June 2023 – August 2023)[2]
- Regulation 19 Pre-Submission Consultation (12 August to 7 October 2024)[3]

E3. Natural England provided a response to the Regulation 19 consultation version of the Local Plan in October 2024[4]. Their response included comments on the Regulation 19 HRA[5]. In this response, Natural England considered that adverse air quality impacts on site integrity at the Midland Meres and Mosses Phase 2 Ramsar site[6] cannot be ruled out based on evidence provided in the Regulation 19 HRA report. Natural England advised that further work be undertaken to better understand the likely significant effects of air quality at the Midland Meres and Mosses Phase 2 Ramsar site where it is underpinned by Black Firs and Cranberry Bog SSSI and Oakhanger Moss SSSI.

E4. In response to Natural England's representation, the Council has commissioned air quality modelling at Midland Meres and Mosses Phase 2 Ramsar site, and specifically at Oakhanger Moss Site of Special Scientific Interest (SSSI) and Black Firs and Cranberry Bog SSSI to better define air quality impacts as a result of the Local Plan both alone and in-combination.

[1] Newcastle-under-Lyme. Newcastle-under-Lyme Local Plan 2020 – 2040. Issues and Options. Available at: https://www.newcastle-staffs.gov.uk/downloads/file/1510/issues-and-options [Date Accessed: 31/01/25].

[2] Newcastle-under-Lyme. (June 2023) Newcastle-under-Lyme Local Plan 2020 – 2040. First Draft Local Plan (Regulation 18 Stage). Available at: https://consult.newcastle-staffs.gov.uk/kse/event/37506 [Date Accessed: 31/01/25].

[3] Newcastle-under-Lyme. (June 2023) Newcastle-under-Lyme Local Plan 2020 – 2040. Final Draft (Regulation 19). Available at: https://www.newcastle-staffs.gov.uk/downloads/file/2447/final-draft-local-plan [Date Accessed: 27/01/25].

[4] Natural England (4th October 2024) Newcastle-under-Lyme Borough Council Regulation 19 pre-submission draft Plan [letter].

[5] Lepus Consulting (2024) Newcastle-under-Lyme First Publication Draft Local Plan 2020-2040. Habitats Regulations Assessment.

[6] Specifically those components underpinned by the Black Firs and Cranberry Bog Site of Special Scientific Interest (SSSI) and Oakhanger Moss SSSI

E5. Lepus Consulting has prepared this report to provide an ecological interpretation of the air quality dispersion modelling data to inform the AA of air quality effects at the Midland Meres and Mosses Phase 2 Ramsar site and address Natural England's concerns.

Oakhanger Moss SSSI component

E6. The critical level for nitrogen oxides will not be exceeded at any point within 200m of the M6. Therefore, no Adverse Impact on Site Integrity (AIOSI) will arise as a direct result of elevated nitrogen oxides from the Local Plan, either alone or in combination.

E7. Taking into consideration local traffic contributions from LPAs, including Newcastle-under-Lyme and Stoke and others to the north and south of the SSSI, it can be concluded that the in-combination growth on the M6 road link shown in the traffic model is likely to be dominated by national growth feeding into the motorway system. This has been agreed with Natural England through consultation on 20th February 2025[7].

E8. Ammonia contributions from the Local Plan alone are below the 1% screening threshold in relation to the lower critical level (1 μg/m^3). It can therefore be concluded that there will be no AIOSI of the Ramsar due to a change in ammonia.

E9. Nitrogen deposition dispersion modelling results indicate that there are no alone exceedances of the 1% screening threshold for short vegetation at any point within the SSSI. AIOSI upon short vegetation habitats associated with the Ramsar site at this SSSI component can therefore be screened out of the assessment.

E10. For tall vegetation however there is an exceedance of the 1% screening threshold for nitrogen deposition on the eastern boundary of the SSSI within the area of woodland. This is the area of the SSSI that is located within 200m of the M6. The maximum deterioration from the Local Plan alone at the SSSI to nitrogen deposition is 0.05 kgN/ha/yr to tall vegetation (wet woodland habitat) at the location where the SSSI begins. The contribution of the Local Plan alone to background levels would retard background improvements by under a year (up to 2030). Taking into consideration the current background concentrations of nitrogen deposition and the predicted reducing trends in nitrogen deposition at the SSSI, it can be concluded that such a minor contribution from the Local Plan is unlikely to impede this downward trend. It is therefore concluded that no AIOSI on site integrity at this component of the Ramsar will arise as a result of nitrogen deposition.

[7] Natural England (20th February 2025) Email to Newcastle-under-Lyme Council.

Black Firs and Cranberry Bog SSSI component

E11. The critical level for nitrogen oxides will not be exceeded at any point within 200m of the A513. Therefore, no AIOSI will arise as a direct result of elevated nitrogen oxides from the Local Plan, either alone or in combination.

E12. A total of 5.86ha of the Black Firs and Cranberry Bog SSSI is located within 200m of the A531. Habitat within 200m of the A531 includes the Black Firs component of the SSSI, which comprises wet woodland and drainage ditch habitat. Only the outer eastern fringe of the Cranberry Bog component of the SSSI is located within 200m of the A531, which comprises arable fields and a small area of wet woodland on the periphery of Cranberry Bog within the fen lagg zone.

E13. An ammonia critical level of 3 $\mu g/m^3$ is applicable to Ramsar features within 200m of the A513 at the Black Firs and Cranberry Bog SSSI. A review of air quality data indicates that this threshold is not exceeded within the SSSI. On the basis of the air quality modelling data and habitat information, it can be concluded that the Local Plan in-combination will have no AISOI at this SSSI component of the Ramsar due to ammonia emissions.

E14. The maximum deterioration from the Local Plan alone at the SSSI to nitrogen deposition is 0.47 kgN/ha/yr to tall vegetation (wet woodland habitat). The contribution of the Local Plan in-combination to background levels would retard background improvements by under a year (up to 2030). Taking into consideration the current background concentrations of nitrogen deposition and the predicted reducing trends in nitrogen deposition at this SSSI component of the Ramsar, it can be concluded that such a minor contribution from the Local Plan in-combination is unlikely to impede this downward trend. It is therefore it can be concluded that no AIOSI on site integrity will arise as a result of nitrogen deposition at this component of the Ramsar.

Conclusion

E15. In conclusion, there will be no AIOSI at the Midland Meres and Mosses (Phase 2) Ramsar due to air pollution associated with the Local Plan alone or in-combination.

1 Introduction

1.1 Background

1.1.1 Newcastle-under-Lyme Borough Council (hereafter referred to as the Council) is preparing a new Local Plan to set out a vision and provide a framework for meeting identified needs and priorities. This will provide a framework for Newcastle-under-Lyme's growth until 2040. The Local Plan will set out where and how new development can take place. The Local Plan covers the period from 2020 to 2040 and extends across the whole of Newcastle-under-Lyme's administrative area (referred to hereafter as the 'Plan area' and illustrated in **Figure 1.1**).

1.1.2 Once adopted, the Local Plan will replace the current adopted Newcastle-under-Lyme and Stoke-on-Trent Joint Core Spatial Strategy[8] and the saved policies from the Newcastle-under-Lyme Local Plan 2011[9].

1.1.3 To date, the Council has undertaken three consultation exercises as part of the plan making process (as listed below). The responses to these consultations have informed the development of the Local Plan which was submitted for examination on 20th December 2024.

- Issues and Strategic Options (November 2021 – February 2022)[10]
- First Draft Local Plan (June 2023 – August 2023)[11]
- Regulation 19 Pre-Submission Consultation (12 August to 7 October 2024)[12]

[8] Newcastle-under-Lyme and Stoke-on-Trent. (October 2009) Core Spatial Strategy 2006 – 2026. Available at: https://www.newcastle-staffs.gov.uk/downloads/file/348/core-spatial-strategy-adopted-version [Date Accessed: 31/01/25].

[9] Newcastle-under-Lyme. (September 2007) Saved Policies of the Newcastle under Lyme Local Plan (Adopted 2003). Available at: https://www.newcastle-staffs.gov.uk/downloads/download/100/current-development-plan [Date Accessed: 31/01/25].

[10] Newcastle-under-Lyme. Newcastle-under-Lyme Local Plan 2020 – 2040. Issues and Options. Available at: https://www.newcastle-staffs.gov.uk/downloads/file/1510/issues-and-options [Date Accessed: 31/01/25].

[11] Newcastle-under-Lyme. (June 2023) Newcastle-under-Lyme Local Plan 2020 – 2040. First Draft Local Plan (Regulation 18 Stage). Available at: https://consult.newcastle-staffs.gov.uk/kse/event/37506 [Date Accessed: 31/01/25].

[12] Newcastle-under-Lyme. (June 2023) Newcastle-under-Lyme Local Plan 2020 – 2040. Final Draft (Regulation 19). Available at: https://www.newcastle-staffs.gov.uk/downloads/file/2447/final-draft-local-plan [Date Accessed: 27/01/25].

1.2 Natural England consultation response during R19 consultation

1.2.1 Natural England provided a response to the Regulation 19 consultation version of the Local Plan in October 2024[13]. Their response included comments on the Regulation 19 HRA (**Appendix A**)[14]. In this response, Natural England considered that adverse air quality impacts on site integrity at the Midland Meres and Mosses Phase 2 Ramsar site[15] cannot be ruled out based on evidence provided in the Regulation 19 HRA report. Natural England advised that further work be undertaken to better understand the likely significant effects of air quality at the Midland Meres and Mosses Phase 2 Ramsar site where it is underpinned by Black Firs and Cranberry Bog Site of Special Scientific Interest (SSSI) and Oakhanger Moss SSSI.

1.3 Appropriate Assessment of air quality impacts

1.3.1 In response to Natural England's representation, the Council has commissioned air quality dispersion modelling at Midland Meres and Mosses Phase 2 Ramsar site, and specifically at Oakhanger Moss SSSI and Black Firs and Cranberry Bog SSSI, to better define air quality impacts as a result of the Local Plan both alone and in-combination.

1.4 About this report

1.4.1 Lepus Consulting has prepared this report to provide an ecological interpretation of the air quality dispersion modelling data to inform the appropriate assessment (AA) of air quality effects at the Midland Meres and Mosses Phase 2 Ramsar site and address Natural England's concerns. The air quality modelling data is provided in the Assessment of Air Quality Impacts at Habitats Site in Newcastle-under-Lyme: Air Quality Assessment Report[16] - referred to hereafter as the Air Quality Report.

1.4.2 For full details of the HRA methodology and approach to the assessment of the Local Plan please see the Regulation 19 HRA Report[17].

[13] Natural England (4th October 2024) Newcastle-under-Lyme Borough Council Regulation 19 pre-submission draft Plan [letter].

[14] Lepus Consulting (2024) Newcastle-under-Lyme First Publication Draft Local Plan 2020-2040. Habitats Regulations Assessment.

[15] Specifically those components underpinned by the Black Firs and Cranberry Bog Site of Special Scientific Interest (SSSI) and Oakhanger Moss SSSI

[16] Sweco (2025) Assessment of Air Quality Impacts at Habitats Site in Newcastle-under-Lyme: Air Quality Assessment Report.

[17] Newcastle-under-Lyme. (June 2023) Newcastle-under-Lyme Local Plan 2020 – 2040. Final Draft (Regulation 19). Available at: https://www.newcastle-staffs.gov.uk/downloads/file/2447/final-draft-local-plan [Date Accessed: 27/01/25].

2 Screening of predicted emissions against the 1% threshold

2.1 Screening thresholds

2.1.1 Natural England has developed a standard methodology for the assessment of traffic related air quality impacts under the Habitats Regulations which is relevant to the HRA of land use plans[18]. This guidance establishes thresholds for the screening of Likely Significant (air quality) Effects (LSEs) at the HRA screening stage (Stage 1 of the HRA process):

- (1) Does the Local Plan give rise to emissions which are likely to reach a European site?
- (2) Are the qualifying features of a European site within 200m of a road sensitive to air pollution?
- (3) Could the sensitive qualifying features of the European site be exposed to emissions?
- (4) Application of screening thresholds (alone and then, if necessary, in-combination).

2.1.2 The Regulation 19 HRA[19] provides a detailed response to each of the above questions which are not repeated in this report. The Regulation 19 HRA report included the application of screening thresholds using average annual daily traffic flow (AADT) as a proxy for emissions (under item 4). Widely accepted environmental benchmarks for imperceptible impacts are set at 1% of the critical load or level of each air pollutant, which is considered to be roughly equivalent to DMRB thresholds for changes in traffic flow of 1,000 AADT and for HDV of 200 AADT. The use of the AADT screening threshold is advocated by Highways England in their Design Manual for Roads and Bridges (DMRB). This screening threshold is intended to be used as a guide to determine whether a more detailed assessment of the impact of emissions from road traffic is required.

2.1.3 The Regulation 19 HRA screened in the following European sites based on an exceedance of thresholds (see **Section 2.1.1**) i.e. that emissions have the potential to result in possible likely significant air quality effects at sensitive habitats within 200m of a European site:

- Midland Meres and Mosses Phase 2 Ramsar - Black Firs & Cranberry Bog SSSI: A531 – a change in 1,618 AADT in-combination (no exceedance alone); and
- Midland Meres and Mosses Phase 2 Ramsar - Oakhanger Moss SSSI: M6 – a change in 1,283 AADT and 1,936 HDV alone, and a change in 22,904 AADT and 4,935 HDV in-combination.

[18] Natural England (2018) Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001). Available at: http://publications.naturalengland.org.uk/publication/4720542048845824 [Date Accessed: 31/01/25].

[19] Lepus Consulting (2024) Newcastle-under-Lyme First Publication Draft Local Plan 2020-2040. Habitats Regulations Assessment.

2.2 Evaluating the 1% critical level screening threshold

2.2.1 The air quality modelling report provides more detailed, local spatial air quality data. This allows a comparison of the change in emissions against 1% of the individual pollutant critical load or level (as set out in **Section 2.1**). This modelling data was used to provide an assessment of LSEs in the context of critical levels and loads, following Natural England's guidelines, against the 1% screening threshold.

2.3 Updated air quality modelling

2.3.1 **Appendix B** provides the outputs of the air quality modelling results against the 1% screening threshold. The air quality modelling was undertaken at receptor grids across each SSSI and included the area within 200m of a modelled road link. Where a road link was within 200m of a SSSI, receptors were modelled at 10m intervals up to a distance of 200m. The extent of receptors modelled is illustrated in the Air Quality Report.

2.4 Air pollutants modelled

2.4.1 Traffic emission modelling and forecasting for the Local Plan air pollution evidence base was carried out using CERC ADMS-Roads v5.0.0.1. Forecast year traffic emissions were calculated for the following scenarios:

- Base Year 2018;
- Future Year alternative baseline (2040): 2040 without any increase in traffic from 2018 (including future-year emissions factors and future year background concentrations and fluxes, but base-year traffic within the dispersion model);
- Future Year Reference Scenario (2040): AADT forecast by assuming no growth inside the plan area (Newcastle-under-Lyme and Stoke) and Tempro growth outside of the partnership authorities; and,
- Future Year with Local Plan 'In-combination' Scenario (2040): AADT forecast by assuming local planning-based growth inside the boroughs of Newcastle-under-Lyme and Stoke and Tempro growth outside of these authority areas.

2.4.2 The air quality modelling focused on the following pollutants which are associated with traffic related emission sources:

- Nitrogen oxides (NOx)
- Ammonia (NH_3)
- Nutrient nitrogen deposition (N-dep)

2.5 Critical loads

2.5.1 In an attempt to manage the negative consequences of atmospheric pollution at designated sites, Critical Loads (CLos) and Critical Levels (CLes) have been established for ecosystems across Europe. Each European site is host to a variety of habitats and species with different sensitivities to different levels of air pollution. The CLo of pollutants are defined as a "...quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge"[20]. The CLe of pollutants are defined as "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"[21].

Nitrogen oxides

2.5.2 Nitrogen oxides (NOx) are produced during the combustion processes, partly from nitrogen compounds in the fuel, but mostly by direct combination of atmospheric oxygen and nitrogen in flames[22]. Road transport emissions of NOx in 2018 were the largest contributor to UK total emissions of NOx with most emissions related to diesel vehicles[23]. The introduction of catalytic converters has seen an overall reduction in emissions since 1990. NOx has the potential to impact habitats through direct toxicity and through their contribution to nitrogen deposition. The CLe for all vegetation types from the direct toxic effects of NOx has been set at 30 $\mu g/m^3$.

Ammonia

2.5.3 Ammonia (NH_3) originates from both natural and anthropogenic sources, with the main man-made source being agriculture. Other man-made sources of NH_3 include industrial processes and vehicular emissions (from catalyst-equipped petrol vehicles and selective catalytic reduction on light and heavy goods diesel fueled vehicles). As with NOx, elevated levels of NH_3 can be directly toxic to plants and can also enrich a system with nitrogen causing eutrophication and acidification effects on habitats.

2.5.4 Lichen species can be sensitive to even small increases in NH_3 (1 $\mu g/m^3$)[24]. As such, there are two CLe for NH_3, 1 $\mu g/m^3$ for lower-level plants (lichens and bryophytes[25]) and 3 $\mu g/m^3$ for higher-level plants (all other vegetation). Each feature for which the sites are notified as a Ramsar has a different sensitivity to NH_3 depending on the presence of lichens and bryophytes. **Tables 2.1** and **2.2** sets out the NH_3 CLe for each feature.

[20] Coordination Centre for Effects (CCE). Critical load and level definitions. Available at: https://www.umweltbundesamt.de/en/Coordination_Centre_for_Effects [Date Accessed: 10/01/25].

[21] Coordination Centre for Effects (CCE). Critical load and level definitions. Available at: https://www.umweltbundesamt.de/en/Coordination_Centre_for_Effects [Date Accessed: 10/01/25].

[22] Air Pollution Information Systems (2017) Pollutants, available at: https://www.apis.ac.uk/ [Date Accessed: 10/01/25].

[23] National Atmospheric Emissions Inventory. Available at: https://naei.beis.gov.uk/overview/pollutants?pollutant_id=6 [Date Accessed: 10/01/25].

[24] Air Pollution Information Systems. Pollutants. Available at: https://www.apis.ac.uk/ [Date Accessed: 10/01/25].

[25] *Lichens and mosses are at most risk as they have limited detoxification capacity relative to their uptake potential and a large surface area relative to mass.* Source: Air Pollution Information Systems. Pollutants. Available at: http://www.apis.ac.uk/overview/pollutants/overview_NH3.htm [Date Accessed: 10/01/25].

Table 2.1: Ammonia CLe for the features of the Midland Meres and Mosses Phase 2 Ramsar underpinned by Oakhanger Moss SSSI

Qualifying Feature (Ramsar criterion)	Ammonia (µg/m^3)
Bottle Sedge *(Carex rostrata)* – Marsh Cinquefoil *(Potentilla palustris)* Swamp	1 or 3 Bryophytes and lichens not an integral part of this habitat
Cross-Leaved Heath *(Erica tetralix)* - Papillose Peatmoss *(Sphagnum papillosum)* Raised and Blanket Mire	1
Feathery Bogmoss *(Sphagnum cuspidatum)/*Spagnum *(recurvum (Fallax))* Bog Pool Community	1 Lichens not an integral part of this habitat
Black Alder *(Alnus glutinosa)* - Greater Tussock-Sedge *(Carex paniculata)* Woodland	1 or 3
Downy Birch (*Betula pubescens)* – Purple Moor Grass (*Molinia caerulea)* Woodland	1 or 3
Grey Willow (*Salix cinerea)* – Common Marsh Bedstraw (*Galium palustre)* Woodland	1 or 3
Greater Tussock-Sedge *(Carex paniculata)* Swamp	1 or 3 Bryophytes and lichens not an integral part of this habitat
Purple Moor Grass (*Molinia caerulea)* – Tormentil (*Potentilla erecta)* Mire	1 or 3 Lichens not an integral part of this habitat
Lesser Pond Sedge (*Carex acutiformis)* Swamp	1 or 3 Bryophytes and lichens not an integral part of this habitat

Table 2.2: Ammonia CLe for the features of the Midland Meres and Mosses Phase 2 Ramsar underpinned by Black Firs and Cranberry Bog SSSI

Qualifying Feature (Ramsar criterion)	Ammonia (µg/m^3)
Feathery Bogmoss *(Sphagnum cuspidatum)/*Spagnum *(recurvum (Fallax))* Bog Pool Community	1 Lichens not an integral part of this habitat
Black Alder *(Alnus glutinosa)* - Greater Tussock-Sedge *(Carex paniculata)* Woodland	1 or 3
Black Alder *(Alnus glutinosa)* – Common Nettle *(Urtica dioica)* Woodland	1 or 3
Standing Water	1 or 3 (site specific) Bryophytes and lichens not an integral part of this habitat

2.5.5 The adopted CLe of NH_3 applied in the Air Quality Report was based on the lowest range (i.e. 1 µg/m^3) to ensure a precautionary approach to screening.

Nitrogen deposition

2.5.6 Air Pollution Information System (APIS) describes nitrogen deposition as 'the input of reactive nitrogen from the atmosphere to the biosphere both as gases, dry deposition and in precipitation as wet deposition[26]'. Anthropogenic sources of enhanced reactive nitrogen deposition come from emissions of oxidised nitrogen (NOx), fossil fuel combustion and reduced nitrogen from agricultural sources.

2.5.7 Nitrogen is a major growth nutrient for plants. An increase in nitrogen can be toxic to plants and can lead to eutrophication which can cause species loss and changes in the structure and function of ecosystems. Nitrogen can also cause acidification of soils. Traffic related inputs of NOx and NH_3 have an impact on the rates of nitrogen deposition (N-dep). N-dep rates are habitat specific as different habitats have different tolerances to different levels. The N-dep CLo for each qualifying feature of the Ramsar site is shown in **Tables 2.3** and **2.4**.

Table 2.3: *N-dep CLo for the features of the Midland Meres and Mosses Phase 2 Ramsar underpinned by Oakhanger Moss SSSI*

Qualifying Feature (Ramsar criterion)	N-dep (kgN/ha/yr)
Bottle Sedge *(Carex rostrata)* – Marsh Cinquefoil *(Potentilla palustris)* Swamp	5-10
Cross-Leaved Heath *(Erica tetralix)* - Papillose peatmoss *(Sphagnum papillosum)* Raised and Blanket Mire	5-10
Feathery Bogmoss *(Sphagnum cuspidatum)*/Spagnum *(recurvum (Fallax))* Bog Pool Community	5-10
Black Alder *(Alnus glutinosa)* - Greater Tussock-Sedge *(Carex paniculata)* Woodland	10-15
Downy Birch (*Betula pubescens)* – Purple Moor Grass (*Molinia caerulea)* Woodland	10-15
Grey Willow (*Salix cinerea)* – Common Marsh Bedstraw (*Galium palustre)* Woodland	10-15
Greater Tussock-Sedge *(Carex paniculata)* Swamp	15-25
Purple Moor Grass (*Molinia caerulea)* – Tormentil (*Potentilla erecta)* Mire	15-25
Lesser Pond Sedge (*Carex acutiformis)* Swamp	No CLo as feature is not sensitive to N-dep

[26] APIS. Nitrogen Deposition. Available at: https://www.apis.ac.uk/ [Date Accessed: 10/01/25].

Table 2.4: N-dep CLo for the Midland Meres and Mosses Phase 2 Ramsar underpinned by Black Firs and Cranberry Bog SSSI

Qualifying Feature (Ramsar criterion)	N-dep (kgN/ha/yr)
Feathery Bogmoss *(Sphagnum cuspidatum)*/Spagnum *(recurvum (Fallax))* Bog Pool Community	5-10
Black Alder *(Alnus glutinosa)* - Greater Tussock-Sedge *(Carex paniculata)* Woodland	10-15
Black Alder *(Alnus glutinosa)* – Common Nettle *(Urtica dioica)* Woodland	10-15
Standing Water	No CLo – site specific

2.5.8 Where a CLo range is provided, the lower end of the range has been used in the screening assessment in the Air Quality Report to ensure a precautionary approach has been applied. In addition, the CLo for the most sensitive feature has been applied for the purposes of screening.

2.6 Interpretation of air quality data to update HRA screening conclusions

2.6.1 The air quality dispersion modelling allowed a comparison of the change in emissions against 1% of the individual pollutant CLo or CLe. This modelling data was used to provide an assessment of LSEs in the context of CLos and CLes, following Natural England's guidelines, against the 1% screening threshold (see **paragraph 2.1.2**).

Nitrogen oxides

2.6.2 At Oakhanger Moss SSSI, the 1% NOx threshold for the Local Plan alone was not exceeded at any points from the M6. In-combination, the 1% screening threshold was exceeded at all modelled points within approximately 200m of the M6.

2.6.3 At Black Firs and Cranberry Moss SSSI, the 1% threshold alone is exceeded immediately adjacent to the road verge (approx. 15m from the verge) and the in-combination 1% threshold within the SSSI and within approximately 25m of the road verge.

Ammonia

2.6.4 In terms of NH_3, at Oakhanger Moss SSSI, NH_3 there were no contributions from the Local Plan alone above 1% of the CLe at any modelled point. In-combination NH_3 contributions were above 1% of the CLe at all modelled points.

2.6.5 At Black Firs and Cranberry Bog SSSI, NH_3 contributions from the Local Plan alone were above 1% of the CLe within the SSSI and at the transect points within approximately 100m of the road verge. In-combination NH_3 contributions were above 1% of the CLe at all modelled points.

Nitrogen deposition

2.6.6 In terms of N-dep at Oakhanger Moss SSSI there were no exceedances above 1% of the CLo for short and tall vegetation. The in-combination contributions for both short and tall vegetation were above 1% of the CLo at all modelled points.

2.6.7 At Black Firs and Cranberry Bog SSSI, the alone contributions were above 1% of the CLo within approximately 120m of the road verge for tall vegetation, and within approximately 200m for short vegetation. The in-combination contributions for both short and tall vegetation were above 1% of the CLo at all modelled points.

Screening Conclusion

2.6.8 Based on a review of air quality modelling data against Natural England's 1% significance screening threshold for each pollutant in the Air Quality Report, air quality pathways of impacts at the Ramsar site at both Oakhanger Moss SSSI and Black Firs and Cranberry Bog SSSI have been screened in for further consideration in the HRA process in terms of NOx, NH_3 and N-dep.

3 Appropriate Assessment

3.1 Introduction

3.1.1 At the Appropriate Assessment (AA) stage, Natural England recommends that the 1% threshold (used in screening) is treated as a proxy value and is not relied upon in isolation to determine whether there is an adverse effect on site integrity from a plan or project. Other factors are relevant which may mean that a plan or project which exceeds the 1% screening threshold can still demonstrate no adverse effect on site integrity through an appropriate assessment.

3.1.2 Section 5 of Natural England's guidance[27] recommends that the following factors are taken into consideration in an AA:

1) Consider whether the sensitive features of the site would be exposed to emissions;
2) Consider the European site's conservation objectives;
3) Consider the spatial scale and duration of the predicted impact and the ecological functionality of the affected area[28];
4) Consider background pollution;
5) Consider the designated site in a national context;
6) Consider best available evidence on small incremental impacts from nitrogen deposition;
7) Consider site survey information;
8) Consider national, regional or local initiatives or measures which can be relied upon to reduce background levels at the site;
9) Consider measures to avoid or reduce the harmful effects of the plan or project on site integrity; and,
10) Consider any likely in-combination effects with other live plans and projects from other sources.

3.2 Are the sensitive qualifying features of the site likely to be exposed to emissions?

Midland Meres & Mosses Ramsar Phase 2

3.2.1 The Midland Meres & Mosses Ramsar Phase 2 comprise of a series of lowland open water and peatland sites formed in depressions, mostly formed by receding ice sheets[29] (see **Appendix B**). The Ramsar sites form an internationally important series of habitats and are either fed by groundwater or rainwater, depending on their stage of physical transition between bog and fen.

[27] Natural England (2018) Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001). Available at: http://publications.naturalengland.org.uk/publication/4720542048845824 [Accessed: 13/01/25]

[28] Note – order has been altered slightly in this report.

[29] Ramsar Sites Information Service (1999) Midland Meres & Mosses. Available at: https://rsis.ramsar.org/ris/653 [Accessed 12/06/24]

3.2.2 A bog is an enclosed depression fed by rainwater, which is slightly acidic and low in nutrients[30]. In comparison, fens are fed by a steady source of groundwater, which is mineral-rich and alkaline. A mire is the transition habitat type between an acidic bog and an alkaline fen and are often unstable underfoot and are therefore described as 'quaking'. More recently, a small number of the Ramsar sites have been formed, at least in part, by subsidence resulting from the removal in solution of underlying salt deposits. These waterbodies are known as 'meres' or 'pools'. The development of these habitats involves peat accumulation in which the nutrient status of the peat surface changes, typically becoming nutrient poor (oligotrophic) and acidic, enabling bog mosses (*Sphagnum spp.*) to colonise. These resulting peat bogs are the 'mosses'. The colonisation of the water surface by floating vegetation, in a few cases, has resulted in the formation of a quaking bog known as a '*schwingmoor*'.

3.2.3 The Midland Meres and Mosses Phase 2 Ramsar site extends over 1,588ha, consisting of 18 sites which comprise nutrient-rich open water bodies (meres) with fringing habitats of reed swamp, fen, carr and damp pasture, and peatlands[31,32]. These sites are distributed throughout the north-west Midlands and north-east Wales. The Ramsar is notified under two criteria as set out in **Box 1**.

Box 1: Midland Meres and Mosses Ramsar notification criterion

Ramsar criterion 1: The site comprises a diverse range of habitats from open water to raised bog.

Ramsar criterion 2: Supports a number of rare species of plants associated with wetlands, including the nationally scarce Cowbane *(Cicuta virosa)* and, Elongated Sedge *(Carex elongata).* Also present are the nationally scarce bryophytes *(Dicranum affine)* and *Sphagnum pulchrum*. Also supports an assemblage of invertebrates including several rare species. There are 16 species of British Red Data Book insect listed for this site including the following endangered species: the Moth *Glyphipteryx lathamella*, the Caddisfly *(Hagenella clathrate)* and the Sawfly *(Trichiosoma vitellinae)*.

3.2.4 As noted in **paragraph 3.2.1**, components of the Ramsar site are either fed by groundwater or rainwater, depending on their stage of physical transition between bog and fen.

[30] Department of Natural Resources. Bogs and Fens. Available at: https://www2.dnr.state.mi.us/publications/pdfs/huntingwildlifehabitat/Landowners_Guide/Resource_Dir/Acrobat/BogsFens.PDF [Accessed 12/06/24]

[31] It is noted that not all features are present on all 18 sites.

[32] Ramsar Sites Information Service. Available at: https://rsis.ramsar.org/ris/891 [Accessed: 19/06/24].

3.2.5 Mires and bogs are nutrient-poor habitats, described as 'ombrotrophic' (rain fed) which are influenced and therefore particularly sensitive to changes in atmospheric inputs of nutrients[33]. Typical bog species include the important peat-forming species, such as Bog-mosses (*Sphagnum* spp.) and Cottongrasses (*Eriophorum* spp.), or Purple Moor-Grass (*Molinia caerulea*) in certain circumstances, together with Heather (*Calluna vulgaris*) and other ericaceous species. The SSSI citations indicate that these species form part of botanical assemblages to be found at both SSSI components of the Ramsar. Increased nitrogen deposition can lead to the growth of more nitrogen-loving species and a subsequent change in species composition. A-dep has the potential to affect the functioning of a peat ecosystem and therefore also result in a change in species composition[34].

3.2.6 Fens and marshes are characterised by a variety of vegetation types that represent their underlying geology and soil type. These systems are seasonally or periodically waterlogged by mineral-rich (minerotrophic) groundwater. These systems are therefore likely to be more vulnerable to a variety of sources of pollution, in particular water pollution.

Oakhanger Moss SSSI

3.2.7 Oakhanger Moss SSSI covers 13.56ha and forms a component of the Midland Meres and Mosses Ramsar Phase 2 site. This SSSI has developed on a particularly shallow glacial depression and supports four mire vegetation communities which demonstrate the succession stages from open water to raised bog. The SSSI citation indicates that the site has a wooded appearance due to the presence of a well-developed shrub cover, with an area dominated by the Bogmoss (*Sphagnum recurvum*) in the centre of the site[35]. Natural England's advice regarding the management of the SSSI notes that "unless the basin mire is important for its eutrophic fen, it is essential to exclude undue concentrations of nitrogen and phosphorus, any increase in which would result in the development of eutrophic fen in favour of the poor or rich fen vegetation, which would be lost"[36].

3.2.8 Oakhanger Moss SSSI comprises one SSSI unit which is designated for the following interest features which are the same as the reasons for notification of the site as a Ramsar under criterion 1 (the site comprises a diverse range of habitats from open water to raised bog):

- Basin fen (lowland);
- Blanket bod and valley bog (upland);
- Lowland mire grassland and rush pasture; and
- Wet woodland.

[33] APIS. Information on Bog Habitat. Available at: https://www.apis.ac.uk/overview/ecosystems/overview_bogs.htm#:~:text=These%20ecosystems%20%2D%20often%20described%20as,as%20bog%2Dmosses%20Sphagnum%20spp. [Accessed: 20/06/24].

[34] APIS. Information on Bog Habitat. Available at: https://www.apis.ac.uk/overview/ecosystems/overview_bogs.htm#:~:text=These%20ecosystems%20%2D%20often%20described%20as,as%20bog%2Dmosses%20Sphagnum%20spp. [Accessed: 20/06/24].

[35] Natural England (1994) SSSI Citation. Oakhanger Moss SSSI. Available at: https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1006639.pdf [Accessed: 20/01/25].

[36] Natural England (2004) Views About Management. Oakhanger Moss SSSI. Available at: https://designatedsites.naturalengland.org.uk/PDFsForWeb/VAM/1006639.pdf [Accessed: 20/01/25].

3.2.9 The features of the SSSI (**paragraph 3.2.8**) are classified as being in an unfavourable condition. The reasons given for unfavourable condition relate to drainage issues and reduced water levels which has resulted in the site drying out[37]. Air quality is not listed as an operation likely to damage the SSSI or on the Ramsar information sheet for the Midland Meres and Mosses Phase 2 Ramsar site (**Appendix B**)[38].

Black Firs and Cranberry Bog SSSI

3.2.10 Black Firs and Cranberry Bog SSSI covers 11ha and forms a component of the Midland Meres and Mosses Ramsar Phase 2 site. This SSSI comprises two key areas, Black Firs and Cranberry Bog. According to the 1968 SSSI citation[39] Black Firs is a modified valley Alderwood on a peat-filled depression and Cranberry Bog is a *schwingmoor* basin mire. Black Mere is the open water section of the SSSI within the Cranberry Bog area and forms the largest dystrophic[40] open water body in Staffordshire. The SSSI citation for this site indicates that the mere and the mire "represent lowland habitats which are nationally threatened and declining due largely to drainage and ground-water enrichment"[41]. Any increase in nitrogen deposition has the potential to exacerbate pollution levels and thereby undermine the reasons for notification of this site as a Ramsar.

3.2.11 Black Firs and Cranberry Bog SSSI comprises four units (005, 006, 007 and 008). It is designated for the following interest features:

- Basin fen (lowland);
- Dystrophic lakes (Black Mere); and
- Wet woodland.

3.2.12 The same interest features are included in the Ramsar notification under criterion 1 (the site comprises a diverse range of habitats from open water to raised bog).

3.2.13 All SSSI features (**paragraph 3.2.11**) are classified as being in an unfavourable condition. The reasons given for unfavourable condition relate to drainage issues (raised water levels) and eutrophication (from agricultural and domestic sources from the surrounding surface water catchment).

[37] Natural England Designated Site Viewer. https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=S1006639&SiteName=Oakhanger%20Moss%20SSSI

[38] Information Sheet on Ramsar Wetlands. West Midlands Meres and Mosses Phase 2. Available at: https://jncc.gov.uk/jncc-assets/RIS/UK11080.pdf

[39] Black Firs and Cranberry Bog SSSI citation (1968) Available at: https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1003841.pdf

[40] A lake having acidic water that is low in oxygen and high in levels of dissolved humus and organic acids.

[41] Natural England (1986) SSSI Citation. Black Firs and Cranberry Bog Moss SSSI. Available at: https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1003841.pdf [Accessed: 12/06/24].

3.2.14 A 2018 Favourable Condition Status (FCS) survey undertaken by Natural England (**Appendix C**) indicated that the wet woodland and wetland habitat in Black Firs is almost non-existent, being limited to the ditch banks and bottoms. Most of the wood is closer to National Vegetation Classification W10 Oak wood than any wetland habitat[42]. Air quality is not listed as an operation likely to damage the SSSI or on the Ramsar information sheet for the Midland Meres and Mosses Phase 2 Ramsar site (**Appendix B**)[43].

3.2.15 Natural England has defined favourable condition status for each SSSI. These reports include maps showing the extent of notified features at each SSSI[44][45] (**Appendix C**). This mapping data indicates the presence of Ramsar notified features (see **Box 1**) within 200m of both the A531 and M6.

3.2.16 A review of APIS data indicates that open water to raised bog (Ramsar criterion 1) and rare species of plants associated with wetlands (Ramsar criterion 2) are sensitive to NH_3, NOx and N-dep. The invertebrate assemblage is not considered to be directly sensitive to N-dep. However, impacts may affect the broad habitat types they rely upon (open water to raised bog).

3.2.17 APIS provides CLo and CLe for each notified feature present within 200m of the A531 and M6 as summarised in **Tables 3.1** and **3.2**.

Table 3.1: *CLos and CLes for the notified features of Oakhanger Moss SSSI within 200m of the M6*

Qualifying Feature	NOx (µg/m3)	Ammonia (µg/m3)	N-Dep (kgN/ha/yr)
Bottle Sedge (*Carex rostrata*) – Marsh Cinquefoil (*Potentilla palustris*) Swamp	30	1 or 3 Bryophytes and lichens not an integral part of this habitat	5-10
Cross-Leaved Heath (*Erica tetralix*) - Papillose Peatmoss (*Sphagnum papillosum*) Raised and Blanket Mire	30	1	5-10
Feathery Bogmoss (*Sphagnum cuspidatum*)/*Spagnum* (*recurvum* (*Fallax*)) Bog Pool Community	30	1 Lichens not an integral part of this habitat	5-10
Black Alder (*Alnus glutinosa*) - Greater Tussock-Sedge (*Carex paniculata*) Woodland	30	1 or 3	10-15

[42] Natural England Designated Site Viewer. https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=S1003841&SiteName=Black%20Firs%20&%20Cranberry%20Bog%20SSSI

[43] Information Sheet on Ramsar Wetlands. West Midlands Meres and Mosses Phase 2. Available at: https://jncc.gov.uk/jncc-assets/RIS/UK11080.pdf

[44] Natural England (2015) Definitions of Favourable Condition for designated features of interest: Black Firs and Cranberry Bog SSSI.

[45] Natural England (2015) Definitions of Favourable Condition for designated features of interest: Oakhanger Moss SSSI.

Qualifying Feature	NOx (µg/m3)	Ammonia (µg/m3)	N-Dep (kgN/ha/yr)
Downy Birch (*Betula pubescens*) – Purple Moor Grass (*Molinia caerulea*) Woodland	30	1 or 3	10-15
Grey Willow (*Salix cinerea*) – Common Marsh Bedstraw (*Galium palustre*) Woodland	30	1 or 3	10-15
Greater Tussock-Sedge (*Carex paniculata*) Swamp	30	1 or 3 Bryophytes and lichens not an integral part of this habitat	15-25
Purple Moor Grass (*Molinia caerulea*) – Tormentil (*Potentilla erecta*) Mire	30	1 or 3 Lichens not an integral part of this habitat	15-25
Lesser Pond Sedge (*Carex acutiformis*) Swamp	30	1 or 3 Bryophytes and lichens not an integral part of this habitat	

Table 3.2: *CLos and CLes for the notified features of Black Firs and Cranberry Bog SSSI within 200m of the A513*

Qualifying Feature	NOx (µg/m3)	Ammonia (µg/m3)	N-Dep (kgN/ha/yr)
Feathery Bogmoss (*Sphagnum Cuspidatum*)/*Spagnum* (*recurvum* (*Fallax*)) Bog Pool Community	30	1 Lichens not an integral part of this habitat	5-10
Black Alder (*Alnus glutinosa*) - Greater Tussock-Sedge (*Carex paniculata*) Woodland	30	1 or 3	10-15
Black Alder (*Alnus glutinosa*) – Common Nettle (*Urtica dioica*) Woodland	30	1 or 3	10-15
Standing Water	30	1 or 3 (site specific) Bryophytes and lichens not an integral part of this habitat	No CLo – site specific

3.3 Consideration of the Conservation Objectives

3.3.1 The reasons for notification of the Ramsar are set out in **Box 1**. Ramsar sites are afforded the same level of protection as European sites (as set out in the Conservation of Habitats Regulations[46]) as a matter of Government policy, through the National Planning Policy Framework (NPPF)[47]. The nationally designated site network should support and contribute to the achievement of FCS of those features present at Ramsar sites (and underpinning SSSIs).

3.3.2 No specific conservation objectives are provided for the Ramsar or underpinning SSSIs in terms of air quality.

3.3.3 The APIS website provides mid-year 2021 (2020-2022) air quality data for each SSSI in 1km grid squares. Data for the 1km grid square which is located within 200m of the A531 and M6 shows the following levels of pollutants for each SSSI (**Table 3.3** and **3.4**).

__Table 3.3:__ 2021 levels of pollutants for the notified features of Oakhanger Moss SSSI taken for the 1km grid square within 200m of the M6 (APIS)

Qualifying Feature	Ammonia (µg/m3)	N-Dep (kgN/ha/yr)
Tall vegetation (woodland)	3.3	44.4
Short vegetation (swamp, raised and blanket mire, bog pool)	4.0	24.5

__Table 3.4:__ 2021 levels of pollutants for the notified features of Black Firs and Cranberry Bog SSSI for the 1km grid square within 200m of the A531 (APIS)

Qualifying Feature	Ammonia (µg/m3)	N-Dep (kgN/ha/yr)
Tall vegetation (woodland)	4.0	46.5
Short vegetation (bog pool community)	4.0	25.6

3.3.4 When comparing these baseline levels to CLes and CLos for each feature (**Tables 3.1** and **3.2**) it can be seen that levels in 2021 exceed the lower NH_3 CLe and the N-dep CLo for each feature.

3.3.5 As background levels at both SSSIs are already exceeding thresholds for NH_3 and N-Dep, they will be undermined by any proposal for which there is evidence that further emissions will compromise the ability of other national or local measures and initiatives to reduce background levels. The extent to which the Local Plan will undermine the conservation objectives of the Ramsar site at these SSSI locations to restore air quality therefore requires further consideration. It is therefore likely that there will be a 'restore' objective for each pollutant to ensure that air quality at both SSSI achieves the favourable condition status of each SSSI and the Ramsar at these locations.

[46] The Conservation of Habitats and Species Regulations 2017 SI No. 2017/1012, TSO (The Stationery Office), London, as amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

[47] Department for Levelling up, Housing and Communities & Local Government (2023). National Planning Policy Framework. Para 194.

3.3.6 Natural England's guidance notes that a judgement on whether conservation objectives of a site to restore air quality objectives would be undermined, must be taken by the competent authority (the Council) which 'should be informed by, amongst others, the extent to which any declining national trends in air pollution or strategic work to tackle emissions affecting the site more locally might otherwise lead to improvements, the rate at which such improvement are anticipated to be delivered, any credible evidence on the extent of the impacts of a plan or project and whether those impacts can properly be considered temporary and reversible.'

3.3.7 An effect from the Local Plan will be significant if it undermines the FCS of the SSSIs which underpin the Ramsar site at these locations. It is therefore necessary to determine whether a deterioration of air quality caused by increased traffic flows on the A531 and M6 will undermine the achievement of FCS at each of the SSSIs which underpin the Ramsar by reducing the ability of air quality to be restored to CLos and CLes.

3.3.8 A review of APIS data illustrates where measures need to be targeted to ensure the achievement of conservation objectives for the SSSI. **Figures 3.1** and **3.2** show that local N-dep contributions from livestock comprise over 50% of all contributions. At both SSSIs, road contributions comprise less than 7% of all background local contributions to N-dep which is a significant difference. It is therefore reasonable to expect that measures required to achieve air quality conservation objectives at both SSSIs would target agricultural activities. It is noted that the below figures provide a site average, and concentrations may be greater closer to road and agricultural point sources.

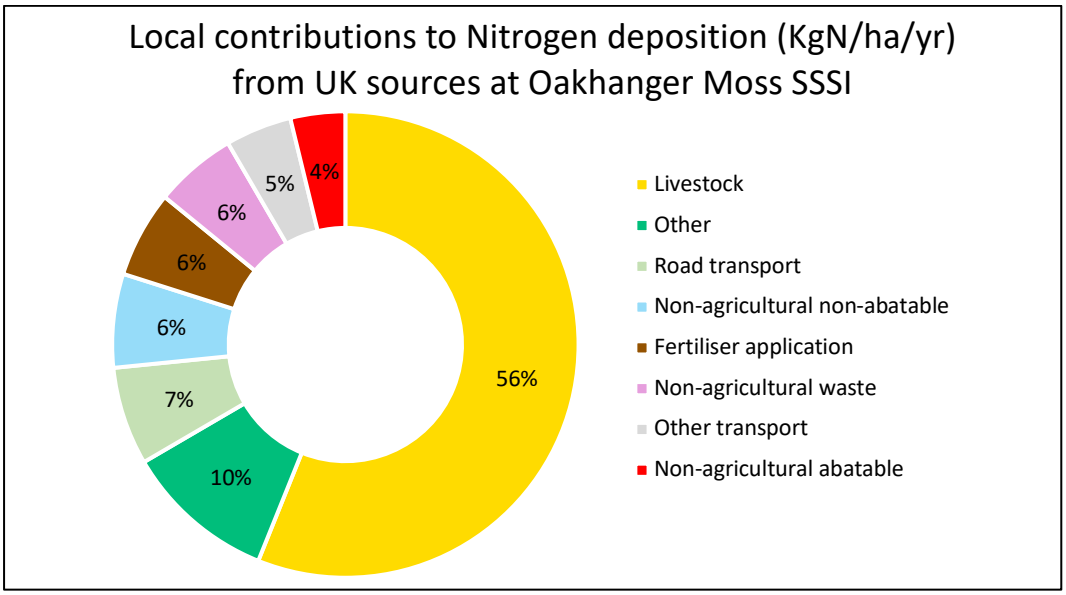

Figure 3.1: Local Contributions to N-dep at Oakhanger Moss SSSI

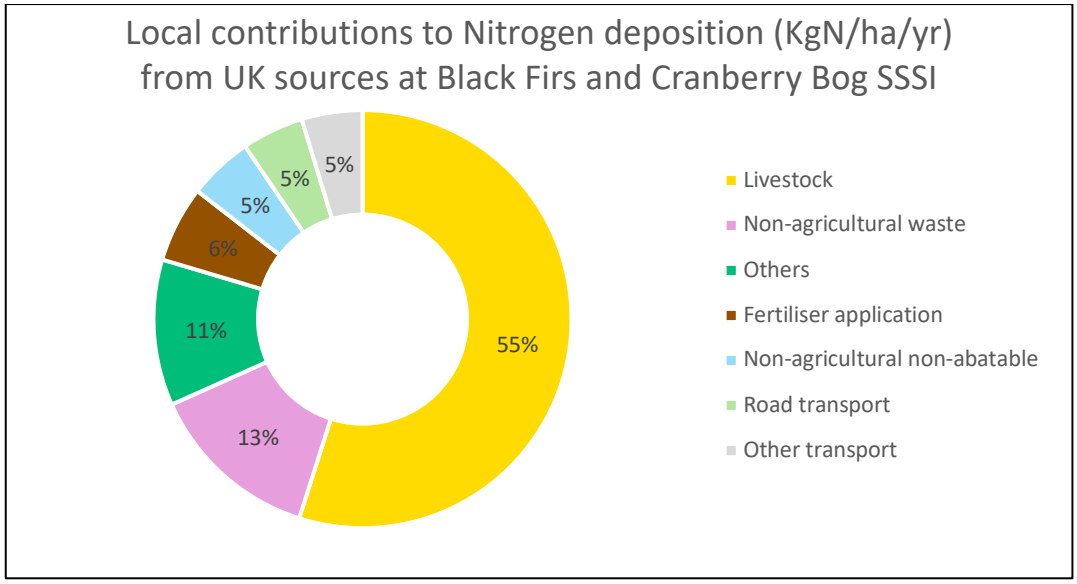

Figure 3.2: Local Contributions to N-dep at Black Firs and Cranberry Bog SSSI

3.4 Spatial scale, duration of the predicted impact and the ecological functionality

3.4.1 The air quality dispersion modelling predicts concentrations of NOx and NH_3 along with N-dep within both SSSIs within 200m of the A531 and M6 (see Air Quality Report).

Oakhanger Moss

Nitrogen oxides

3.4.2 At Oakhanger Moss SSSI, in all future year scenarios and at all locations, the total concentration of NOx is well below the CLe of 30 µg/m3. As the CLe will not be exceeded, **no adverse impact upon site integrity (AIOSI) at the Ramsar will arise as a direct result of elevated NOx from the Local Plan, either alone or in combination.**

Ammonia

3.4.3 The M6 is located approximately 123m to the east of the Oakhanger Moss SSSI at its closest point (see **Figure 3.3**). A total of 1.6ha of the SSSI is located within 200m of the M6. A review of aerial photography indicates that the motorway verge, agricultural fields, a minor road (Nursey Road) and residential properties are situated between the Ramsar designation boundary and the M6. A review of mapping data indicates that the SSSI is located within the ownership of Oakhanger Farm. The FCS survey data (**Appendix C**) indicates that wet woodland habitat is located in the eastern section of the SSSI and in the area that is located within 200m of the M6.

3.4.4 Information presented in the 1968 SSSI citation states that habitat in this area is dominated by Alder (*Alnus glutinosa*) and willows above mature Greater Tussock-sedge (*Carer paniculata*), with Cyperus Sedge (*C. pseudocyperus*), Marsh Pennywort (*Hydrocotyle vulgaris*), Marsh Violet (*Viola palustris*), Purple-Loosestrife (*Lythrum salicaria*) and Marsh Cinquefoil (*Potentilla palustris*). The SSSI citation goes on to note that there is a drier perimeter of the site which support a few pedunculate oaks (*Quercus robur*) over a bracken (*Pteridium aquilinum*) ground layer. Analysis of aerial photography (**Figure 3.5**) and a site visit undertaken along Nursey Road to the immediate east of the SSSI (to the west of the M6) confirmed that habitat along the eastern SSSI boundary (and within 200m of the M6) comprises woodland. It should be noted that access was not possible into the SSSI itself to allow a detailed habitat survey

3.4.5 The in-combination scenario modelled for the M6 includes national traffic growth feeding into the motorway system at the point where is passes within 200m of Oakhanger Moss SSSI. The M6 forms part of the national strategic road network and runs through a number of LPAs locally including Cheshire East to the north of the Plan area and Stafford District, South Staffordshire and Walsall to the south.

3.4.6 To inform local plan production in their respective local authority areas, Wolverhampton, Dudley, Sandwell, East Staffordshire, South Staffordshire, Stafford, Lichfield, Cannock Chase and Walsall Councils have worked together (as part of a Partnership) to prepare a joint strategic air pollution evidence base. These local authorities quantified the contribution of traffic from local sources using the M6 at the point it passes Oakhanger Moss SSSI. Through this work they showed that the contribution to the traffic change attributed to the Partnership Authorities Local Plans is forecast to be below 100 AADT, which is notably below the 1,000 AADT screening threshold.

3.4.7 In 2022 Cheshire East adopted their Site Allocations and Development Policies Document[48]. This plan was supported by an HRA[49] which provided a screening of air quality impacts at the Midland Meres and Mosses Phase 2 Ramsar (which includes Oakhanger Moss SSSI). The Cheshire East HRA concluded that development proposed in the Site Allocations and Development Policies Document would not cause an increase in traffic on the M6 greater than the threshold for potential impact (1,000 AADT) due to the small scale of development proposed in the Plan and that any increase in traffic would be negligible. Air quality LSEs were therefore screened out of the HRA process.

3.4.8 Taking into consideration local traffic contributions from LPAs, including Newcastle-under-Lyme and Stoke and others to the north and south of the SSSI, it can be concluded that the in-combination growth for the M6 road link from the traffic model is likely to be dominated by national growth feeding into the motorway system. This has been agreed with Natural England through consultation on 20th February 2025[50].

[48] Cheshire East Council (2022) Site Allocations and Development Policies Document.

[49] JBA Consulting (2000) Cheshire East Local Plan Site Allocations and Development Policies Document. Habitats Regulations Assessment Revised Publication Draft

[50] Natural England (20th February 2025) Email to Newcastle-under-Lyme Council.

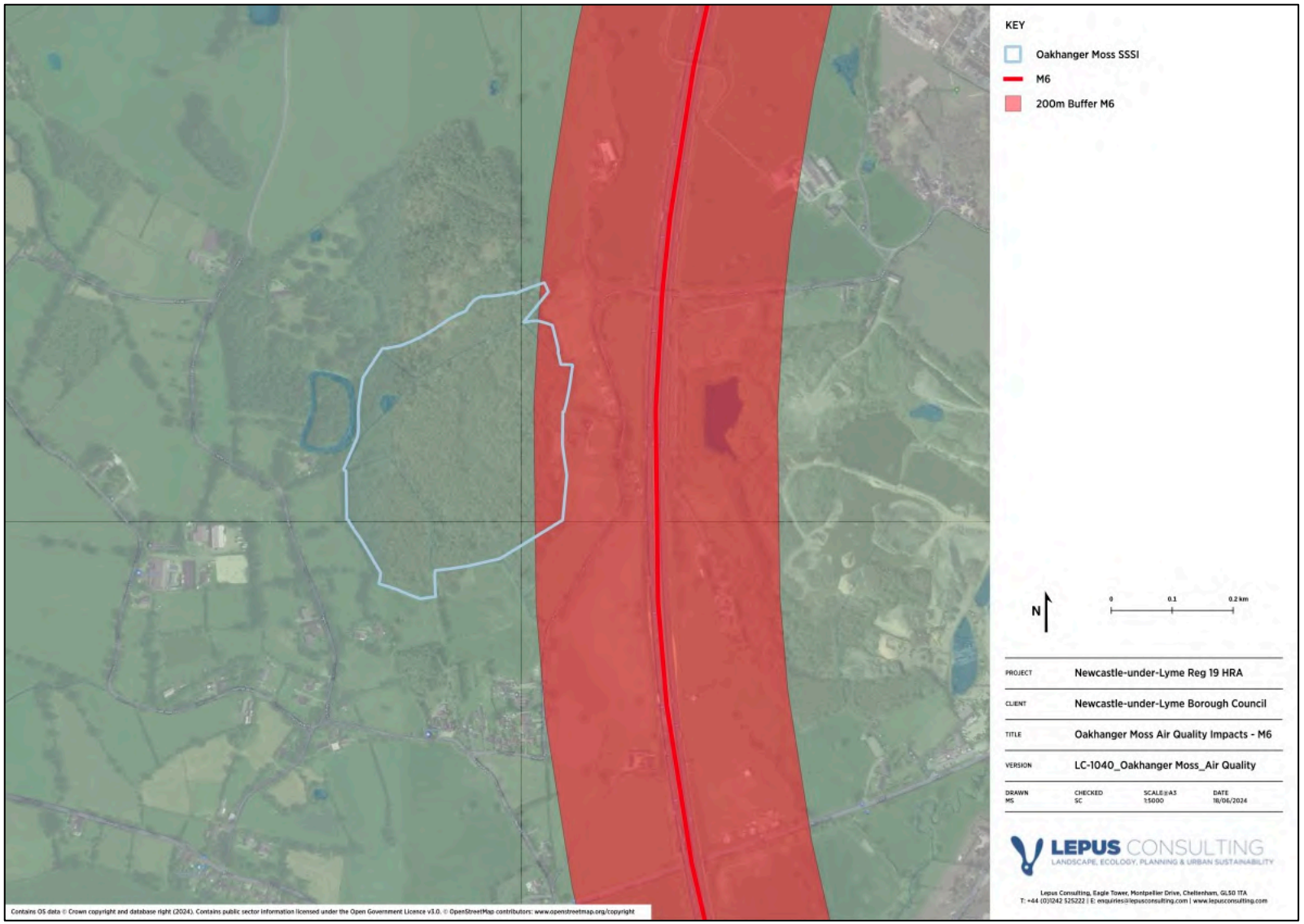

***Figure 3.3**: Location of Oakhanger Moss SSSI in relation to the M6*

3.4.9 As set out in **Table 3.1**, there are two CLe for NH_3, 1 µg/m^3 for lower plants (lichens and bryophytes[51]) and 3 µg/m^3 for higher level plants (all other vegetation).

3.4.10 It is noted that the Sweco Air Quality Report applied a screening threshold appropriate for the lower CLe (1 µg/m^3). As set out in **Section 2**, the NH_3 alone 1% threshold (1 µg/m^3) is not exceeded anywhere across Oakhanger Moss SSSI for the alone scenario.

3.4.11 The conservation objectives of the Ramsar and this SSSI component is to restore air quality to CLos and CLes as set out on APIS for each of the site features. Given the NH_3 contributions from the Local Plan alone are below the 1% screening threshold in relation to the lower CLe (1 µg/m^3), it can be **concluded that there will be no AIOSI of the Ramsar due to a change in NH_3 levels.**

Nitrogen deposition

3.4.12 As set out in **paragraph 3.4.8**, taking into consideration local traffic contributions from LPAs, including Newcastle-under-Lyme and Stoke and others to the north and south of the SSSI, it can be concluded that the in-combination growth for the M6 road link from the traffic model is likely to be dominated by national growth feeding into the motorway system.

3.4.13 As set out in **Section 2**, the dispersion modelling results indicate that there are no alone exceedances of the 1% screening threshold for N-dep for short vegetation at any point within the SSSI. **AIOSI upon short vegetation habitats associated with the Ramsar at this SSSI component can therefore be screened out of this assessment in terms of N-dep and are not considered further.**

3.4.14 For tall vegetation however there is an exceedance of the 1% screening threshold for N-dep on the eastern boundary of the SSSI within the area of woodland. This is the area of the SSSI that is located within 200m of the M6. This assessment therefore focuses only upon N-dep alone impacts upon the woodland vegetation to the east of the SSSI (wet woodland) and within 200m of the M6 where the 1% screening threshold for N-dep has been exceeded.

3.4.15 Maximum N-dep levels for tall vegetation in-combination (including baseline levels) range from 41.6 to 44.3 kgN/ha/yr, with higher concentrations closer to the M6. This shows that the lower CLo range for tall vegetation (10 kgN/ha/yr) is exceeded at the SSSI for the in-combination scenario.

3.4.16 The maximum deterioration from the Local Plan alone at the SSSI to N-dep is 0.05 kgN/ha/yr to tall vegetation (wet woodland habitat) at the location where the SSSI begins (see mapping data in **Appendix C**).

3.4.17 In addition to the assessment of modelled air quality data, Natural England's guidance recommends that consideration be given to background pollution trend data.

3.4.18 For the 1km grid square adjacent to the M6 APIS data shows that N-dep fell for forest (woodland) from 49.9 kg N/ha/year in 2003 to 44.4 kg N/ha/year in 2021 (see **Figure 3.4**).

[51] *Lichens and mosses are at most risk as they have limited detoxification capacity relative to their uptake potential and a large surface area relative to mass.* Source: Air Pollution Information Systems. Pollutants. Available at: http://www.apis.ac.uk/overview/pollutants/overview_NH3.htm [Date Accessed: 10/01/25].

3.4.19 This suggests that there is an improving trend on N-dep at the SSSI. However, the data indicates that the lower N-dep CLo for tall vegetation is exceeded at the SSSI.

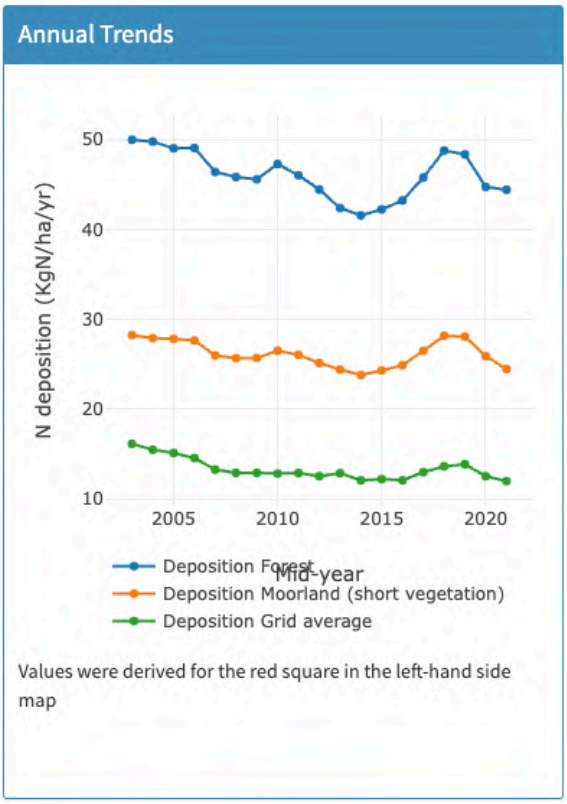

Figure 3.4: Annual N-dep trends for the 1km grid square within 200m of the M6: source APIS

3.4.20 The dispersion modelling results show that baseline N-dep levels in 2040 will be 43.03 kgN/ha/yr for tall vegetation. Background concentrations of nitrogen deposition have been taken from APIS. The background deposition values are interpolated from the 1 km x 1 km averages to a 1 m resolution. APIS currently presents 3-year mean values centred on the calendar year of 2021 (2020-2022). These have been adjusted to represent 3-year averages centred on 2030 using the rate of change predicted for this area using the Business-as-Usual assumptions of JNCC's Nitrogen Futures project. Nitrogen Futures only predicted changes to 2030, so the background values for 2030 have been used to represent 2040. It is not currently possible to reliably predict any subsequent changes to local background conditions between 2030 and 2040.

3.4.21 The baseline data provided for both 2021 (2020-2022) and 2040 in the air quality report indicates that the lower N-dep CLo for tall vegetation will be exceeded at all locations modelled without the Local Plan, or any other plans or projects in place.

3.4.22 For tall vegetation, the air quality report provides an estimated background N-dep concentration in 2040 (end plan year) of 43.03 kgN/ha/yr *(without the proposal alone and in combination)*. This is a reduction of 1.37 kgN/ha/yr from a 2021 baseline level as provided on APIS of 44.4 kgN/ha/yr (see **Figure 3.4**).

3.4.23 Assuming this reduction will take place over a 9-year period (i.e. 2030 – 2021 – see **paragraph 3.4.20**). This suggests that cleaner vehicle technology will result in an average year on year reduction (as a single figure) in N-dep of 0.152 kgN/ha/yr.

3.4.24 Taking into consideration the contribution from the Local Plan to tall vegetation (total 0.052 kgN/ha/yr) there would be a reduction of 1.422 kgN/ha/yr over the period of 9 years. This would mean that to get the same reduction of 0.152 kgN/ha/yr, it would take 9.3 years (1.422 divided by 0.152 = 9.3 years). This means that the Local Plan would retard background improvements by under a year (up to 2030).

3.4.25 It is noted that the data provided for the Local Plan scenarios is for both Newcastle-under-Lyme and Stoke's growth over the plan period and is therefore likely to be precautionary and worst case.

3.4.26 Taking into consideration the current background concentrations of N-dep and the predicted reducing trends in N-dep at the SSSI, it can be concluded that such a minor contribution from the Local Plan is unlikely to impede this downward trend.

3.4.27 **It can be concluded that no AIOSI on the Ramsar at this SSSI component will arise as a result of N-dep.**

Black Firs and Cranberry Bog

Nitrogen oxides

3.4.28 At the Black Firs and Cranberry Bog SSSI component of the Ramsar, in all future year scenarios and at all locations, the total concentration of NOx is well below the CLe of 30 µg/m3. As the CLe will not be exceeded, **no AIOSI will arise as a direct result of elevated NOx from the Local Plan, either alone or in combination on the Ramsar at this SSSI component.**

Ammonia

3.4.29 Black Firs and Cranberry Bog SSSI is located within ownership and management of the Staffordshire Wildlife Trust. As set out in **paragraph 3.2.10** and illustrated in figures provided in **Appendix C**, Black Firs and Cranberry Bog SSSI comprises two key components, wet woodland associated with Black Firs (9.5 acres) and the lowland basin fen and dystrophic lake associated with Cranberry Bog and Black Mere (2.8 acres).

3.4.30 A total of 5.86ha of the SSSI is located within 200m of the A531. As shown in **Figure 3.5**, habitat within 200m of the A531 includes the Black Firs component of the SSSI, which comprises wet woodland and drainage ditch habitat. Many of these ditches remain dry for most of the year and have become overgrown with brambles and ferns[52]. A review of Natural England's FCS targets (**Appendix C, Annex 1**) indicates that the Black Firs area is assessed against the National Vegetation Classification W5[53] wet woodland targets.

[52] Staffordshire Wildlife Trust. Black Firs and Cranberry Bog Reserve Management Plan 2019 – 2029.

[53] W5 *Alnus glutinosa – Carex paniculata* woodland.

3.4.31 Only the eastern fringe of the Cranberry Bog component of the SSSI is located within 200m of the A531. The open water area of Black Mere and the sphagnum lawn are not located within 200m of the A531[54]. A review of habitat mapping data and aerial photography provided by Staffordshire Ecological Records Centre (**Appendix D**) indicates that the key habitat type at the Cranberry Bog component within 200m of the A513 comprises arable fields. Wet woodland is located further to the east, approximately 175m from the A513, on the periphery of Cranberry Bog, within the fen lagg zone. A review of Natural England's FCS targets (**Appendix C,** Annex 1) indicates that this fen lagg zone habitat (which is dominated by mature willows, alder and birch) is assessed against the W5 wet woodland targets (or other wetland targets (S28[55]/S5[56]).

[54] Staffordshire Wildlife Trust. Black Firs and Cranberry Bog Reserve Management Plan 2019 – 2029.

[55] *Phalaris arundinacea* tall-herb fen.

[56] *Glyceria maxima* swamp.

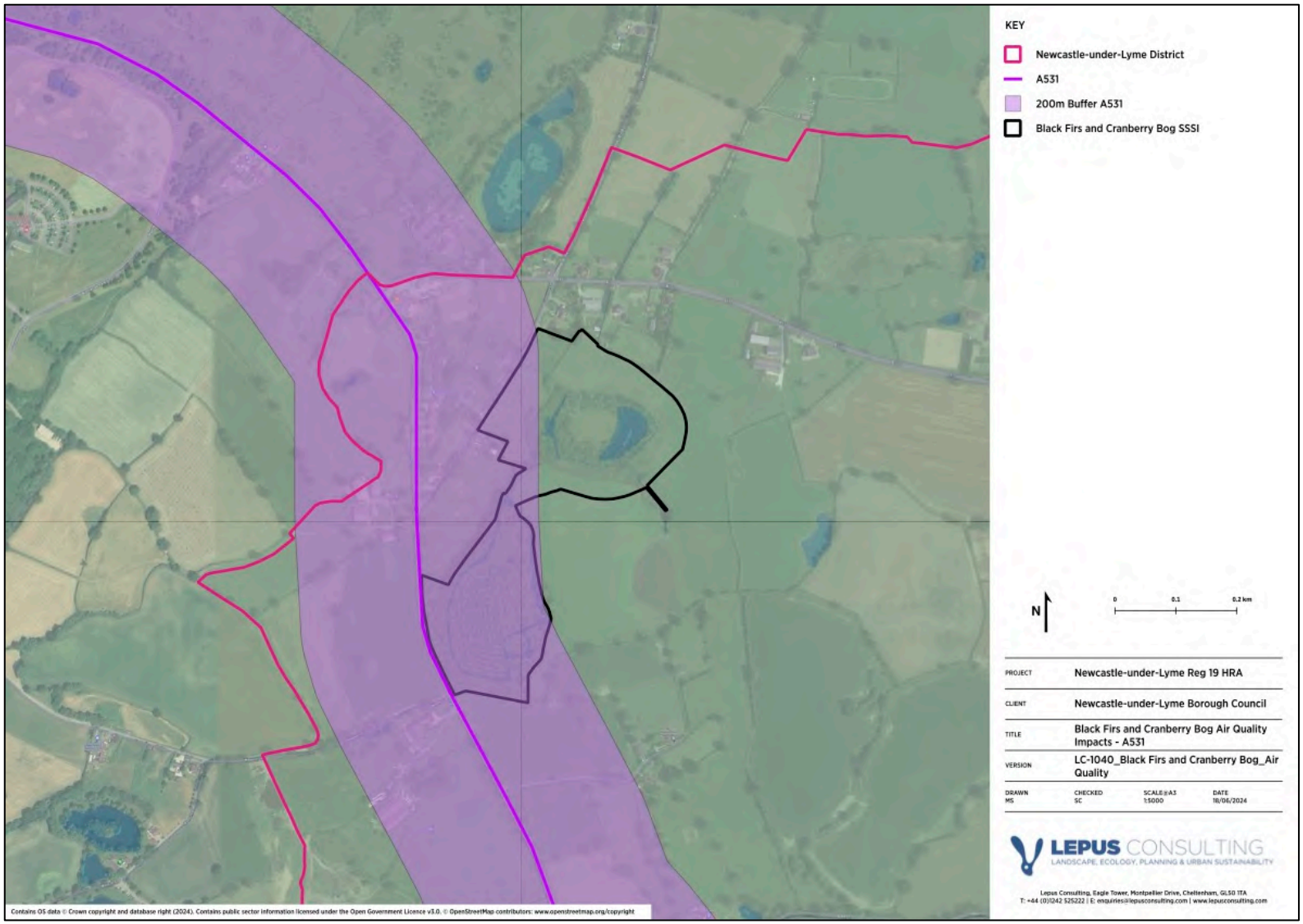

Figure 3.5: Location of Black Firs and Cranberry Bog SSSI in relation to the A531

Black Firs

3.4.32 The A531 runs immediately adjacent to the western boundary of the Black Firs component of the SSSI (**Figure 3.5**). Ramsar criterion 1 (**Box 1**) indicates that the site comprises a diverse range of habitats from open water to raised bog. The Ramsar features associated with this component of the SSSI is Black Alder wet woodland. Mature pines have however been planted in this western edge of the SSSI at Black Firs close to the A531 over the last 5 to 100 years[57]. Black Firs is therefore currently dominated by mixed broadleaved and coniferous woodland, which is typical of a drier woodland community type, rather than a wet woodland. A botanical survey undertaken in 2014 indicates that the entire area of Black Firs comprises Scots Pine and alder woodland[58]. The boundary along the road is marked by a derelict hedgerow which runs alongside the pavement. The management plan for the SSSI indicates that:

3.4.33 '*Much of Black Firs is classified as acid valley alder woodland and included within the SSSI citation for this habitat type. The ground layer is however becoming increasingly dominated by buckler fern, bramble and bracken. Natural regeneration throughout the woodland is largely of species more typical of a drier woodland community type; oak, beech, holly and rowan. The northern end of Black Firs, and throughout this compartment on the higher ground, the woodland is increasingly dominated by oak, beech and birch. Sycamore is regenerating abundantly in these areas. Planting has occurred throughout Black Firs as is evidenced by the presence of a significant number of large, mature pine trees. The western edge of the woodland has been most altered by planting in the last 50-100 years. This area is generally on higher ground and is therefore constantly drier than the rest of the woodland. The ground flora is very species poor and is dominated by grasses (Yorkshire fog), bramble, bracken and honeysuckle. This part of the reserve does however support a small colony of bluebells. Throughout the woodland the structure is generally of closely spaced, tall canopy trees with a relatively sparse understorey*[59]'.

3.4.34 A site visit to the A513 at the point where it runs adjacent to the SSSI was undertaken by the Council on 26th February. This confirmed the planting of pine trees along the western boundary of the SSSI close to the A531 (see **Plate 3.1**).

[57] Staffordshire Wildlife Trust. Black Firs and Cranberry Bog Reserve Management Plan 2019 – 2029.

[58] JBA Consulting (2021) Blackfirs and Cranberry Bog 2021 Review.

[59] Staffordshire Wildlife Trust (2018) Black Firs and Cranberry Bog Reserve Management Plan 2019 – 2029.

Plate 1: *Photos of Black Firs and Cranberry Bog SSSI from A513*

3.4.35 As set out in **Table 3.2**, there are two CLe for NH_3, 1 µg/m^3 for lower plants (lichens and bryophytes[60]) and 3 µg/m^3 for higher level plants (all other vegetation). APIS indicates that within the area of woodland at Black Firs the CLe for the Black Alder woodland Ramsar feature is 1 – 3 µg/m^3 depending on the presence of lichen and bryophyte. The current mixed broadleaved and coniferous woodland community type currently present in this section of the SSSI is unlikely to be associated with presence of lichen and bryophytes. As noted in **paragraph 3.4.30**, the FCS of this unit of the SSSI is assessed against W5 wet woodland targets. The indicators for this habitat type do not include bryophytes and liches (**Appendix C**, Table 3). In addition, the SSSI citation does not indicate that lichen and bryophytes comprise a key component of the Black Firs area of the SSSI. Bryophytes are variable within NVC W5 and associated with areas of damper ground around tussocks, on tree bark and around the bases or on fallen trunks and branches[61]. Staffordshire Ecological Records Centre provided bryophyte and lichen records for the SSSI (see **Figure 3.6**). These records show that there are no records of lichen and bryophytes within 200m of the A513.

[60] *Lichens and mosses are at most risk as they have limited detoxification capacity relative to their uptake potential and a large surface area relative to mass.* Source: Air Pollution Information Systems. Pollutants. Available at: http://www.apis.ac.uk/overview/pollutants/overview_NH3.htm [Date Accessed: 10/01/25].

[61] Rodwell, J.S. (1991) British Plant Communities, Volume 1. Woodlands and Scrub.

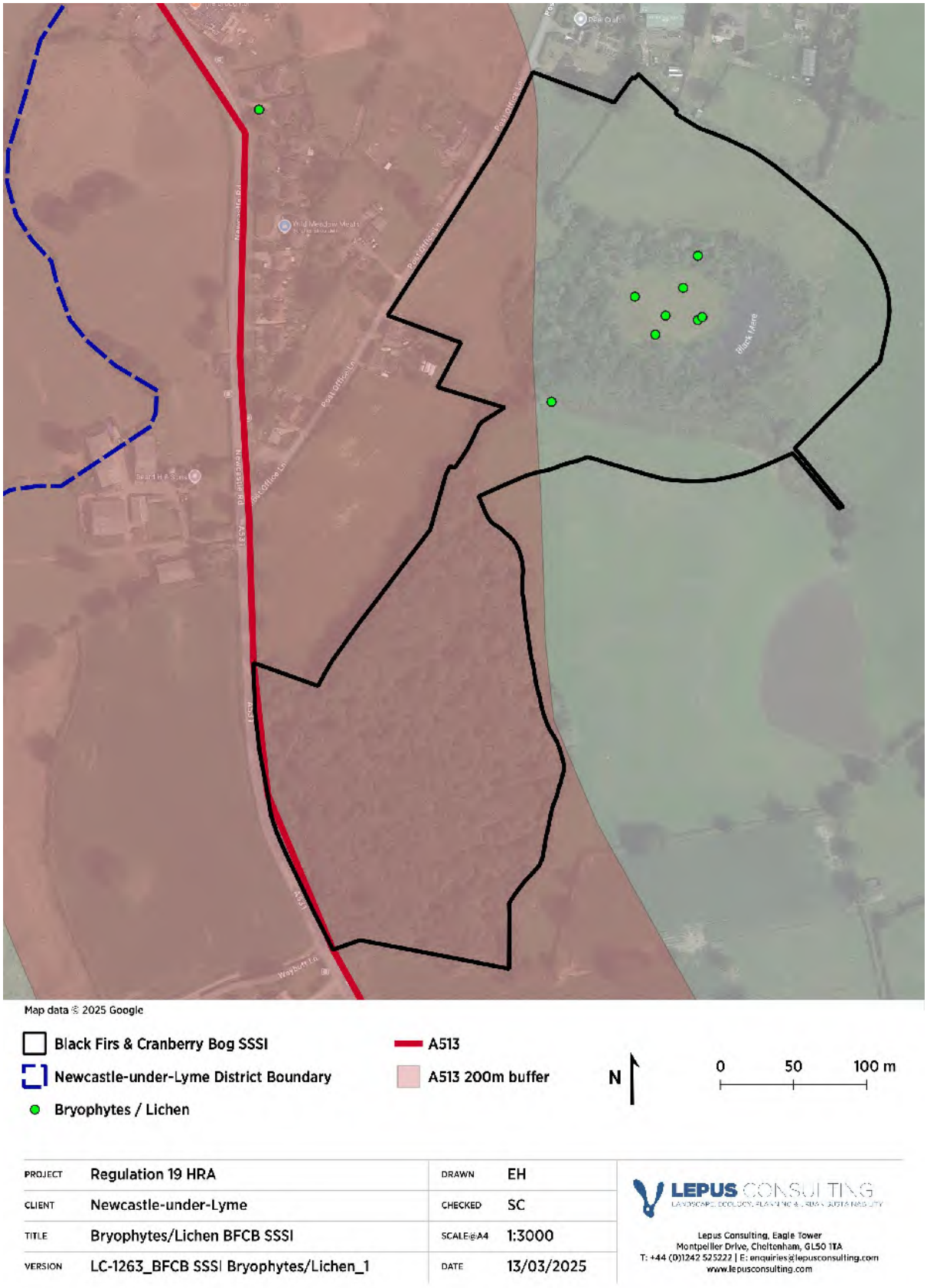

Figure 3.6: Bryophyte and Lichen records at Black Firs and Cranberry Bog SSSI

3.4.36 Given the absence of lichen and bryophyte records, and the drier nature of the woodland present in this component of the SSSI, the upper critical level for NH_3 of 3 µg/m^3 would therefore be appropriate.

3.4.37 Looking at the Black Firs component specifically, it is possible to apply a screening threshold appropriate to the upper CLe of 3 µg/m^3 (0.03 µg/m^3). A review of air quality data indicates that 1% of this threshold is not exceeded at any location across the Black Firs component of the SSSI for the Local Plan in-combination – see **Figure 3.7**. The only exception to this is at the immediate road edge. Habitat at the immediate road edge comprises hedge habitat associated with the road verge and is therefore considered to be part of the site fabric[62] (see **Plate 3.1**).

[62] 'Site-fabric' is a general term used to describe land and/or permanent structures present within a designated site boundary which are not, and never have been, part of the special interest of a site, nor do they contribute towards supporting a special interest feature of a site in any way, but which have been unavoidably included within a boundary for convenience or practical reasons. Areas of site-fabric will be deliberately excluded from condition assessment and will not be expected to make a contribution to the achievement of conservation objectives.

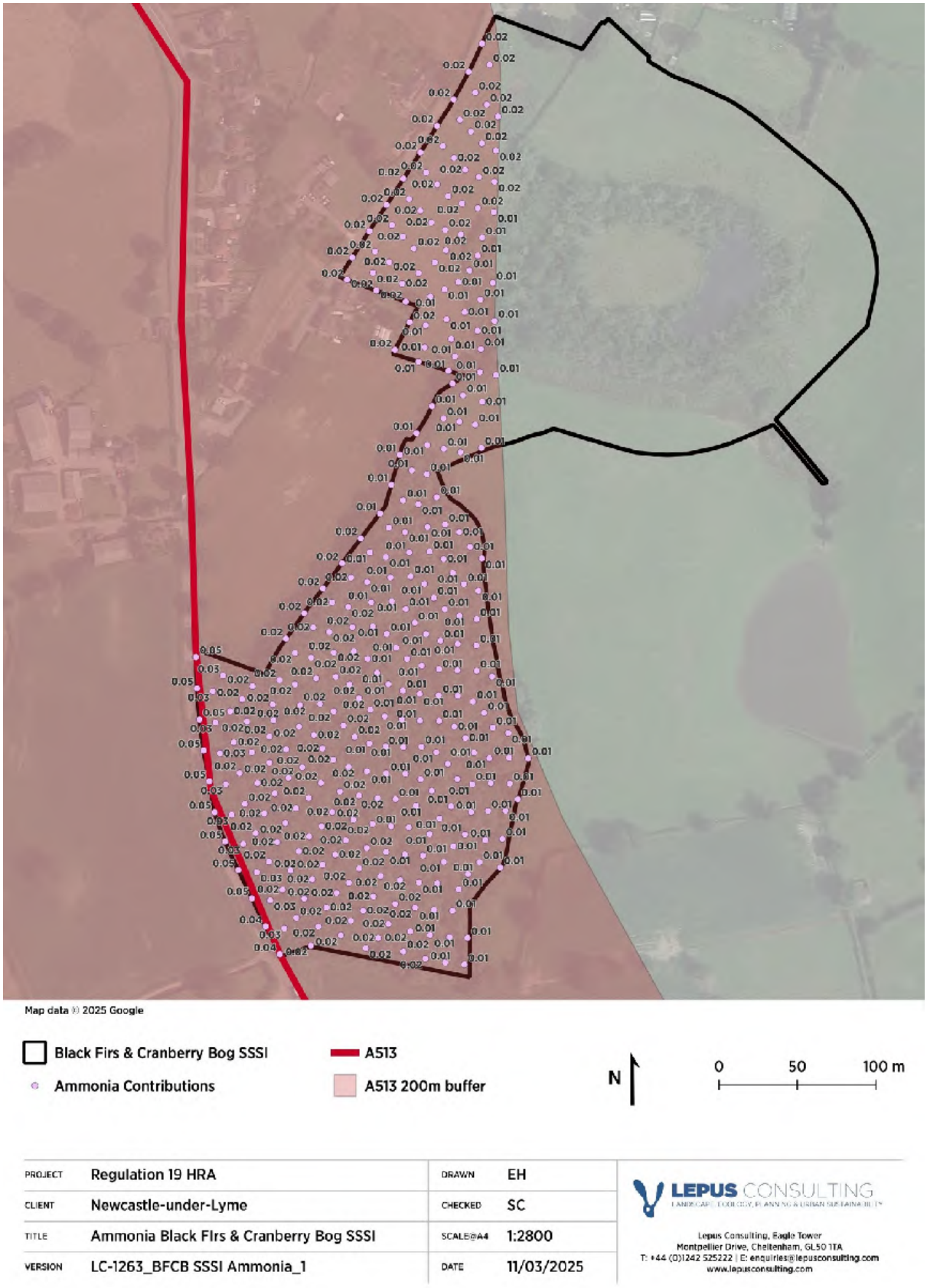

Figure 3.7: Ammonia in-combination contribution at Black Firs and Cranberry SSSI component

Cranberry Bog

3.4.38 The Cranberry Bog section of the SSSI is located approximately 98m to the north east of the A531 at its closest point (see **Figure 3.5**). Ramsar criterion 1 (**Box 1**) indicates that the site comprises a diverse range of habitats from open water to raised bog. The Cranberry Bog component of the SSSI contains Bog Pool Community, Sphagnum Moss and open water (Black Mere) sensitive features. However, as noted in **paragraph 3.4.31**, the open water area of Black Mere and the sphagnum lawn are not located within 200m of the A531.

3.4.39 A review of habitat mapping data provided by Staffordshire Ecological Records Centre (**Appendix D**), indicates that habitat at the Cranberry Bog component within 200m of A513 comprises arable fields, with wet woodland located further to the east, approximately 175m from the A513, on the periphery of Cranberry Bog within the lagg zone. The botanical survey undertaken in 2014 indicates that habitat within 200m of the A513 is grassland and woodland habitat[63].

3.4.40 As shown in **Appendix C** (Annex 1), this section of the SSSI would be assessed against W5 wet woodland targets. The indicators for this habitat type do not include bryophytes and liches (**Appendix C**, Table 3). In addition, the SSSI citation does not indicate that lichen and bryophytes comprise a key component of the wet woodland habitat. Bryophytes are variable within NVC W5 and associated with areas of damper ground around tussocks, on tree bark and around the bases or on fallen trunks and branches[64]. As shown in **Figure 3.6,** there are no lichens and bryophyte records located within 200m of the A513.

3.4.41 Therefore, as set out on APIS, a CLe of 3 $\mu g/m^3$ is applicable to Ramsar features within 200m of the A513 at the Cranberry Bog component. A review of air quality data indicates that this threshold is not exceeded within the SSSI (see **Figure 3.7**).

3.4.42 On the basis of the air quality modelling data and habitat information, it can be concluded that the Local Plan in-combination will have no AISOI at either component of the SSSI due to NH_3 emissions.

Nitrogen deposition

3.4.43 As set out in **Section 2**, the dispersion modelling results indicates that for the Local Plan alone, for short vegetation, there is an exceedance of the N-dep 1% screening threshold within approximately 120m of the A531. For the Local Plan alone, for tall vegetation, the exceedance of the 1% threshold extends up to approximately 200m from the A531. In-combination, there are exceedances of the 1% screening threshold for N-dep for both short and tall vegetation across the whole SSSI.

3.4.44 As noted above, habitat within 200m of the A531 includes the Black Firs component of the SSSI, which comprises wet woodland and drainage ditch habitat. The eastern edge only of the Cranberry Bog component of the SSSI is located within 200m of the A531. This comprises arable fields and a small area of wet woodland on the periphery of Cranberry Bog within the fen lagg zone. Taking into consideration these habitat types, it is appropriate within this assessment to apply deposition to tall vegetation.

[63] JBA Consulting (2021) Blackfirs and Cranberry Bog 2021 Review.

[64] Rodwell, J.S. (1991) British Plant Communities, Volume 1. Woodlands and Scrub.

3.4.45 Maximum N-dep levels for tall vegetation in-combination (including baseline levels) across the SSSI range from 41.6 to 43.7 kgN/ha/yr, with higher levels closer to the A531. This shows that the lower CLos for tall (10 kgN/ha/yr) vegetation at the SSSI is exceeded.

3.4.46 The maximum N-dep deterioration from the Local Plan in-combination at the SSSI is approximately 0.47 kgN/ha/yr to tall vegetation.

3.4.47 In addition to the assessment of modelled air quality data, Natural England's guidance recommends that consideration be given to background pollution trend data.

3.4.48 For the 1km grid square adjacent to the M6, APIS data shows that N-dep fell for forest (woodland – tall vegetation) from 51.2 kg N/ha/year in 2003 to 45.8 kg N/ha/year in 2021 (see **Figure 3.8**). This suggests that there is an improving trend on N-dep at the SSSI. However, the data indicates that the lower N-dep CLo for tall vegetation is exceeded at the SSSI.

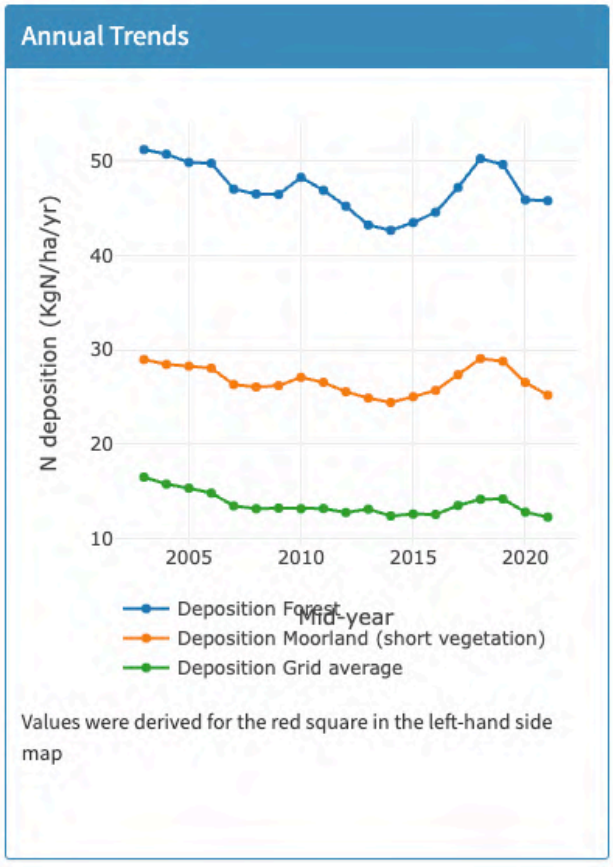

Figure 3.8: *Annual N-dep trends for the 1km grid square within 200m of the A513: source APIS*

3.4.49 The dispersion modelling results show that baseline N-dep levels in 2040 will be 42.55 kgN/ha/yr for tall vegetation. Background concentrations of nitrogen deposition have been taken from APIS. The background deposition values are interpolated from the 1 km x 1 km averages to a 1 m resolution. APIS currently presents 3-year mean values centred on the calendar year of 2021 (2020-2022). These have been adjusted to represent 3-year averages centred on 2030 using the rate of change predicted for this area using the Business-as-Usual assumptions of JNCC's Nitrogen Futures project. Nitrogen Futures only predicted changes to 2030, so the background values for 2030 have been used to represent 2040. It is not currently possible to reliably predict any subsequent changes to local background conditions between 2030 and 2040.

3.4.50 The baseline data provided for both 2021 (2020-2022) and 2040 in the air quality report indicates that the lower N-dep CLo for tall vegetation will be exceeded at all locations modelled at the SSSI without the Local Plan, or any other plans or projects in place.

3.4.51 For tall vegetation, the air quality report provides an estimated background N-dep concentration in 2040 (end plan year) of 42.55 kgN/ha/yr *(without the proposal alone and in combination)*. This is a reduction of 3.25 kgN/ha/yr from a 2021 baseline level as provided on APIS of 45.8 kgN/ha/yr (see **Figure 3.7**).

3.4.52 Assuming this reduction will take place over a 9-year period (i.e. 2030 – 2021, see **paragraph 3.4.49**). This suggests that cleaner vehicle technology will result in an average year on year reduction (as a single figure) in N-dep of 0.361 kgN/ha/yr.

3.4.53 Taking into consideration the contribution from the Local Plan in combination to tall vegetation (total 0.47 kgN/ha/yr), there would instead be a reduction of 3.72 kgN/ha/yr over the period of 9 years. This would mean that to get the same reduction of 0.361 kgN/ha/yr, it would take 10.2 years (3.72 (3.25+0.47) divided by 0.413 (3.75/9) = 9.08 years). This means that the Local Plan in-combination would not retard background improvements (up to 2030).

3.4.54 It is noted that the data provided for the Local Plan scenarios is for both Newcastle-under-Lyme and Stoke-on-Trent's growth over the plan period and is therefore likely to be precautionary and worst case.

3.4.55 Given the Local Plan in-combination with other plans and projects will not retard the achievement of the air quality conservation objectives for the Black Firs and Cranberry Moss SSSI component of the Ramsar **it can be concluded that there will be no AIOSI as a result of N-dep.**

3.5 Consideration of the designated site in the national context

3.5.1 Black Firs and Cranberry Bog SSSI and Oakhanger Moss SSSI make an important contribution to the achievement of the conservation status of meres and mosses in the UK.

3.6 Consideration of best available evidence on small incremental impacts from nitrogen deposition

3.6.1 Given the conclusions set out above, it is not considered necessary to consider small incremental impacts of nitrogen deposition at the SSSIs.

3.7 Consideration of site survey information

3.7.1 Detailed site survey information has been taken into consideration in the above assessment (see **Appendix C** and **Appendix D**).

3.8 Consideration of national, regional or local initiatives

3.8.1 Whilst there are national and local initiatives and measures in place to promote a modal shift away from the private car, promote the use of electric vehicles and uptake of active travel, which will have a positive impact upon local air quality, there are no local initiatives to reduce air pollution levels within the SSSI components of the Ramsar site specifically.

3.9 Consideration of measures to avoid or reduce the harmful effects of the plan

3.9.1 Given the conclusions set out above, is not considered necessary to consider mitigation measures.

3.10 Consideration of any likely in-combination effects

3.10.1 The air dispersion modelling has been informed by a traffic modelling prepared for the Local Plan. The traffic model is described in the Regulation 19 HRA report (Lepus, 2024). This modelling takes into consideration baseline traffic flows which may act in-combination with the Local Plan. In addition, the air quality dispersion modelling incorporates background air quality concentration from all other sectors.

3.11 Summary of findings – Oakhanger Moss SSSI component

3.11.1 The CLe for NOx will not be exceeded at any point within 200m of the M6. Therefore, no AIOSI will arise as a direct result of elevated NOx from the Local Plan, either alone or in combination, at this SSSI component of the Ramsar.

3.11.2 Taking into consideration local traffic contributions from LPAs, including Newcastle-under-Lyme and Stoke and others to the north and south of the SSSI, it can be concluded that the in-combination growth on the M6 road link shown in the traffic model is likely to be dominated by national growth feeding into the motorway system. This has been agreed with Natural England through consultation on 20th February 2025[65].

3.11.3 NH_3 contributions from the Local Plan alone are below the 1% screening threshold in relation to the lower CLe (1 μg/m^3). It can therefore be concluded that there will be no AIOSI at this SSSI component of the Ramsar due to a change in NH_3 levels.

3.11.4 N-dep dispersion modelling results indicate that there are no alone exceedances of the 1% screening threshold for N-dep for short vegetation at any point within the SSSI. AIOSI upon short vegetation habitats associated with the Ramsar at this SSSI component can therefore be screened out of this assessment.

[65] Natural England (20th February 2025) Email to Newcastle-under-Lyme Council.

3.11.5 For tall vegetation however there is an exceedance of the 1% screening threshold for N-dep on the eastern boundary of the SSSI within the area of woodland. This is the area of the SSSI that is located within 200m of the M6. The maximum deterioration from the Local Plan alone at the SSSI to N-dep is 0.05 kgN/ha/yr to tall vegetation (wet woodland habitat) at the location where the SSSI begins. The contribution of the Local Plan alone to background levels would retard background improvements by under a year (up to 2030). Taking into consideration the current background concentrations of N-dep and the predicted reducing trends in N-dep at the SSSI, it can be concluded that such a minor contribution from the Local Plan is unlikely to impede this downward trend. It is therefore it can be concluded that no AIOSI on site integrity at this SSSI component of the Ramsar will arise as a result of N-dep.

3.12 Summary of findings – Black Firs and Cranberry Bog SSSI component

3.12.1 The CLe for NOx will not be exceeded at any point within 200m of the A513. Therefore, no AIOSI will arise as a direct result of elevated NOx from the Local Plan, either alone or in combination at this SSSI component of the Ramsar.

3.12.2 A total of 5.86ha of the Black Firs and Cranberry Bog SSSI is located within 200m of the A531. Habitat within 200m of the A531 includes the Black Firs component of the SSSI, which comprises wet woodland and drainage ditch habitat. Only the outer eastern fringe of the Cranberry Bog component of the SSSI is located within 200m of the A531, which comprises arable fields and a small area of wet woodland on the periphery of Cranberry Bog within the fen lagg zone.

3.12.3 An ammonia CLe of 3 $\mu g/m^3$ is applicable to Ramsar features within 200m of the A513 at the Black Firs and Cranberry Bog SSSI. A review of air quality data indicates that this threshold is not exceeded within the SSSI. On the basis of the air quality modelling data and habitat information, it can be concluded that the Local Plan in-combination will have no AISOI at this SSSI component of the Ramsar due to NH_3 emissions.

3.12.4 The maximum deterioration from the Local Plan alone at the SSSI to N-dep is 0.47 kgN/ha/yr to tall vegetation (wet woodland habitat). The contribution of the Local Plan in-combination to background levels would retard background improvements by under a year (up to 2030). Taking into consideration the current background concentrations of N-dep and the predicted reducing trends in N-dep at the SSSI, it can be concluded that such a minor contribution from the Local Plan in-combination is unlikely to impede this downward trend. It is therefore it can be concluded that no AIOSI will arise as a result of N-dep at this SSSI component of the Ramsar.

3.13 Conclusion

3.13.1 In conclusion, there will be no AIOSI at the Midland Meres and Mosses (Phase 2) Ramsar due to air pollution associated with the Local Plan either alone or in-combination.

Appendix A – Natural England Regulation 19 Response

Date: 4 October 2024
Our ref: 486256
Your ref: Newcastle-under-Lyme Borough Council Regulation 19 pre-submission draft Plan

Allan.Clarke@newcastle-staffs.gov.uk
planningpolicy@newcastle-staffs.gov.uk
BY EMAIL ONLY

Customer Services
Hornbeam House
Crewe Business Park
Electra Way
Crewe
Cheshire
CW1 6GJ

T 0300 060 3900

Dear Allan

Newcastle-under-Lyme Borough Council Regulation 19 pre-submission draft Plan

Thank you for your consultation dated and received by Natural England 12th August 2024.

Natural England is a non-departmental public body. Our statutory purpose is to ensure that the natural environment is conserved, enhanced, and managed for the benefit of present and future generations, thereby contributing to sustainable development.

Natural England welcomes the opportunity to comment at this stage of the Local Plan and particularly supports the inclusion of policies on green and blue infrastructure, biodiversity, health and wellbeing, trees hedgerows and woodlands. We have reviewed the consultation documents and provide comments that relate to the soundness of the Local Plan and that are most relevant to our interest in the Natural Environment.

Natural England has adopted a robust precautionary approach within this plan response. Whilst we welcome the content of the Local Plan, Natural England advises that the plan is currently **at risk of being unsound and/or not legally compliant due to the potential impacts on air quality in relation to internationally designated nature conservation sites and the justification for the potential loss of 263ha best and most versatile (BMV) agricultural land**. Further detail is provided below.

Natural England have also provided other advice within this submission relating to further improvements that could strengthen plan policies and specific strategic site options and related mitigation.

Do you consider that the Newcastle Under Lyme Plan is Sound and Legally Compliant?

Natural England notes that the plan is at the pre-submission stage and as such your authority is seeking confirmation on the soundness of the plan. Having reviewed the plan and supporting documents, Natural England considers the pre-submission plan in its current form is not sound or legally compliant, this is due to a lack of evidence with regards to air quality and the cumulative loss of BMV agricultural land both in a local and national context.

Air quality

Natural England notes that the Sustainability Appraisal states that *"Although various Local Plan policies aim to reduce air pollution and promote sustainable modes of transport, the introduction of 8,000 dwellings and 63ha of employment floorspace is expected to increase vehicle emissions in the Plan area and result in an overall reduction in air quality*. (p 67)

As Natural England understands it the current evidence base used to conduct the HRA cannot rule out adverse impacts on designated sites. The HRA states at page 22 *3.4.16 "At the time of writing, the traffic modelling run for the final suite of Regulation 19 allocations had not been undertaken."* Appendix A lists the local plans for neighbouring LPA's concluding that 'in combination" with plans and projects (approved and those yet to be implemented) they may trigger in-combination effects on European sites as a result of air quality, particularly as we understand it in the key commuting areas.

Natural England notes that Annual Average Daily Traffic (AADT) data and traffic modelling in the Strategic Transport Assessment (STA) concludes a potential reduction in travel and related air pollution at allocated sites as a result of a predicted preference in the use of public transport. We are surprised by this projected decrease in both traffic and related air pollution, particularly as one employment allocation site includes a 200-bay lorry park and increased congestion is predicted at junction 16 of the M6 where it joins the A500 in a rural location with no existing rural transport provision. The Sustainability Appraisal also notes that: *"There is a low uptake of sustainable modes of transport in the borough, with private car use being the most popular method of travel when commuting to work"*. (p 206)

Cumulative adverse effects on integrity in relation to air quality as a result of this plan and neighbouring LPAs plans cannot therefore currently be ruled out at the following internationally designated sites:

- **Midlands Meres and Mosses Phase 2 Ramsar - Black Firs and Cranberry Bog SSSI**
- **Midlands Meres and Mosses Phase 2 Ramsar - Oakhanger Moss SSSI**

The HRA outlines that the main source of ammonia emissions is agricultural practice, and that material increases in NH3 emissions are unlikely to be associated with the proposed local plan. At Black Firs and Cranberry Bog and Oakhanger Moss, any increase in nitrogen deposition has the potential to exacerbate pollution levels and thereby undermine the reasons for notification of these sites as a Ramsar.

Ammonia can be emitted from vehicle exhaust emissions as a by-product of the catalytic conversion process designed to reduce emissions of nitrogen oxide. As traffic composition transitions toward more petrol and electric cars (i.e., fewer diesel cars on the road), catalytic converters may aid in reducing NOx emissions but result in increased ammonia emissions. Ammonia emissions from road traffic therefore could make a significant difference to nitrogen deposition close to roads.

Natural England therefore advise that ammonia sourced from traffic emissions should be included for assessment within the local plan HRA, as the impact from this source on designated sites is currently unclear. For further information please see this report from Air Quality Consultants (AQC) that looks at ammonia emissions from roads for assessing impacts on nitrogen-sensitive habitats. Whilst we are aware that the current CREAM model created by AQC used to assess ammonia emissions from road traffic has not been peer reviewed, at this time it has been recognised as a Best Available Tool and we deem it appropriate to be used where any caveats associated with this model are also considered within the assessment. An assessment based on the best available approach is necessary. The next stage of assessment can then consider uncertainties in the model and site specifics to decide if mitigation needs to be considered.

Further work is therefore required to inform the Habitat Regulations Assessment. Natural England will engage with the Local Planning Authority in order to produce a Statement of Common Ground (SoCG) on this matter.

'Best and most versatile' (BMV) agricultural land

Natural England notes that *"the proposed site allocations in this Local Plan are likely to cumulatively result in the loss of up to 342ha of previously undeveloped land, A total of 20 of the allocated sites contain areas of ALC Grades 1, 2 or 3 within the site area, leading to potential for up to* ***263ha of 'best and most versatile' (BMV) agricultural land, which is likely to result in a long-term, irreversible cumulative adverse effect on ecosystem services"*****.** (page 74 Sustainability Appraisal).

Under the Town and Country Planning (Development Management Procedure) (England) Order 2015 (DMPO) Natural England is a statutory consultee on development that would lead to the loss of over 20ha of 'best and most versatile' (BMV) agricultural land (land graded as 1, 2 and 3a in the Agricultural Land Classification (ALC) system, where this is not in accordance with an approved plan.

Natural England would like to understand how the local planning authority have produced the evidence base and options assessment which informs the strategic site allocations.

Natural England will engage with the local planning authority to consider the cumulative impacts of the loss of BMV both in the local and national context and the challenges related to environmental impact, infrastructure, and the requirement to deliver a balance between the need for development and the potential urbanisation of the countryside including the potential mitigation measures that need to be considered.

NPPF paragraph 174e states:

Planning policies and decisions should contribute to and enhance the natural and local environment by: … preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.

Natural England provides guidance to inform further assessment of air quality and the loss of BMV agricultural land in our response to the content of the plans Strategic Policies as set out below.

Do you consider that the Newcastle-under-Lyme Borough Council Regulation 19 pre-submission draft Plan is compliant with Duty to Co-operate?

In terms of working with neighbouring authorities, Natural England notes that initially the plan was intended to be produced jointly with the City of Stoke-on-Trent, the plan does not however currently present an evidence base that demonstrates that a collaborative approach has been adopted and that the Duty to Co-operate has been fully complied with.

The Sustainability Appraisal states that: "*Overall, there is potential for a cumulative adverse effect on biodiversity, owing to the fragmentation of the ecological network… Where a large amount of development is located on previously undeveloped land surrounding rural settlements, this is likely to produce a long-term irreversible negative cumulative effect regarding the urbanisation of the countryside*" (p 71)

Natural England would therefore like to further understand how the areas identified to meet the City of Stoke-on-Trent's unmet employment needs are justified and appropriate and whether meeting some of the employment needs of the City of Stoke-on-Trent has led to the need to release or

safeguard more land from the Green Belt in Newcastle under Lyme. If this is the case, what are the exceptional circumstances for doing this and how does this align with the allocated sites options assessment?

Recreational Pressure

In terms of the South Pennie Moors SAC and recreational impacts, the Local Plan does comply with the Duty to Co-operate. Natural England recommends that reference is made to the 'Recreation use of the South Pennine Moors and implications for strategic housing growth' report by Footprint Ecology Ref 778 date 27th March 2024. This report should both inform the evidence base and ensure that policies relating to open space/green infrastructure are as rigorous and robust as possible.

The report concludes that more data/evidence is required to determine if recreational use is causing an impact across to the South Pennine Moors and to get a better understanding of the scale and location of any impact. Natural England notes that the report records 7,000 additional dwellings in Newcastle-under-Lyme over the plan period rather than the 8,000 included in this regulation 19 submission.

Newcastle-under-Lyme Borough Council should therefore continue to work with local authority and other partners to ensure coordinated and continued cross boundary action.

Other matters

Natural England has specific concerns related to allocations in the Green Belt. Notwithstanding that, Natural England considers most of the policies within the plan to be sound and deliverable. The plan is consistent with national policy with regard to those policies that are within Natural England's remit. Further information on strengthening policies including but not limited to Soils and best and most versatile (BMV) agricultural land, preventing loss and fragmentation of habitats and supporting green infrastructure are provided below.

Vision and Strategy

Natural England notes that the Plan's vision and emerging development strategy set out a framework for the future development of Newcastle-under-Lyme and addresses the needs in relation to housing, the economy, community facilities and infrastructure, including specific reference to a proposed employment site allocation.

This vision and the related objectives should also set out the environmental ambition for the plan area and form the basis for nature recovery and enhancement, supported by the policies and proposals in the plan.

Natural England advises that the vision should also incorporate more on the local ecology and landscape features which underpin local distinctiveness such as the "*strong rural character with long open views across the surrounding rural landscape, towards more distant hills often framed by trees"* (p 69) Part 3 Site Specific Landscape & Visual Appraisal. *"Tranquillity, ancient woodland, deciduous woodland, and strong undulating landforms"* (p 187) Sustainability Appraisal.

Strategic Objectives

Natural England welcome strategic objective SO-4 relating to carbon reduction and climate change, however we do not feel that this group of thirteen strategic objectives value or reflect the Boroughs whole ecology and landscape including but not limited to the protection of soil and best and most

versatile (BMV) agricultural land. We would suggest that additional objectives are added relating to: air quality, water quality and quantity, soils and landscape.

Natural England would also like to see stronger reference to the Nature Recovery Network which is one of the specific aims of the Environment Act 2021 and will underpin the approach to the enhancement of nature.

Air quality is a major threat to habitats and species. Many ecological sites are exceeding their critical loads and levels for ammonia, nitrogen deposition and acid deposition. The strengthening of the policies and the rationale behind site allocations within this plan will ensure that new development does not contribute to the further deterioration of habitats and species due to air pollution. Further advice on strengthening the plans evidence base with regards to air quality is provided in the links below:

Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001)
http://publications.naturalengland.org.uk/publication/4720542048845824

JNCC - Guidance on Decision-making Thresholds for Air Pollution: Main Report and Technical Report 2021
https://hub.jncc.gov.uk/assets/6cce4f2e-e481-4ec2-b369-2b4026c88447

CIEEM Advisory Note: Ecological Assessment of Air Quality Impacts
https://cieem.net/resource/advisory-note-ecological-assessment-of-air-quality-impacts/

IAQM Guidance
https://iaqm.co.uk/guidance/

Guidance- Air quality-Provides guidance on how planning can take account of the impact of new development on air quality.
https://www.gov.uk/guidance/air-quality--3

Clean Air Strategy 2019
https://www.gov.uk/government/publications/clean-air-strategy-2019

Apis
http://www.apis.ac.uk/
Ecosystem Services and air pollution impacts

Simple Calculation of Atmospheric Impact Limits
http://www.scail.ceh.ac.uk/

Strategic Policies

5 Planning for Sustainable Development

Policy PSD5: Green Belt
Natural England notes that this policy "*aims to protect the Borough's essential open spaces, prioritise the use of brownfield land, and guide potential future development in accordance with the National Planning Policy Framework* (NPPF)".

Natural England however notes that amendments to the Green Belt boundary are proposed in the form of 14 site allocations to accommodate both the growth requirements of the borough and the employment requirements of wider Stoke-on-Trent conurbation. Natural England's has some site-specific concerns about the potential impacts of some of the green belt sites selected on the natural

environment with regards to habitat loss, fragmentation and justification for the loss of BMV agricultural land.

We note the LPA's intention to release and compensate for the loss of green belt and prioritise the use of suitable brownfield land. However, the site allocations in the green belt would result in the potential loss of 263ha of Best and Most Versatile (BMV) agricultural land. The council should satisfy itself that it is making a balanced decision for sustainable development, the Sustainability Appraisal concludes that:

"The Green Belt Study assessed land parcels against the contribution they make to the five purposes of the Green Belt on a four-point scale…Three allocated sites (AB12, AB33 and TK10) are located in areas which make a 'strong' overall contribution to the purposes of the Green Belt ***where "the site contributes to the purpose in a strong and undeniable way, whereby removal of the site from the Green Belt will detrimentally undermine this purpose"*** *(p101)*

"Site allocations on previously undeveloped land or that would result in a net loss of GI / vegetation could result in a reduced capability of the environment to provide ecosystem services including carbon storage, the storage and filtration of water including natural flood protection, as well as reduced availability and connectivity of habitats within the green network enabling movement of species. (p 165)

Strategic Site Allocations

Natural England suggests that the HRA should include a "requirement for project-level/site specific HRA's and targeted ecological surveys".

The Sustainability Appraisal concludes that:

"Some 12 allocated sites partially coincide with ***priority habitats****, where 3.43% of the total site allocation areas coinciding with priority habitats which include deciduous woodland, good quality semi-improved grassland and Site BL18 coincides with lowland fens which is a very high distinctiveness habitat in the BNG handbook (2024). These habitats can support a range of species of principal importance. Allocated Site KL15 is adjacent to 'The Butts and Hands Wood' ancient woodland, with a further 20 allocated sites located in close proximity to ancient woodlands. P158*

"Six allocated sites (Sites CT20, HD10, KL13, RC8, SP11(2) and SP23) are located within areas of 'high' or 'very high' habitat distinctiveness that provide high biodiversity value. Whilst in many cases these habitats can be conserved alongside development, it is likely that in some cases fragmentation or loss of habitats and connections between habitats will occur"

"The majority of allocated sites are located on previously undeveloped land, which would result in the ***loss of soil resources*** *and the ecosystem services they provide. (p 159) The development of new buildings on previously undeveloped land would be expected to result in a direct loss of soil resource, with little or no scope for mitigation" (p 216)*

"The proposed development of 8,000 new dwellings and 63ha of new employment land across the borough, with a number of development sites located within more rural areas, is likely to result in a loss of tranquillity of the rural landscape as a consequence of ***increases in noise and light pollution****. (p 68)*

For all sites, Natural England advises that the hydrological catchment within which the site sits is taken into consideration, with regards to the potential impact of the developments proposed on the adjoining watercourses and wider catchments, including but not limited to surface water runoff (including during construction), existing and required capacity of Waste Water Treatment Works (WwTW) and water supply and flooding issues. Each site will require site specific investigation, and the council should understand the impact of all the sites put forward individually and in combination.

Natural England has specific concerns and or requires further information about the following **'Strategic Site Allocations'** which could potentially impact on designated sites as a result of air and water quality and/or lead to the loss and / or fragmentation of priority habitats and BMV agricultural land:

BL18 – Clough Hall Playing Fields, Talke
Natural England would like to further understand this larger residential development proposal with regards to the potential impacts on the lowland fen habitat.

KL13 & KL15 – Land South of A525 between Keele University and Newcastle
Natural England notes this proposal for Employment development is immediately adjacent to ancient woodland priority habitat.

HM28 – Land off East Lawns, Betley
Existing and projected water quality issues at Betley Mere will need to be considered with regards to this allocation.

LW53 – Loggerheads
Natural England notes this residential housing development proposal is located within the IRZ of protected sites (Burnt Wood SSSI) which states that development proposals of 50 or more homes outside existing settlements/urban areas in these zones should be consulted upon with Natural England.

SP11 – Former Keele Municipal Golf Course
This Larger residential development is categorised in the Landscape Assessment as having a Major adverse impact on the local Landscape.

AB2 – Land Adjoining Corner of A500 and M6 Southbound
Natural England notes this proposed employment allocation released entirely from the green belt, which comprises 70ha of grade 2 BMV agricultural land. The Landscape study concludes that the: "*Proposed development scenario is likely to have a major adverse effect on the SA objective with no satisfactory mitigation possible*" (p 15). With regards to potential Air Quality impacts on protected sites Natural England notes from the options analysis that "*The loss or potential moving of a layby to enable access to the site could be problematic indicating potential issues with site access and traffic flow. An increase in HGV and personal vehicle traffic is anticipated, which could lead to potential congestion and air pollution in the area".* Natural England would therefore also like to understand the evidence base further including the rationale for an alternative site TK30 @ Talke A34 / A500 roundabout being ruled out.

Policy PSD6: Health and Wellbeing

Natural England welcome this policy direction in terms of safeguarding health and amenity and supporting healthy communities, through the protection and provision of high-quality open spaces, including allotments and the promotion of active travel transport choices Further information on joining up Nature Recovery and Green Infrastructure (GI) with health priorities is set out below.

If more cities and towns can be creatively designed and managed, with nature and communities at their heart, we will see nature and people thrive. This is something we set out to inspire at Natural England when developing the Green Infrastructure Framework and Design Guide.

Natural England's People and Nature survey tells us that, for 82% of people '*being in nature makes me happy*'. With the cost-of-living crisis, 'free' places like local parks and greenspace, have become even more important. The value of these spaces for the economy is estimated at £28.7 billion per year.

Green infrastructure in towns and cities provides places to relax, exercise, and spend time outdoors; cools urban areas; reduces flooding by allowing water to permeate the ground rather than overwhelm our drains; increases biodiversity and helps to reduce inequalities in access to nature. Options assessments for development sites and related green and blue Infrastructure within and between developments, green spaces and designated sites should; include soft transition and consider potential direct and indirect implications on sustainable use for example visitor pressure and transport / access options.

The natural environment affords the best 'natural' play opportunities for children while offering multifunctional nature-based solutions to climate change etc. These can be blended into wildlife rich green infrastructure and green open spaces that can act as destination play sites for local children (See best practice at Play England and Play Wales) that have proven health and wellbeing value.

Evidence for nature play and health:
Play, naturally: a review of children's natural play
Nature for health and wellbeing | The Wildlife Trusts
Good practice in social prescribing for mental health: the role of nature-based interventions - NECR228 (naturalengland.org.uk)

6 Climate and Renewable Energy

Whilst Natural England welcomes this group of policies we recommend including **Policy CRE1: Climate Change and Policy CRE2: Renewable Energy within the Sustainable Environment (SE) group of policies to achieve a** collective strategic focus on sustainable development and working toward achieving net zero alongside the SE policies relating to Pollution and Air Quality (SE1) **and** requirements for sustainable water management measures to reduce water use, natural flood protection features alongside the specific policies on Sustainable Drainage Systems (*Policy SE4:)*

Natural England continues to work with the LPAs across the region on understanding air pollution across area boundaries (see comments and links in objectives section.)

10 Infrastructure and Transport Policy.

Policy IN4 Cycleways, Bridleways and Public Rights of Way
Natural England welcomes the inclusion of this group of policies which seek to maintain and enhance the network of public rights of way that cross the borough. We note that the sustainability appraisal states that *"the borough has relatively poor accessibility to the cycle network and is the lowest performing in the county for walking zones"* (p 206) and that, "*eight allocated sites (AB2, AB12, AB33, HD10, KL15, MD29, SP11(3) and TK10) do not currently have safe pedestrian or cycle access adjacent to the site, where site end users may reliant upon less sustainable modes of transport including private car use".* (p 180)

11 Sustainable Environment

Natural England welcomes this group of polices and has the following policy specific comments:

Policy SE1: Pollution and Air Pollution.

Natural England welcomes this policy that notes that development proposals which are likely to result in detrimental impacts on air quality, will not be permitted unless it can be demonstrated that mitigation measures effectively address these impacts. (Comments on Air Quality are also provided on page 2 and 4 of this letter). The promotion of sustainable and active travel options, low-emission technologies and enhancement of green infrastructure to absorb air pollution is also noted. (see comment above re integrating the group: 6 Policies Climate and Renewable Energy).

Policy SE7: Biodiversity Net Gain

Natural England supports the inclusion of a policy on BNG. We suggest the following minor amendments to further improve the plan policy.

The BNG policy should make it clear that biodiversity net gain is not applied to irreplaceable habitats, and that any mitigation and/or compensation requirements for Habitats sites should be dealt with separately from biodiversity net gain provision. The policy should also set out how biodiversity net gain will be delivered and managed through the lifetime of the scheme and including monitoring requirements. This should include indicators to demonstrate the amount and type of gain provided through development. The indicators should be as specific as possible to help build an evidence base to take forward for future reviews of the plan, for example the total number and type of biodiversity units created, the number of developments achieving biodiversity net gains and a record of on-site and off-site contributions.

Natural England notes that the Sustainability Appraisal states *"Despite the BNG provisions at the site level, there remains potential for a cumulative adverse impact on biodiversity at the landscape scale, owing to incremental habitat losses. As a result of development within the Local Plan undeveloped land will be lost which will include the loss of soil resources, habitats recognised as being of 'high' and 'very high' distinctiveness, and potentially ecological links between biodiversity assets, whereby the policies will not be expected to fully mitigate the fragmentation of the ecological network. Fragmentation of the ecological network across Newcastle-under-Lyme is expected to be a long-term and permanent significant effect."* (p 162)

Policy SE8: Biodiversity and Geodiversity

Natural England supports the inclusion of this policy to protect the Boroughs internationally, nationally and locally designated sites important for their biodiversity value and to enhance the natural environment and work with partners toward Nature Recovery.

We particularly welcome the plans recognition of the value of "*wider ecological networks*" stating that "*Other sites, both individually and collectively, that are not designated can also contribute towards protecting and enhancing diversity of species locally*".

Policy SE10: Landscape

Natural England welcomes this policy aimed at ensuring that "*development proposals should protect and enhance the character, quality, beauty, and tranquillity of the Borough"*. We note from the sustainability appraisal that "*The entirety of the south of the borough is identified as being **high in relation to landscape sensitivity**, which starts in Audley in the north and covers the southern area of the borough, including Loggerheads and Almington*." We agree that "*Alteration of the landscape character is a long-term and permanent significant effect…There is potential for a cumulative adverse effect on landscape character resulting from the development proposed in the Plan*". (p193) SA.

Natural England has divided England into 159 distinct natural areas called National Character Areas (NCAs) Newcastle-under-Lyme falls within two NCAs: Shropshire, Cheshire and Staffordshire Plain: gently rolling plains dominated by intensive dairy farming, beef and arable production; The Potteries and Churnet Valley: strong contrast between the industrialised landscape of the Potteries and the pastoral, strongly dissected hills and small plateaux that flank the Churnet and Dove valleys.

Natural agrees with the following statement in the sustainability appraisal: "*Although various policies aim to ensure that development conserves and enhances landscape character and distinctiveness, when combined with Local Plan policies that support infrastructural improvements such as for transportation, water, and waste, this is likely to lead to a long-term and irreversible cumulative adverse effect on landscape character and tranquillity and associated indicators such as dark skies*." (p72)

Policy SE11: Trees, hedgerows, and woodland

Natural England welcomes this plans recognition that "*Trees, hedgerows, and woodlands are integral to the distinctive character and ecological health of the Borough of Newcastle-under-Lyme, defining landscapes across both urban and rural settlements*." And that "*This policy prioritises the protection of existing natural assets, seeking to not only preserve, but actively enhance, these valuable features wherever possible"*.

Policy SE13: Soil and Agricultural Land

Natural England has concerns about the justification for the loss of BMV agricultural land within this plan. "*The proposed site allocations in this Local Plan are likely to cumulatively result in the loss of up to 342ha of previously undeveloped land, A total of 20 of the allocated sites contain areas of ALC Grades 1, 2 or 3 within the site area, leading to potential for up to 263ha of* ***'best and most versatile' (BMV) agricultural land, which is likely to result in a long-term, irreversible cumulative adverse effect on ecosystem services."*** (page74) (SA)

Natural England notes that policy SE13 states: "Outside of sites allocated for development in the Local Plan, development proposals should avoid the loss of best and most versatile agricultural land (BMV) unless it can be demonstrated that the benefits of development clearly outweigh the loss of the land and every effort has been made to mitigate for the overall impact of the development on best and most versatile agricultural land."

With regards to **Soil and Agricultural Land Quality,** Natural England advices that The Local Plan should give appropriate weight to the roles performed by the area's soils. These should be valued as a finite multi-functional resource which underpin our wellbeing and prosperity. Decisions about development should take full account of the impact on soils, their intrinsic character and the sustainability of the many ecosystem services they deliver.

The 25 Year Environment Plan (25YEP) sets out government action to help the natural world regain and retain good health, including highlighting the need to:

- protect the best agricultural land
- put a value on natural capital, including healthy soil
- ensure all soils are managed sustainably by 2030
- restore and protect peatland

Soil is a finite resource which plays an essential role within sustainable ecosystems, performing an array of functions supporting a range of ecosystem services, including storage of carbon and water, the infiltration and transport of water, nutrient cycling, a buffer against pollution and provision of food. In order to safeguard soil resources as part of the overall sustainability of the development, it is important that the soil resource is able to retain as many of its important functions as possible. This can be achieved through careful soil management and appropriate, beneficial soil re-use, with consideration on how any adverse impacts on soils can be avoided or minimised.

The conservation and sustainable management of soils is reflected in the National Planning Policy Framework (NPPF), particularly in paragraph 180(a), 180(b) and 181 (footnote 62). When planning authorities are considering land use change, the permanency of the impact on soils is an important consideration. Particular care over planned changes to the most potentially productive soil is needed, for the ecosystem services it supports including its role in agriculture and food production.

Plan policies should therefore take account of the impact on land and soil resources and the wide range of vital functions (ecosystem services) they provide in line with paragraph 180(b) of the NPPF.

Soil Plan Policies

We strongly advise that at a minimum, the plan includes core policies for:

- the protection of best and most versatile (BMV) agricultural land (Grades 1, 2 and 3a in the Agricultural Land Classification (ALC)); and
- for the protection of and sustainable management of soils as a resource for the future.
- Areas of poorer quality land (ALC grades 3b, 4, 5) should be preferred to areas of higher quality land (grades 1, 2 and 3a).
- Recognise that development has an irreversible adverse impact on the finite national and local stock of BMV land.
- Conforms to NPPF and Planning Practice Guidance (Natural Environment and Minerals).
- Requires detailed ALC surveys to support plan allocations and for subsequent planning applications (for all sites larger than 5 ha). ALC surveys to support plan allocations and for subsequent planning applications for smaller sites (1 – 5 ha) would be welcomed.
- Recognise that development (soil sealing) has a major and usually irreversible adverse impact on soils.
- Soils of high environmental value (e.g., wetland and carbon stores such as peatland, low nutrient soils; or soils of high environmental value in the local context) should also be considered as part of ecological connectivity (Nature Recovery Network / Green Infrastructure).
- Requires soil handling and sustainable soil management strategies based on a detailed assessment of the soil resource based on best practice guidance (for all sites larger than 5 ha), ideally as part of the planning application process for major sites to help inform master-planning, and to safeguard the continued delivery of ecosystem services through careful soil management and appropriate, beneficial soil re-use. Soil handling and sustainable soil management strategies for smaller sites (1 – 5 ha) would be welcomed.
- Reference should be made to Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites
- In addition, for minerals and other temporary forms of development, plans for reinstatement, restoration and aftercare will be required (or for solar, a commitment to do so if the operational life is in decades); normally this will be return to the former land quality (ALC grade)
- Refers to soils issues within relevant policy areas such as renewable energy, climate change, green infrastructure and biodiversity net gain, flood schemes, managed realignment, development design and landscaping.

Policy SE14: Green and Blue Infrastructure

Natural England supports this policy. Well-designed cross boundary multi-functional green infrastructure contributes greatly to a number of benefits both for people and nature. Your green and blue (for example cross boundary canals) infrastructure should dovetail with your biodiversity net gain strategies to maximise benefits.

We would advise that the Local Authority also considers Natural England's Green Infrastructure Framework of Principles and Standards for England. As stated in our document, "*Green infrastructure (GI) is part of the solution to many of the challenges we face; health inequalities, biodiversity crisis, climate change, nature recovery and levelling up. The GI framework supports local authorities, developers, parks and greenspace managers and local communities to enhance and create new good quality green infrastructure.*"

We would also suggest reference is made to the emerging **Local Nature Recovery Strategy**. Preparing Local Nature Recovery Strategies (LNRS) is a statutory requirement under the Environment Act 2021. LNRS are designed to work closely alongside other measures in the Act including supporting the delivery of mandatory biodiversity net gain and providing a focus for a

strengthened duty on all public authorities to conserve and enhance biodiversity. They will also underpin the Nature Recovery Network, alongside work to develop partnerships and to integrate nature into our incentives and land management activities.

Each LNRS will be specific and tailored to its area. The responsible authorities and people involved in preparing a strategy can choose how they want it to look, but every strategy must contain:

1. A local habitat map.
2. A written statement of biodiversity priorities.

Statutory guidance for responsible authorities explains in detail what these 2 things should contain. Together they set out what the strategy is aiming to achieve and what practical actions will help do this. They will also propose where actions could be carried out for best effect and to connect and expand existing areas that are important for nature.

We expect local nature recovery strategies to propose actions such as the:

- creation of wetlands
- restoration of peatlands
- planting of trees and hedgerows
- more sustainable management of existing woodlands and other habitats like grasslands

These actions are intended to help nature itself and to also help improve the wider natural environment.

Whilst the Staffordshire Local Nature Recovery Strategy (LNRS) is currently a work in progress, Newcastle-under-Lyme Borough Council Regulation 19 pre-submission should still be consistent with NPPF Paragraph 185 in terms of setting out local habitat priorities and identifying potential measures by which they can be achieved, alongside mapping areas that could become of particular importance in the future.

Natural England encourages Newcastle Under Lyme Borough Council via their Local Nature Recovery Strategy to actively develop cross border cooperation between other Local Planning Authorities (LPA) (for example Staffordshire Moorlands Borough Council) in coordinating land development projects that impact on local biodiversity sites to ensure that local biodiversity corridors are maintained and link up other local important sites for nature conservation.

This is a good way of achieving nature recovery and preparing to deliver the LNRS alongside enabling the local authority and its partners to identify, map and safeguard site areas, including green and blue infrastructure opportunities and interlinkages.

Habitats Regulations Assessment

Natural England notes that this Local Plan is not directly connected with or necessary to the management of any European site. A screening assessment has been undertaken which identified a number of Likely Significant Effects (LSE) associated with the Local Plan. Taking no account of mitigation measures, the HRA concludes that Local Plan has the potential to affect the following European sites:

- Cannock Chase SAC
- Humber Estuary SAC, SPA and Ramsar
- Mersey Estuary SPA and Ramsar
- Midland Meres and Mosses Phase 1 Ramsar
- Midland Meres and Mosses Phase 2 Ramsar
- Pasturefields Salt Marsh SAC
- Peak District Dales SAC
- Peak District Moors (South Pennine Moors Phase 1) SPA
- Severn Estuary SAC, SPA and Ramsar

- South Pennine Moors SAC
- West Midland Mosses SAC

We welcome that your HRA includes the Humber Estuary SAC, SPA and Ramsar site which is hydrologically connected to the river Trent. If the Local Plan resulted in significant water pollution, this European site could be affected and has therefore been screened in, in relation to water quality only, on a precautionary basis. Natural England however notes that the Sustainability Appraisal identifies "A long-term cumulative adverse effect …in terms of water quality" (p 148) as a result of the plan, this is not fully reflected in the current HRA.

Natural England note that the Sustainability Appraisal states: that "*the entirety of the borough falls within IRZs of one or more SSSIs. All five SSSIs within the borough are in 'unfavourable' condition: Burnt Wood SSSI, Maer Pool SSSI, Black Firs and Cranberry Bog SSSI (Midlands Meres and Mosses Phase 2 Ramsar), Betley Mere SSSI (Midlands Meres and Mosses Phase 1 Ramsar) and Metallic Tileries, Parkhouse SSSI."*

Natural England are also aware of the extensive network of ancient woodland spread across the borough, totalling 707.60 hectares, as well as a large quantity of priority habitats, totalling 1,791 hectares.

Natural England agree that the following designated sites and related priority habitats in adjoining LPA areas may also be affected by development through several pathways, including fragmentation, recreational pressure and/or pollution (including Air and Water Quality). Midlands Meres and Mosses Phase 2 Ramsar - Oakhanger Moss SSSI, Wybunbury Moss SAC SSSI, Tyrley Canal Cutting SSSI, King's and Hargreaves Wood SSSI, Gannister Quarry SSSI, Roe Park Woods SSSI, Wetley Moore SSSI, Churnet Valley SSSI, Hatherton Flush SSSI, Sounds Heath SSSI, Ford Green Redebed SSSI, and Cop Mere SSSI.

It is noted that the Appropriate Assessment stage of the HRA assessed potential impacts by topic;

- Impacts on designated features affected by a possible deterioration in air quality
- Impacts on water quality and quantity associated with increased levels of built development.
- Impacts associated with increased recreational pressure at European sites; and
- Consideration of impacts at associated functionally linked land.

Natural England notes that the HRA also factored the following into the assessment process *"the protective framework provided by the Local Plan and existing protection measures set out in high level strategic policy and existing planning policy frameworks that serve to help overcome the identified potential adverse effects*" and that "*taking into consideration these factors, it is concluded that the Local Plan would have* ***no adverse impact on site integrity at any European site, either alone or in-combination.***

Natural England disagree agree with this conclusion that for those Habitats sites in the area of search with features sensitive to air pollution, adverse effects on their integrity, alone or in-combination, can be ruled out for the reasons set out at the beginning of this letter on page 2 and repeated in part below:

Cumulative adverse effects on integrity in relation to air quality as a result of this plan and neighbouring LPAs plans cannot currently be ruled out at the following internationally designated sites:

- **Midlands Meres and Mosses Phase 2 Ramsar - Black Firs and Cranberry Bog SSSI**
- **Midlands Meres and Mosses Phase 2 Ramsar - Oakhanger Moss SSSI**

Natural England are currently in discussion with a number of the Staffordshire and West Midlands LPA's with regards to the cumulative impacts of air quality. We advise that further work is required to inform the HRA. The HRA should demonstrate that there are no adverse effects on integrity of

Habitat sites as a result of this Local Plan, alone and in combination with other plans and projects. With regards to allocated sites, it is unclear whether the individual sites put forward in the Local Plan have been assessed through the Habitat Regulations Assessment process and how mitigation will be applied here.

Sustainability Appraisal

Natural England has reviewed the Sustainability Appraisal (SA) and included comments taken from the document throughout our response.

The SA is a comprehensive document which should be reviewed in strengthening the HRA, particularly with regards to residual adverse effects that would be expected to remain in terms of wastewater following the implementation of the Local Plan policies. (p 141*)* Natural England notes that "Increased pressure on wastewater treatment has the potential to be a long term and potentially permanent significant effect" (p 142)

The SA recognises the local distinctiveness of the plan area;

"The Borough itself is largely rural in nature and supports some high-quality agricultural land, but is more heavily built up towards the north east surrounding Stoke-on-Trent. (p 8)

Newcastle-under-Lyme has a strong rural character with a high-quality landscape and countryside, with some areas identified as being sensitive to change as a result of new development. (p 19)

Tranquillity, ancient woodland, deciduous woodland, and strong undulating landforms make up the key features of some of these Landscape Character Types." (p 20)

Sets out the area specific barriers to achieving sustainable growth;

"Although various Local Plan policies aim to reduce air pollution and promote sustainable modes of transport, the introduction of 8,000 dwellings and 63ha of employment floorspace is expected to increase vehicle emissions in the Plan area and result in an overall reduction in air quality. (p 67)

Loss of tranquillity The proposed development of 8,000 new dwellings and 63ha of new employment land across the borough, with a number of development sites located within more rural areas, is likely to result in a loss of tranquillity of the rural landscape as a consequence of increases in noise and light pollution.(p 68)

"The pre-mitigation SA assessments identified negative impacts in relation to air quality due to the proximity of sites to major roads, landscape character due to the location of sites within areas of high landscape sensitivity, close proximity to the PRoW network and potential for coalescence and urban sprawl, habitat sites, priority habitats, habitat distinctiveness, loss of undeveloped land, 'best and most versatile' (BMV) agricultural land, coinciding with mineral safeguarding areas (MSAs) and areas of surface water flood risk (SWFR); and access to healthcare facilities, schools, the local cycle network and railway network. (p 40)

There is a low uptake of sustainable modes of transport in the borough, with private car use being the most popular method of travel when commuting to work. (p 21)

Trends in transport choice are unlikely to change significantly, and private car use would continue to increase as the selected method of transport to work, with potential adverse impacts on air quality in the borough."(p 23)

Considers the local and cumulative significance of soil loss alongside the ecological implications:

"Loss of soil resources, BMV land and ecosystem services The proposed allocations would cumulatively result in the loss of up to approximately 342ha of previously undeveloped land, including up to 263ha of BMV agricultural land. The proposed development would be expected to reduce the ability of the local soil biome to effectively provide ecosystem services, to some extent. Additionally, the loss of permeable soils could potentially increase the risk of flooding and result in a loss of biodiversity across the Plan area. Loss of soil can also result in an increase in soil erosion and have subsequent impacts on agricultural yield.(p 68)

The majority of the borough is ALC Grade 3 soil, with areas of ALC Grade 2 scattered across the borough. Grade 2 and potentially Grade 3 represents some of the borough's BMV agricultural land and should be conserved wherever possible (p 21)

A total of 20 of the allocated sites contain areas of ALC Grades 1, 2 or 3 within the site area, leading to potential for up to 263ha of BMV land to be lost as a result of the development proposed in the Local Plan." (p 59)'

Other Advice

Further general advice is provided within Natural England Advice Note – Local Plans February 2024, attached at (Appendix A).

This advice note sets out the natural environment issues that Natural England consider should be incorporated in Local Plans to take forward relevant policies of the National Planning Policy Framework (England).

For any further consultations on your plan, please contact: sally.mclaughlin@naturalengland.org.uk or consultations@naturalengland.org.uk

Yours sincerely

Sally McLaughlin

Sally McLaughlin
Senior Adviser

Land use planning – West Midlands Area Team

Planning for a Better Environment – West Midlands Team.

Natural England Advice Note – Local Plans
February 2024

Natural England is a non-departmental public body. Our statutory purpose is to ensure that the natural environment is conserved, enhanced, and managed for the benefit of present and future generations, thereby contributing to sustainable development. This advice note sets out the natural environment issues that Natural England consider should be incorporated in Local Plans to take forward relevant policies of the National Planning Policy Framework.
Information on consulting Natural England on plans and development proposals is set out in Planning and transport authorities: get environmental advice on planning - GOV.UK (www.gov.uk)

		NPPF paragraph
The Spatial Development Strategy		
Vision and Objectives	The Plan should include the natural environment in its long-term vision and objectives for the plan area. These should be based on local characteristics and circumstances and include locally specific goals for nature recovery and enhancement, supported by policies and proposals in the plan.	8(c), 20(d), 123, 181
The spatial strategy and allocating land for development	In setting an overall strategy to guide development and allocate land the Plan should: • conserve and enhance the natural environment, including landscapes and green infrastructure (GI) • make as much use as possible of previously developed or 'brownfield' land • allocate land with the least environmental or amenity value. It should be recognised that some previously developed land is important for biodiversity as it can contain the open mosaic habitats (dataset), a priority habitat.	11, 32, 89, 123, 124(b)(c), 181, 181, 172, 186(a), 187, 188, 191
Biodiversity and Geodiversity		
Designated sites	The Plan should include policies and proposals to protect and enhance biodiversity, including designated nature conservation sites (internationally, nationally and locally designated sites of importance for biodiversity). The direct and indirect impacts of proposed development on designated should be considered, including impacts on water quality and the impacts on air quality from increased traffic, intensive agriculture or industrial developments. The Plan should identify and map local wildlife sites and include appropriate policy for their protection and enhancement, reflecting their role in the wider ecological network and for nature recovery. Criteria-based policies to guide development should include application of the mitigation hierarchy and how the direct, indirect and cumulative impacts of development on designated sites will be addressed. Further information on designated sites is at Designated Sites View (https://designatedsites.naturalengland.org.uk/). Natural England's Impact Risk Zones (IRZ) on MAGIC maps (www.magic.defra.gov.uk) identify potential development	181, 186(a)(b)(c), 187,188 and Glossary

	impacts. In some Plan areas strategic mitigation solutions may exist or be desirable to address the cumulative impacts of development on designated sites e.g. recreational pressures or nutrient impacts. Where this is the case further advice should be sought from Natural England and robust evidence will be needed to support any strategic approach.	
Irreplaceable Habitats including ancient woodland and ancient and veteran trees	The Plan should protect irreplaceable habitats (including ancient woodland and ancient and veteran trees) from loss or deterioration and seek their enhancement wherever possible. Further advice can be found in Natural England's standing advice- Ancient woodland and veteran trees: protecting them from development.	186(c), Glossary
Biodiversity Net Gain (BNG)	The Plan should identify and pursue opportunities for securing measurable net gains for biodiversity. This should include setting a percentage target level of provision of at least 10% net gain, higher targets should be supported by evidence. The Plan should also set out the BNG strategy including: • requirements for on-site and off-site provision • identifying priority opportunities of strategic significance (habitats and areas) for BNG, for instance through mapping ecological networks • advising on the metric to use to calculate gains, for example the most up to date version of Defra's Biodiversity Metric. The Plan should also aim to achieve wider environmental gains, going beyond BNG, to include wider natural capital benefits such as improved water and air quality and recreation. Natural England's Environment Benefits from Nature tool can help identify opportunities.	180(d), 185(b), 186(d)
Nature recovery	The Plan should include policies and proposals for nature recovery. It should recognise the potential of a connected network of wildlife-rich habitats to improve biodiversity. For instance the protection and recovery of priority species and habitats and supporting habitats outside designated sites for protected species. Consideration should be given to wider benefits such as carbon capture, flood risk management and enhanced access to nature. The Plan should map local ecological networks, including buffers and wildlife corridors and set out policies and proposals to safeguard and enhance the network, including contributions through development where appropriate. These could draw on Local Nature Recovery Strategies where available.	8(c), 185(a)(b), Glossary
Priority species and habitats	The Plan should protect and enhance priority habitats and species. This should include appropriate protection and restoration of deep and shallow peatlands, found in fen and bog priority habitats that are valuable for biodiversity and as a carbon store. Other priority habitats include upland and lowland heathland, traditional orchards, meadows, woodlands and coastal habitats.	185(b), Glossary

	Details can be found on the Joint Nature Conservation Committee website and on MAGIC maps (www.magic.defra.gov.uk)	
Geodiversity	The Plan should make explicit reference to geological conservation (including protection for geological SSSIs and local geological sites) and the need to conserve, interpret and manage geological sites and features in the wider environment.	180, 175
Landscape		
Designated landscapes	The Plan, including site allocations, should give great weight to conserving and enhancing designated landscapes (National Parks, The Broads and National Landscapes (Areas of Outstanding Natural Beauty). This should reflect their natural beauty and special qualities (as identified in their Management Plans). Policies should help in furthering the statutory purposes of designated landscapes. Policies can be informed by landscape character and sensitivity assessments. The scale and extent of development should be limited in these areas. The Plan should consider both the direct and indirect impacts of development on the designated landscape and its setting. Policy should guide any development in these areas to meet the highest standards of design and environmental quality and seek opportunities to enhance the landscape and improve access to nature. The Plan should set out a definition of major development to guide the determination of planning applications against the 'major developments test.' Policy should also consider how development will be managed in the setting of a designated landscape, with development being sensitively located and designed to avoid or minimise adverse impacts.	20(d), 180, 182,183
Wider landscapes	The Plan should include policies and proposals for conserving and enhancing the landscape. The Plan should identify, protect and enhance locally valued landscapes, informed by landscape character assessments., Policies for development in or adjacent to rural areas and urban fringe should ensure they reflect the character of the countryside, as well as seeking opportunities for enhancement and improved access to nature. Local design codes and guides can set out how development can respond to and enhance landscape character.	129, 135(c), 180(a)(b)
Heritage Coasts	Where relevant, the Plan should identify and include policy protection for defined Heritage Coasts, to retain and enhance their special character	184
Light Pollution and Tranquillity	The Plan should include a policy to reduce light pollution. Lighting can be harmful to wildlife and undermine enjoyment of the countryside or night sky, especially in intrinsically dark landscapes, such as protected landscapes and nature reserves. Where appropriate the Plan should identify areas of tranquillity and include policies to protect them.	191 (b)(c)

Green infrastructure, open space, access and design		
Green Infrastructure (GI)	GI is a network of multi-functional green and blue spaces and other natural features that can deliver a wide range of benefits for people, places and nature. Plans should consider the role of GI strategically throughout the plan area as well as links to adjoining areas. The Plan should address unequal access to natural green space and the needs of different user, age, and socio-economic groups. The Plan should set out a clear vision for delivering GI, including identification of deficiencies in provision and opportunities for new and enhanced GI. Plans can be supported by a GI strategy. GI policy should support and align with other natural environment policies, such as those on sustainable drainage systems, biodiversity, access, active travel and open space protection and enhancement. Plans can make use of the Natural England's Green Infrastructure Framework (GIF) to help prepare a GI evidence base that can support policies, site allocations and local design codes. Specific guidance for plan-makers is provided in the GI Process Journeys. The Green Infrastructure Map can be used to identify inequalities in access to greenspace and plan for new GI. The GI standards can be applied locally in policies and design codes.	20(d), 96,167(c)
Open Space and Local Green Space	The Plan evidence base should include a robust and up-to-date assessment of open space requirements and opportunities, with policies and proposals to remedy deficiencies in greenspace provision, including through land allocation. In assessing greenspace provision, consideration should be given to the quality and accessibility of space, as well as the various uses that may need separate provision such as children's play space, opportunities for connecting with nature, formal sports areas and facilities for groups with a variety of needs. Open space provision can use Natural England's Accessible Greenspace Standards to determine needs based on size, proximity capacity and quality. The Plan should identify, designate and have policies to protect and enhance areas of Local Green Space that are of particular importance to local communities.	88(d), 97(a), 102, 103, 105-107
Public Rights of Way and access	The Plan should have policies to maintain and improve access to nature and enjoyment of the countryside. Policies should be in place to protect and enhance public rights of way, access land and national trails, including the England Coast Path. Policies should provide for better connections and address unequal access to nature to support health and well-being outcomes. The design of new or improved routes should consider a range of modes of access including walking, cycling and horse riding, as well as a range of users including children and older people, different socio-economic groups and people with disabilities.	104
Design	Local design codes or guides should be used to support plan	132, 133

	policies to deliver high quality development that responds to and enhances local character and distinctiveness, incorporating nature and GI. Natural England's GI Design Guide provides details of what good GI design looks like. The guide is linked to the ten characteristics of well-designed places set out in the National Model Design Code and the National design guide. Landscape and townscape character assessments can also inform good design.	
Green Belt	Plan policies and proposals should positively enhance land within the Green Belt. This should include compensatory improvements to environmental quality and accessibility of remaining Green Belt where land is removed from the Green Belt. Green Belt land can often be degraded 'urban fringe' landscapes. Therefore, there will be opportunities to 'green' the Green Belt and deliver environmental benefits such as landscape enhancement, habitat creation and enhancement and improved access to nature.	147, 150, 151
Agricultural Land and Soils		
Best and Most Versatile agricultural land	The Plan should contain policies to protect Best and Most Versatile (BMV) agricultural land (Grades 1, 2, 3a). Polices should avoid the loss of BMV land. The Plan should recognise that development has an irreversible adverse impact on the finite national stock of BMV land. Any development proposed on BMV land should be informed by a detailed soil survey. .	180(b)
Sustainable management of soils	The Plan should have a policy for the protection of and sustainable management of soils on development sites. This should set out mitigation measures to minimise soil disturbance and retain as many ecosystem services as possible through careful soil management during the construction process and appropriate soil re-use. The Plan should recognise that development (soil sealing) has a major and usually irreversible adverse impact on soils. The impact of all types of development on soils should be considered. Healthy soils are not only important for agriculture, but soils with high environmental value (e.g. wetland carbon stores such as peatland and low nutrient soils) are also important to ecological connectivity. Development should be supported by soils surveys and management plans - see Defra's Code of Practice for the sustainable use of soils on construction sites.	180(a)
Coast		
Coastal Change	Where relevant, the Plan should consider the implications of coastal change and opportunities for nature and improved access. The Shoreline Management Plan should be used to inform the evidence base for the Plan. Coastal Change Management Areas should be identified with appropriate policies set out for development and to manage the change. Policies should reflect and enhance the character of the coast and maintain the route of the England Coast Path. Opportunities for enhancing biodiversity, landscapes and access to nature should also be secured.	14, 20(b), 176, 177, 178, Glossary
Marine	Where relevant, the Plan should have policies in place to	176

environment	ensure effective alignment of the terrestrial and marine planning regimes, for instance in plan areas on estuaries or areas with tidal rivers. This should include reference to the relevant marine plan.	
Climate Change		
Climate Change	The Plan should contain policies to mitigate and adapt to climate change impacts on the natural environment. The Plan should recognise that climate change mitigation and adaptation and biodiversity loss are interlinked. Many habitats provide essential ecosystem services to allow adaptation to climate change e.g. natural flood management, as well as mitigation e.g. through tree planting and retaining peat as a carbon store. Policies should set out appropriate nature-based solutions for climate mitigation and adaptation such as woodland or wetland creation or peatland restoration. Policies should address water use, promoting the use of sustainable drainage systems (SuDS) and water sensitive design as part of a wider green infrastructure approach. In areas of known water constraint, plans should include policies to manage available resources, such as water efficiency or water reuse measures. Consideration also needs to be given to the likely impacts of climate change on protected sites, habitats and species. See the Climate Change Adaptation Manual, Carbon Storage and Sequestration by Habitat and National biodiversity climate change vulnerability model.	11(a), 20(d), 158 and Glossary

Site Allocations

The strategy for allocating land for development should:

- avoid protected sites and apply the biodiversity mitigation hierarchy (NPPF 180a)
- give great weight to conserving and enhancing designated landscapes
- avoid the loss of best and most versatile agricultural land.

Selecting sites and setting design principles for their delivery should conserve and enhance the natural environment. This includes considering potential impacts and opportunities set out int the table above, as well as the issues set out in the table below secured through planning policy.

Evidence	An appropriate evidence base should be used to support the selection of sites and inform the policies for their delivery. This should include: • Landscape and Visual Impact Assessments, Landscape Sensitivity Assessments and Landscape Character Assessments. • Soil surveys and mapping (Agricultural Land Classification available on Magic maps) • ecological surveys, green infrastructure and biodiversity opportunity mapping.
Assessments	Site selection must also be informed by the relevant environmental assessments. These are: • **Sustainability Appraisal incorporating Strategic Environmental Assessment**: it should be clear how this has informed and provided

	justification for the sites selected for allocation assessed against reasonable alternatives. Recommendations and findings from the assessments should also be used to inform mitigation measures and design principles for the allocated sites. • **Habitats Regulations Assessment**: mitigation and avoidance measures identified through the HRA should be secured through policies in the Plan. Where mitigation or avoidance is not possible the site should not be allocated.
Environmental requirements	Plans should set requirements, opportunities and detailed design guidance for site allocations to conserve and enhance the natural environment. This should include measures secured through policy covering: • **BNG:** This could include specifying whether and what BNG should be delivered on-site given the scale of development anticipated, or if off-site provision will be required. Site allocations should be supported by a baseline assessment of biodiversity value for example using the latest version of Defra's Biodiversity Metric. • **GI strategy:** Allocations should set out measures to protect, enhance and improved connectivity of GI within and beyond allocation sites. Consideration should also be given to setting appropriate GI standards for allocation sites. • **Landscape features:** Allocation policy should incorporate and enhance existing landscape features within the development This could include hedgerows, walls, ancient and veteran trees, woodland and wildlife corridors. • **Agricultural land and soils:** Allocations should be based on a detailed soils survey and have policies should secure a soil management plan. • **Access**: Policies for allocations should incorporate and enhance public access to the natural environment. This includes Public Rights of Way that run through or adjacent to allocated sites, as well as linking from the site to the wider route network.

Appendix B – Ramsar Information Sheet

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 02 February 1997

3. Country:

UK (England/Wales)

4. Name of the Ramsar site:

Midland Meres and Mosses Phase 2

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* □;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

52 55 20 N 02 45 43 W

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Chester, Shrewsbury, Stafford

The 18 units which make up the site are spread over the Wrexham / Shropshire / Cheshire and Staffordshire Plain. The majority of the units are in Cheshire and north Shropshire, with a small number of outlying sites in adjacent parts of Staffordshire and Wrexham.

Administrative region: Cheshire; Clwyd; Shropshire; Staffordshire; Wrecsam/ Wrexham

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 1588.24

Min. 63
Max. 94
Mean 83

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The Meres and Mosses form a geographically diverse series of lowland open water and peatland sites in the north-west Midlands of England and north-east Wales. These have developed in natural depressions in the glacial drift left by receding ice sheets which formerly covered the Cheshire/Shropshire Plain. The 18 component sites include open water bodies (meres), the majority of which are nutrient-rich with associated fringing habitats, reed swamp, fen, carr and damp pasture. Peat accumulation has resulted in the nutrient-poor peat bogs (mosses) forming in some sites on the fringes of the meres or completely infilling basins. In a few cases the result is a floating quaking bog or schwingmoor. The wide range of resulting habitats support nationally important flora and fauna.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 2

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 1

The site comprises a diverse range of habitats from open water to raised bog.

Ramsar criterion 2

Supports a number of rare species of plants associated with wetlands, including the nationally scarce cowbane *Cicuta virosa* and, elongated sedge *Carex elongata*. Also present are the nationally scarce bryophytes *Dicranum affine* and *Sphagnum pulchrum*.

Also supports an assemblage of invertebrates including several rare species. There are 16 species of British Red Data Book insect listed for this site including the following endangered species: the moth *Glyphipteryx lathamella*, the caddisfly *Hagenella clathrata* and the sawfly *Trichiosoma vitellinae*.

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	acidic, basic, neutral, sand, clay, alluvium, peat, nutrient-rich, nutrient-poor, sandstone, sandstone/mudstone, gravel
Geomorphology and landscape	lowland, hilly, floodplain, escarpment
Nutrient status	eutrophic, mesotrophic, oligotrophic
pH	acidic, circumneutral, strongly acidic
Salinity	fresh
Soil	mainly organic
Water permanence	usually permanent
Summary of main climatic features	Annual averages (Shawbury, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/shawbury.html) Max. daily temperature: 13.4° C Min. daily temperature: 5.2° C Days of air frost: 61.8 Rainfall: 655.7 mm Hrs. of sunshine: 1398.1

General description of the Physical Features:

The Meres and Mosses of the north-west Midlands comprise a series of open water and peatland sites, most of which developed in natural depressions left by the retreating ice sheets at the end of the last Ice Age. There are over 60 open water sites, or 'meres', as well as a smaller number of peatland sites, known as 'mosses'.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Meres and Mosses of the north-west Midlands comprise a series of open water and peatland sites, most of which developed in natural depressions left by the retreating ice sheets at the end of the last Ice Age. There are over 60 open water sites, or 'meres', as well as a smaller number of peatland sites, known as 'mosses'.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Recharge and discharge of groundwater, Flood water storage / desynchronisation of flood peaks

19. Wetland types:

Inland wetland

Code	Name	% Area
U	Peatlands (including peat bogs swamps, fens)	66.1
O	Freshwater lakes: permanent	14.4
Other	Other	12.7
Xp	Forested peatland	4.7
W	Shrub-dominated wetlands	2.1

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The site's primary interest is its wide range of lowland wetland types and successional stages within a distinct biogeographical area. Waters are generally circumneutral or acidic depending on the component site's soil type, catchment size and usage. Substantial areas of open water remain in some sites, and in many cases this is fringed by extensive and varied swamp, fen and carr communities. Some basins have become peat-filled, leading in some circumstances to the development of ombrotrophic conditions; of particular importance are the quaking bogs or schwingmoors.

Fenns, Whixall, Bettisfield, Wem and Cadney Mosses are large raised bogs of exceptional importance.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

Calamagrostis stricta, Carex elongata, Cicuta virosa, Thelypteris palustris

Lower Plants.

Sphagnum pulchrum, Dicranum undulatum

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species with peak counts in spring/autumn:

Northern shoveler , *Anas clypeata*, NW & C Europe	171 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Great cormorant , *Phalacrocorax carbo carbo*, NW Europe	323 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)
Great bittern , *Botaurus stellaris stellaris*, W Europe, NW Africa	1 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)
Water rail , *Rallus aquaticus*, Europe	7 individuals, representing an average of 1.5% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Invertebrates.

Limnophila heterogyna, Atylotus plebeius, Hagenella clathrata, Limnophila fasciata, Carorita limnaea, Glyphipteryx lathamella, Trichiosoma vitellinae, Eilema serica, Brachythops wusteneii, Pachinematus xanthocarpos, Sittcus floricola, Lampronia fuscatella, Hybomitra lurida.

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23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Archaeological/historical site
Environmental education/ interpretation
Livestock grazing
Non-consumptive recreation
Peat cutting (small-scale/subsistence)
Scientific research
Sport fishing

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	
Local authority, municipality etc.	+	+
National/Crown Estate	+	+
Private	+	+

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	
Recreation	+	
Current scientific research	+	
Collection of non-timber natural products: (unspecified)	+	
Commercial forestry		+
Fishing: recreational/sport	+	
Arable agriculture (unspecified)		+
Grazing (unspecified)	+	+
Hunting: recreational/sport	+	+
Sewage treatment/disposal		+
Irrigation (incl. agricultural water supply)		+
Mineral exploration (excl. hydrocarbons)		+
Transport route		+
Urban development		+
Non-urbanised settlements		+

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Eutrophication	1		+	+	+
Introduction/invasion of non-native plant species	1		+		+
Pollution – pesticides/agricultural runoff	1			+	+

For category 2 factors only. What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Is the site subject to adverse ecological change? NO

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
National Nature Reserve (NNR)	+	
Land owned by a non-governmental organisation for nature conservation	+	
Management agreement	+	+
Site management statement/plan implemented	+	
Other	+	+
Special Area of Conservation (SAC)	+	

b) Describe any other current management practices:

The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Habitat.
Catchment management planning.
Peatland restoration & monitoring.
Fen rehabilitation.
Limnology.
Hydrology.

Environment.
Water chemistry.
Trophic status/nutrient budgets.
Peat paleo-ecology.
Impacts of fish.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Areas owned by the Local Authority and National Nature Reserves are used by schools and universities for site-based projects and individual dissertations.
National Nature Reserves are used as management-practice and machinery demonstration sites.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities.
Angling; boating.

Facilities provided.
There is a network of public footpaths.

Seasonality.
Increased use in summer.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB
Head, Countryside Division, Welsh Assembly Government, Cathays Park, Cardiff, CF1 3NQ

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK / Site Safeguard Officer, International Designations, Countryside Council for Wales, Maes-y-Ffynnon, Penrhosgarnedd, Bangor, Gwynedd, LL57 2DW

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

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Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
Telephone**: +41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**

Appendix C – Natural England FCS reports

Definitions of Favourable Condition for designated features of interest

These definitions relate to all designated features on the SSSI, whether designated as SSSI, SPA, SAC or Ramsar features.

Cheshire, Greater Manchester,
Merseyside and Lancashire Team
Second Floor, Arndale House
The Arndale Centre
Manchester, M4 3AQ
Enquiry Service 0300 060 3900
enquiries@naturalengland.org.uk

Name of Site of Special Scientific Interest (SSSI)	
Oakhanger Moss	
Names of designated international sites	
Special Area of Conservation (SAC)	N/A
Special Protection Area (SPA)	N/A
Ramsar	Midland Meres and Mosses (Phase 2)
Relationship between site designations	
Midland meres and mosses (phase 2) - 19 Sites of Special Scientific Interest (SSSI): Abbots Moss; Aqualate Mere; Black Firs & Cranberry Bog;. Brownheath Moss; Chapel Mere; Cole Mere; Cop Mere; Fenn's, Whixall, Bettisfield, Wem & Cadney Mosses; Hanmer Mere; Hencott Pool; Linmer Moss; Llyn Bedydd; Morton Pool & Pasture: Oak Mere; Oakhanger Moss; Oss Mere; Rostherne Mere; Sweat Mere & Crose Mere; Vicarage Moss.	

Version control information	
Status of this Version (Draft, Consultation Draft, Final)	Final
Prepared by	Dr Paul Thomas
Date of this version	29th September 2015
Date of generic guidance on favourable condition used	CSM Lowland Wetlands Guidance Version August 2004 (Updated from February 2004) CSM Guidance Woodland Habitats Version February 2004 NE CSM wetland positive negative species 2010
Other notes/version history	Draft P Waring & K Walsh 22nd Sept 2008

Quality assurance information		
Checked by	**Name Rosemary Budd**	**Date 12 October 2015**
	Signature	

Definitions of Favourable Condition: notes for users

Definitions of Favourable Condition

The definitions comprise one or more condition definitions for the special interest features at this site. These are subject to periodic review and may be updated to reflect new information or knowledge. They will be used by Natural England to determine if a site is in a favourable condition. The standards for favourable condition have been developed and are applied throughout the UK.

Standards for favourable condition are defined with particular reference to the specific designated features listed in Table 1, and are based on a selected set of attributes for features which most effectively define favourable condition as set out in Tables 2, 2a and 3. When an SSSI's features meet these attributes, then they are said to be in 'favourable condition'.

Explanatory text for Tables 2 and 3

Tables 2, 2a and 3 set out the measures of condition which we will use to provide evidence to support our assessment of whether features are in favourable condition. They have been tailored by local staff to reflect the particular characteristics and site-specific circumstances of individual sites. Quality Assurance has ensured that such site-specific tailoring remains within a nationally consistent set of standards. The tables include an audit trail to provide a summary of the reasoning behind any site-specific targets etc. In some cases the requirements of features or designations may conflict; the detailed basis for any reconciliation of conflicts on this site may be recorded elsewhere.

Use under the Habitats Regulations

The Definitions of Favourable Condition (DFCs) are used to periodically measure and assess the condition of both notified SSSI features and designated European Site features.

Where SSSIs also form part of a European Site (such as a SAC or SPA), a separate document containing specific European Site Conservation Objectives will have been prepared. These objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and the Habitats Directive 1992. They are for use when either the appropriate nature conservation body or a competent authority is required to make an 'appropriate assessment' of the likely effects of a proposed plan or project on the integrity of a European Site under the relevant parts of the respective legislation. The European Site Conservation Objectives are available from the Natural England Publications Catalogue.

The concepts of 'site integrity' and 'favourable condition' are similar and the assessment of a feature's condition will measure attributes that also represent aspects of a site's ecological integrity. However, the periodic determination of a feature's condition is separate from a judgement about the effect upon a site's overall integrity. This is because the DFCs do not represent a comprehensive or definitive list of all of the elements that might contribute to site integrity, merely those that are most appropriate to monitor in order to rapidly determine the present condition of a feature. The full range of factors that are components of a site's integrity, and which may need to be considered by an appropriate assessment, will be specified in the European Site Conservation Objectives. Some of the information contained within the DFCs may however contribute to such assessments.

Table 1: Individual designated interest features

Broad Habitat type / Geological Site Type	Specific designated features	Explanatory description of the feature for clarification	SSSI notified interest features	SAC qualifying interest features	SPA qualifying interest features dependency on specific habitats			Ramsar criteria applicable to specific habitats			
					Annex 1 species	Migratory species	Waterfowl assemblage	1a Wetland characteristics	2a Hosting rare species &c	3a 20000 waterfowl	3c 1% of population
Fens, marsh swamp (lowland)	Basin fen (lowland): M2 *Sphagnum cuspidatum / recurvum* bog pool community	Basin fen: ombrogenous nuclei (topogenous bog)	*					*			
	Basin fen (lowland): M18 *Erica tetralix-Sphagnum papillosum* raised and blanket mire.	Basin fen: ombrogenous nuclei (topogenous bog)	*					*			
	Basin fen (lowland): S3 *Carex paniculata* swamp	Base-poor and base-rich sump wetland	*					*			
	Basin fen (lowland): S7 *Carex acutiformis* swamp	Base-poor and base-rich sump wetland	*					*			
	Basin fen (lowland): S27 *Carex rostrata-Potentilla palustris* swamp	Base-poor and base-rich sump wetland	*					*			
	Wet woodland: W1 *Salix cinerea-Galium palustre* fen woodland	Fen woodland	*					*			
	Wet woodland: W4 *Betula pubescens-Molinia caerulea* fen woodland	Fen woodland	*					*			
	Wet woodland: W5 *Alnus glutinosa-Carex paniculata* woodland	Fen woodland	*					*			

Table 2 Habitat extent objectives

Extent - Dynamic balance	To maintain the designated features in favourable condition, which is defined in part in relation to a balance of habitat extents (extent attribute). Favourable condition is defined at this site in terms of the following site-specific standards.
	On this site favourable condition requires the maintenance of the extent of each habitat type (either designated habitat or habitat supporting designated species). Maintenance implies restoration if evidence from condition assessment suggests a reduction in extent.

Habitat Feature (Broad Habitat level, or more detailed level if applicable)	Estimated extent (ha) and date of data source/estimate	Site Specific Target range and Measures	Comments
Lowland fens (Basin mire)	13.58 ha = whole site extent and total mire expanse (Natural England 1994). 0.5 ha = Open mire M2 and M18 0.3 ha = Open fen S3, S7, S27 12.8 ha = Woodland W1, W4 and W5	There should be no reduction in the total combined extent of wetland in relation to the established baseline. A baseline map showing the boundary of the habitat should be used to assess any changes in extent. See Annex 1. Aerial photographs can offer a convenient means of rapidly assessing extent in some cases.	Oakhanger Moss is one of the shallowest of a cluster of depressions in glacial sands lying to the west of Alsager. It is of greatest importance for the range of mire vegetation communities it supports and the way that they, together with the sediment and peat deposit record, so clearly demonstrate the vegetation succession stages from open water to raised bog. In the centre of the site are two distinct areas of vegetation dominated by bog moss that are noticeably higher than the surrounding communities, an incipient raised bog community. Scrub and woodland are integral components of many mire systems and may be particularly important for invertebrates. However invasion by woody species and their development to maturity may indicate drying out, dereliction, disturbance and/or enrichment. Trees and shrubs may also exacerbate drying out. It is intended that the current extent of woodland be maintained but that future encroachment in to the basin fen complex trigger a management response.

Audit Trail

Rationale for habitat extent attribute

(Include methods of estimation (measures), and the approximate degree of change which these are capable of detecting).

The whole site area is taken from the English Nature citation (1994) and the habitat extents from 2000 and 2010 aerial photography on web map. A phase 1 map from 2000 (Ecus 2001) would be the usual baseline to use. However, the mire/fen areas are not clearly shown on this map so a more up to data map is justified. The 2014 map (produced by Natural England staff) highlights the areas of important habitat on the site and will make a good baseline against which to assess future changes (see Annex 1).

As recorded by the 2007 and 2014 condition assessment, the site is badly degraded. The M18 key interest feature had been lost in 2007 and is slowly being restored through scrub and woodland clearance and through re-wetting of the site. In addition, many of the transitional communities for which the site had been notified were also lacking. The S7 community is still present on site and site objectives retain this feature and promote all mire – fen transition communities. On-going scrub and woodland management in combination with further hydrological investigations (especially in relation to the main ditch on site which appears to be actively removing water from site) should lead to recovery. See Annex 2 for more information.

Note that the edges of the site support broadleaf woodland (W10 commuity) and bracken (U20). This area is important as a hydrological buffer to the mire/fen and will be retained as part of the site fabric. It has not been possible to measure the extent of the site fabric buffer.

During the drafting of this 2015 FCT, the notified M25 (*Molinia caerulea – Potentialla erecta* mire) feature on the site was removed. It has also been reoved from habitat extent calculations. As described below, the majority of M25 has probably succeeded to W4 woodland. This community was removed for the following reasons:

- The Molinia community was probably never a true M25; it was a tussocky species poor Molinia-dominated community that bore little resemblance to the species rich community described in the NVC community descriptions
- The Molinia community on site was probably the result of existing drainage channels that were drying out the bog until recently. As management on Cheshire mosses and Manchester wetlands has shown, year-round waterlogging tends to reduce Molinia dominance, and the presence of this community indicates that the site was not at optimal wetness or condition in the past
- The site scrubbed over heavily, until recent scrub clearance removed this growth, and the community has been lost to succession. Paul Thomas recorded a lot of W4 wet woodland in his recent 2014 condition assessment and thinks this was formed from the original M25 community; some Molinia still forms the ground flora in the woodland area
- Recent ditch blocking works have restored the hydrology of the site, causing areas to re-wet. No M25 community has reappeared and it is unlikely to reappear – the area either being too wooded or too wet for Molinia
- This lowland raised bog is unlikely to generate a true species rich M25 community, and the species-poor variant is not a target community for the site; the wet woodland, lagg fen and basin mire / wet heath communities are far more valuable in this particular basin mire context

Rationale for site-specific targets (including any variations from generic guidance)

Other Notes

Other Notes
References: Ecus (2001) Meres and Mosses Conservation Plans: Oakhanger Moss. Map and Phase 1 Survey. Report to Natural England. Natural England (1994) SSSI citatation

Table 3a Site specific Habitat/geological condition objectives

To maintain the **Fen, marsh and swamp (lowland)** at **Oakhanger Moss** in favourable condition, with particular reference to relevant specific designated interest features. Favourable condition is defined at this site in terms of the following site-specific standards:
Site-specific details of any geographical variation or limitations (where the favourable condition standards apply)
N/A

Site-specific standards defining favourable condition

Criteria feature	Attribute term in guidance	Measure	Site-specific Targets	Comments	Use for CA?
Basin fen (lowland): all communities (M2, M18, S3, S7 and S27)	Habitat extent	Field survey and / or aerial photograph in relation to the baseline map (see Annex 1).	There should be no reduction in the total combined extent of wetland, including all associated pools and lag fen, in relation to the established baseline. See Table 2a for area extent and Annex 1 for habitat type and distribution.		Yes
Wet woodland: W1, W4 and W5	Habitat extent	Field survey and / or aerial photograph in relation to the baseline map (see Annex 1).	At least current area (as surveyed in 2014, see Annex 1) of recent semi-natural stands maintained, although their location may alter.	Some loss of wet woodland as part of management works to restore areas of open fen and bog is acceptable within the fen/mire areas.	Yes
Basin fen (lowland): all communities (M2, M18, S3, S7 and S27) Wet Woodland: W1, W4 and W5	Habitat composition	A baseline habitat community map showing the boundary of the components should be used to assess any changes in composition.	There should be no loss of the component types, M2, M18, S3, S7 and S27. See Annex 1. Balance between open fen and wet woodland W1, W4 and W5 maintained at current levels and in roughly the current locations. See Annex 1. Community and habitat transitions are maintained at current levels and in current locations. See Annex 1.	Lowland fens: variety within fens is determined by water supply mechanism, hydroseral succession and land management practices. See note 1.	Yes

Basin fen (lowland): all communities (M2, M18, S3, S7 and S27)	Habitat structure: exposed substrate	Visual estimate of % cover.	Total extent of exposed substrate across the area assessed should be no more than 10%.	A high frequency and cover of exposed substrate will usually be undesirable and may indicate, inter alia, over-grazing, and water scour.	Yes
Wet woodland: W1, W4 and W5 communities ONLY	Habitat structure and natural processes	Assess by field survey using a structured walk and / or transects.	(1) Understorey (2-5m) present over at least 20% of total stand area. (2) Canopy cover present over 30-90% of stand area. (3) A minimum of 3 fallen lying trees with greater than 20cm diameter per ha and 4 trees per ha allowed to die standing. (4) Signs of seedlings growing through to saplings to young trees at sufficient density to maintain canopy density over a 10 year period.		Yes
Basin fen (lowland): M2 and M18 mire communities ONLY	Vegetation composition: positive indicators	Visual assessment of cover, using structured walk or transects and recording quadrats.	(1) At least 3 of the following species constant, with a combined cover of no more than 80%: *Calluna vulgaris, Erica tetralix, Eriophorum angustifolium, E.vaginatum* & *Trichophorum cespitosum*. (2) No single species in above list >50% cover. (3) One of the following species at least frequent: *Andromeda polifolia, Drosera rotundifolia, Empetrum nigrum, Narthecium ossifragum and Vaccinium oxycoccos*. (4) At least 2 of the following spp. constant with a combined cover >20%: *Sphagnum capillifolium, S. magellanicum, S. papillosum and S. tenellum*.	The areas of bog are transitional and this is reflected in the *Sphagnum* seen. *S. Fallax and S. palustre* are the dominant	Yes

			(5) *Sphagnum cuspidatum and/or S. pulchrum* at least occasional.	mosses at this site. *S. squarrosum* also plays a key part in the development of lawns within the areas of W4 wet woodland.	
Basin fen (lowland): S3 swamp community ONLY	Vegetation composition: positive indicators	Visual assessment of cover, using structured walk or transects and recording quadrats.	(1) Healthy tussocks of *Carex paniculata* with bare peat or water between. (2) Plus at least 3 scattered associates (e.g. *Angelica sylvestris, Filipendula ulmaria, Galium palustre, Rubus fruticosus, Solanum dulcamara*) at least rare between the tussocks and as epiphytes.		Yes
Basin fen (lowland): S7 swamp community ONLY	Vegetation composition: positive indicators	Visual assessment of cover, using structured walk or transects and recording quadrats.	(1) *Carex acutiformis* to be dominant within the S7 swamp (2) *At least 3 Angelica sylvestris, Galium palustre, Mentha aquatic* and other associated species to be scattered throughout the sedge-beds, at least rare.		Yes
Basin fen (lowland): S27 swamp community ONLY	Vegetation composition: positive indicators	Visual assessment of cover, using structured walk or transects and recording quadrats.	(1) EITHER *Carex rostrata, C. vesicaria, C. nigra, C. elata, C. aquatilis, C. appropinquata*, *Eriophorum angustifolium* with a combined cover >25% OR *Phragmites australis and Juncus effusus* with a combined cover >25% (2) *Potentilla palustris, Menyanthes trifoliata, Equisetum fluviatile*: these species individually or together with a combined cover >25% *(3) Calliergonella cuspidata, Calliergon cordifolium, C. giganteum:* at least one species at least rare.		Yes

			(4) Associated species are: *Galium palustre, Cardamine pratense, Epilobium palustre, Mentha aquatica, Myosotis laxa, Caltha palustris, Hydrocotyle vulgaris, Veronica scutellata, Lysimachia vulgaris.* At least 3 of these species should be constant. (5) Site specific target: On the eastern side of the fen (see Annex 1 target note *) mature greater tussock-sedge (*Carex paniculata*) can be found with its associates of cyperus sedge (*C. pseudocyperus*), marsh pennywort (*Hydrocotyle vulgaris*), marsh violet (*Viola palustris*), purple-loosestrife (*Lythrum salicaria*) and marsh cinquefoil (*Comarum palustre*). These species should remain present in roughly the current proportions – occasional to frequent in cover. See note 2 below.		
Wet woodland: W1, W4 and W5 communities ONLY	Vegetation composition: positive indicators	Visual assessment of cover, using structured walk or transects and recording quadrats.	(1) At least 95% of cover in any one layer of site-native or acceptable naturalised species. This includes: *Salix cinerea, Betula pubescens, Alnus glutinosa* as constant species. For W4 and W5 commuities this should consist of *Betula pubescens* as the dominant species. *Fraxinus excelsior* may also be frequent in the W5 community. (2) 80% of ground flora referable to relevant NVC community: W4 or W5 with elements of M2, M18, S3, S7, S27.		Yes
Basin fen (lowland): all communities (M2, M18, S3, S7 and S27) Wet Woodland: W1, W4 and W5	Vegetation composition: indicators of negative change	Visual assessment of cover, using structured walk or transects and recording quadrats.	Invasive non-native species should be absent, or no more than rare if present.	This site is being invaded by Himalayan Balsam (*Impatiens glandulifera*).	Yes

Basin fen (lowland): M2 and M18 mire communities ONLY	Vegetation composition: indicators of negative change	Visual assessment of cover, using structured walk or transects and recording quadrats.	(1) Not more than one of *Phalaris arundinacea, Glyceria maxima, Epilobium hirsutum, Urtica dioica, Pteridium aquilinum, Rubus fruticosus,* Juncus spp., *Deschampsia cespitosa, Cirsium spp. Brachythecium rutabulum, Eurhynchium praelongum* and that species at less than 5% cover. (2) *Phragmites australis* acceptable around upwellings or their equivalent. (3) *Polytrichum* spp. (other than *Polytrichum alpestre*) no more than occasional. (4) Trees and shrubs (Betula, Salix, Rhododendron, Pinus species, other gymnosperms) no more than rare and < 5% cover.	Scrub and woodland are integral components of many fen systems and may be particularly important for invertebrates. However invasion by woody species and their development to maturity may indicate drying out, dereliction, disturbance and/or enrichment for both fen. Trees and shrubs may also exacerbate drying out.	Yes
Basin fen (lowland): S3, S7 and S27 swamp community ONLY	Vegetation composition: indicators of negative change	Visual assessment of cover, using structured walk or transects and recording quadrats.	(1) Not more than one of *Phragmites australis, Phalaris arundinacea, Glyceria maxima, Epilobium hirsutum, Urtica dioica* and that species at less than 5% cover. (2) Not more than one of *Pteridium aquilinum, Rubus fruticosus, Molinia caerulea* and that species not more than 5% cover. (3) Trees and shrubs (*Betula, Salix, Rhododendron, Pinus* species, other gymnosperms) no more than rare and <5% cover.	Scrub and woodland are integral components of many fen systems and may be particularly important for invertebrates. However invasion by woody species and their development to maturity may indicate drying out, dereliction, disturbance and/or enrichment for both fen. Trees and shrubs may also exacerbate drying out.	Yes
Wet woodland: W1, W4 and W5 communities ONLY	Vegetation composition: indicators of negative change	Visual assessment of cover, using structured walk or transects and recording quadrats.	Death, destruction or replacement of native woodland species through effects of introduced fauna or other external unnatural factors (i.e. planting, trampling) not more than 10% by number or area in a five year period.		Yes

Basin fen: ombrogenous nuclei (topogenous bog) & base-poor and base-rich sump wetland	Indicators of local distinctiveness: Presence of notable spp: Adder (*Vipera berus)*	Visual assessment of frequency/cover of local species in sample points chosen to represent their present distribution.	Existing populations of adder are maintained at least at current levels and local distribution characteristics (see note 3).	No information from notification, no baseline or other survey available providing population data. Secure Adder survey to ascertain numbers on site and whether population breeding. Thereafter, use Common Standards Monitoring form to assess whether basin fen compex provides an adequate suite of habitats for breeding reptiles.	No

Audit Trail

Rationale for limiting standards to specified parts of the site

A phase 1 map from 2000 would be the usual baseline to use, however the mire/fen areas are not clearly shown on this map so more up to data map is justified. The 2014 map highlights the areas of important habitat on the site and will make a good base line to assess future changes (see Annex 1).

Rationale for site-specific targets (including any variations from generic guidance)

Oakhanger Moss is of greatest importance for the range of mire vegetation communities and the way that they, and the sediment and peat deposit record, clearly demonstrate the vegetation succession stages from open water to raised bog. At the time of designation four different mire communities were noted although it had a well-developed shrub cover giving the site a wooded appearance, this would seem to have reached a natural equilibrium and much of the site is now closed canopy wet woodland. The objectives above are written assuming restoration of a range of fen/mire communities will be undertaken within the areas shown in Annex 1 to restore the site to favourable condition.

Note 1: At this site hydroseral succession was reset by peat cutting. The site sits within a shallow basin filled with 2.5m of peat. BGS borehole logs for the area show the basin is underlaid with mix of sand and gravels with bands of clay. Water is likely to enter the site from ground water and there are a number of surface water ditches feeding water into the moss from adjacent land. See Annex 1. The areas of bog are associated with raised areas of peat with less ground and surface water influence. Also note that depending on the water levels some areas of bog/fen do raft up and become free floating.

Note 2: The generic targets in this document should be applied to all areas of S3, S7 and S27 swamp. However, the site specific target (*Carex paniculata* community) should be applied to the area of swamp highlighted in the target note on Annex 1. These species are all uncommon in Cheshire and Natural England wishes to retain their presence on site as individual species and as components of a wider site specific community.

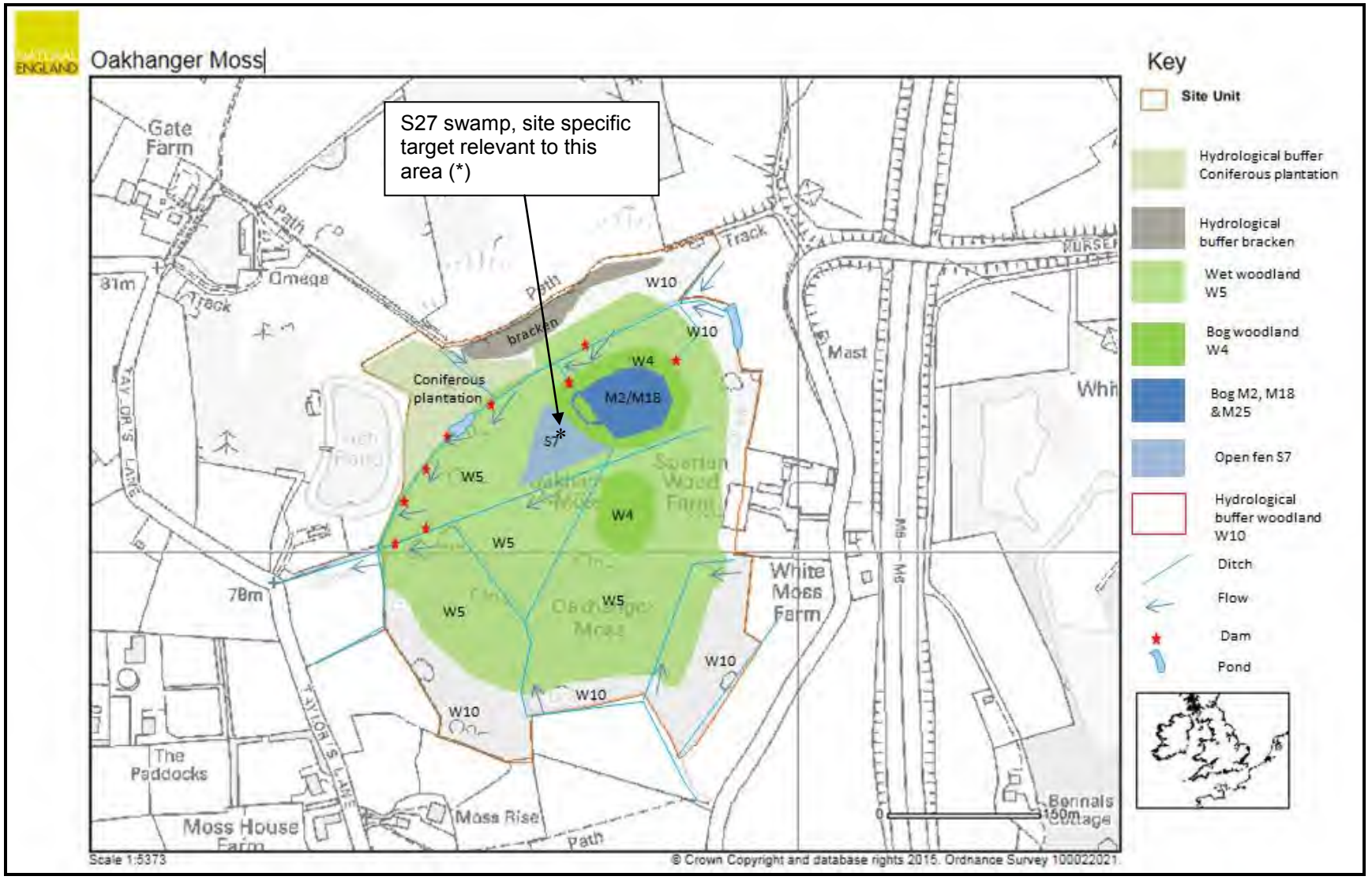
Note 3: Adder *Viper berus* is mentioned on the criteria sheet and citation as being present on site. There was only one other site known for adder in Cheshire at that time. Therefore, the continued presence of this species should be monitored under the local distinctiveness attribute.While the SSSI citation states that Oakhanger Moss is one of two known sites for Adder in Cheshire, no information is available regarding population size or distribution. There is no baseline or other survey available providing population data. It is unclear whether the reptiles are breeding on site. The only evidence of their presence on site is third party information from nearby Spartan Wood Farm that they were seen on site in 2003. Hence, it is important to secure an Adder survey to ascertain numbers on site and whether the population is breeding.

Rationale for selection of measures of condition (features and attributes for use in condition assessment)

(The selected vegetation attributes are those considered to most economically define favourable condition at this site for the broad habitat type and any dependent designated species).

Other Notes

Annex 1: Oakhanger Moss SSSI – Site NVC Community map



Annex 2: Justification for recent condition assessment and future management

By: Dr Paul Thomas, Natural England – Cheshire to Lancashire

Date: 8th May 2014

Site Condition in 2007

A condition assessment was carried out by Natural England in 2007. This assessment was completed following a period of scrub management on site, intended to open up the centre of the site and restore the mire communities. Overall the site was assessed as "unfavourable recovering".

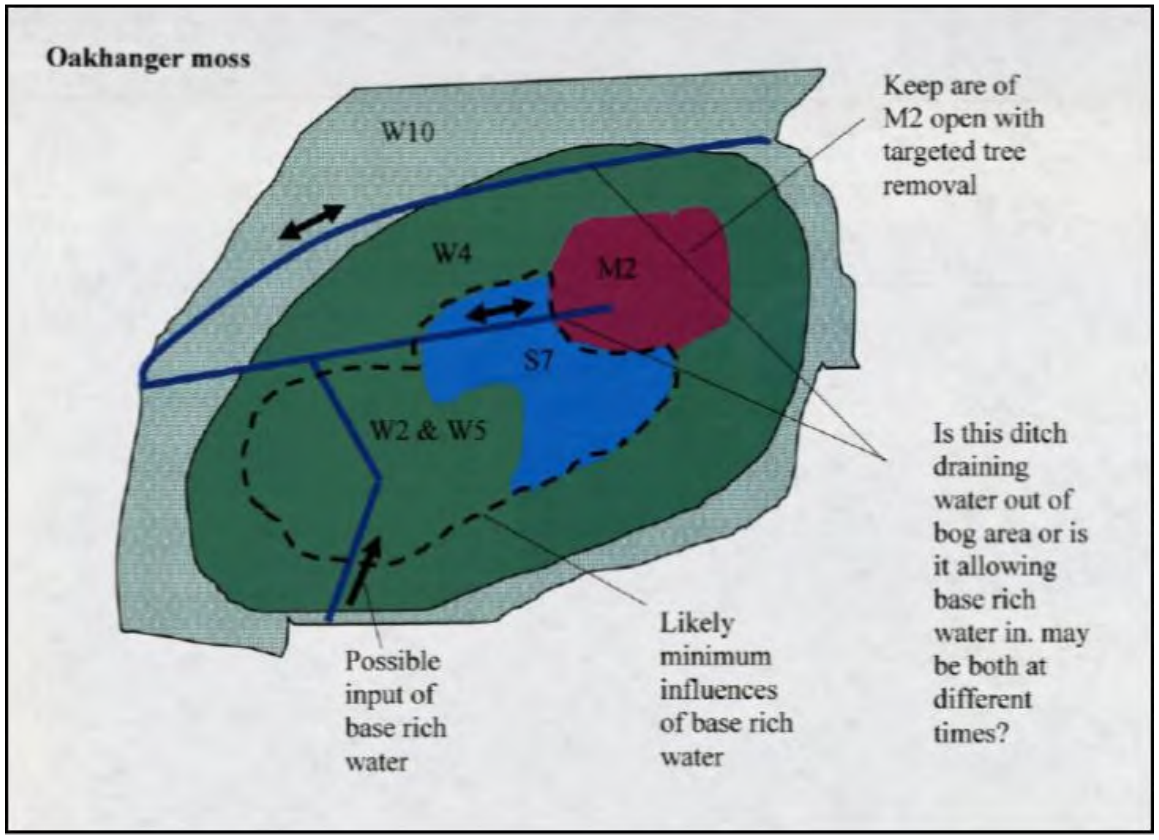


Figure 1: map generated by the 2007 condition assessment on Oakhanger Moss

The site was recorded as being degraded, with the loss of all M18 heath communities. It was also dry and dominated by woodland communities, rather than the series of transitional mire communities for which it is designated. There was evidence of relic M18 species on the site, such *Erica tetralix*, and this suggests that a more open bog community had been present in the recent past.

Jacqui Ogden (Natural England specialist), when consulted, noted that M18 occurs in basin mires when vegetation mats float and become purely rainfall-fed. The M18 community can subsequently succeed to other communities or spread and develop into raised bog proper. Had the M18 been present on site, she suspects its loss was due to extensive tree growth; M18 disappears if the floating mire mat becomes anchored and inundated by groundwater due to plant root penetration.

An area of M2 was recorded (see figure 1) in the area that had been recently felled. The presence of M2 was presumed to be an indicator of the recovering nature of the mire communities in this area. The short-term objective for this area is to keep it free of woodland and scrub. The long term objective is to promote its succession to M18 heath, with regular reviews as more is known about the hydrology of the site and how it may be affected by climate change.

An area of S7 swamp was also recorded (see figure 1). This is a potential indicator of enrichment and may have one of two sources. Firstly, this could be a result of the historic peat cuttings on site, which have come into contact with ground water and begun to decompose. Secondly, this could be the result of nutrient rich surface waters flowing on to the moss via the active drainage system. Any nutrient enrichment on site could also be promoting vigorous woodland and scrub growth.

The short term objective for this area is to investigate the hydrology, specifically to understand whether any diffuse pollution sources are involved in the nutrient enrichment or whether this is a natural and stable influence. Where the S7 community is result of a natural and stable influence, it is intended that this community be retained. In the longer term, natural succession should be allowed to proceed in areas of W5 and S7, except where they form part of transition of successional habitats buffering the raised bog / mire (see figure 2).

The majority of the remaining area (see figure 2) was nutrient poor W4 wet woodland.

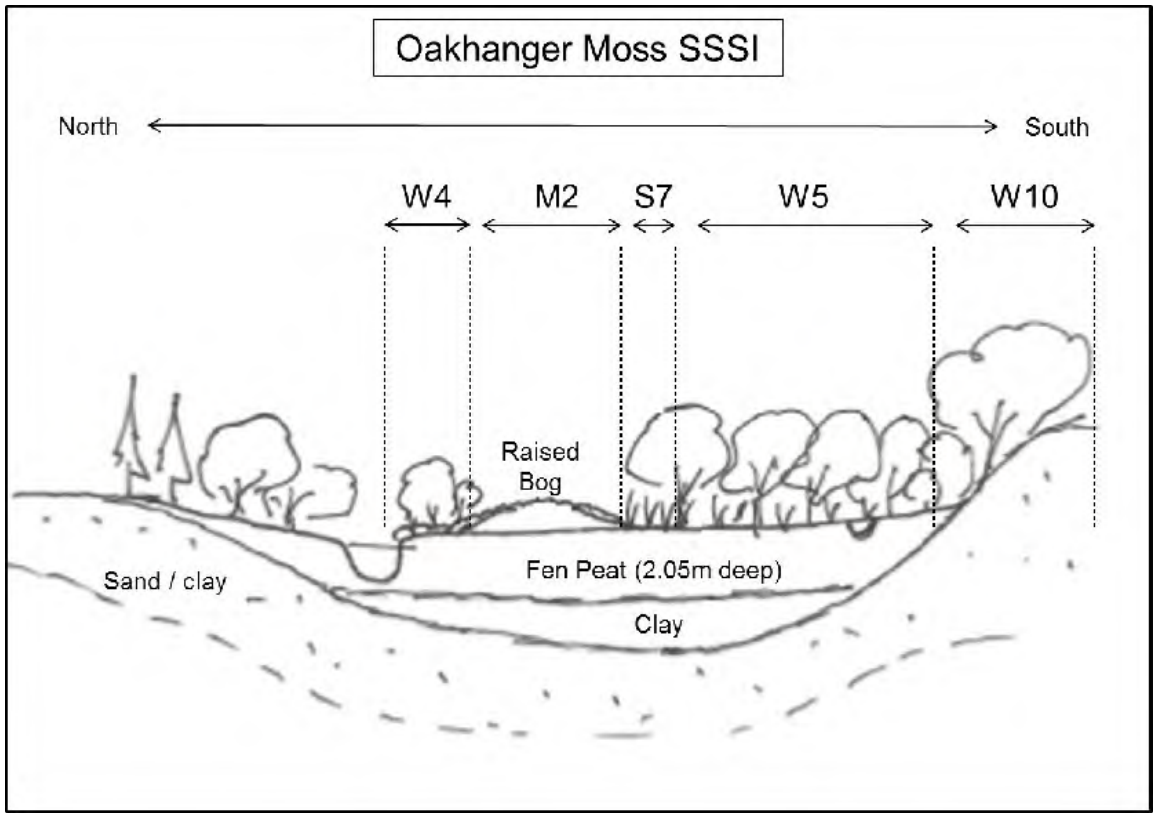


Figure 2: Habitat successions on Oakhanger Moss – the main reason for notification

Site Condition in 2014

A further condition assessment was undertaken in 2014 by Natural England. The site was recorded as being very dry, especially on the east side and within the open mire (M2) area.

Hydrological investigations were undertaken. This resulted in the following:

- Firstly, the sluices / dams installed on site (see figures 3 and 5) did not seem to be effective at retaining water on site; the water levels were the same on both sides of the dams. This issue was rectified during early 2015 and the dams are now successfully holding water on site.
- Secondly, surface water (see figure 3) and ground water (see figure 4) models of the site were produced to better understand the site hydrology.
- Lastly, it was suspected that the main ditch crossing the centre of the site is still active below the ground and needs to be fully investigated (see figure 5). This may be the source of the nutrient enrichment on site noted in 2007, may explain the low water table on site and may require blocking in the future.

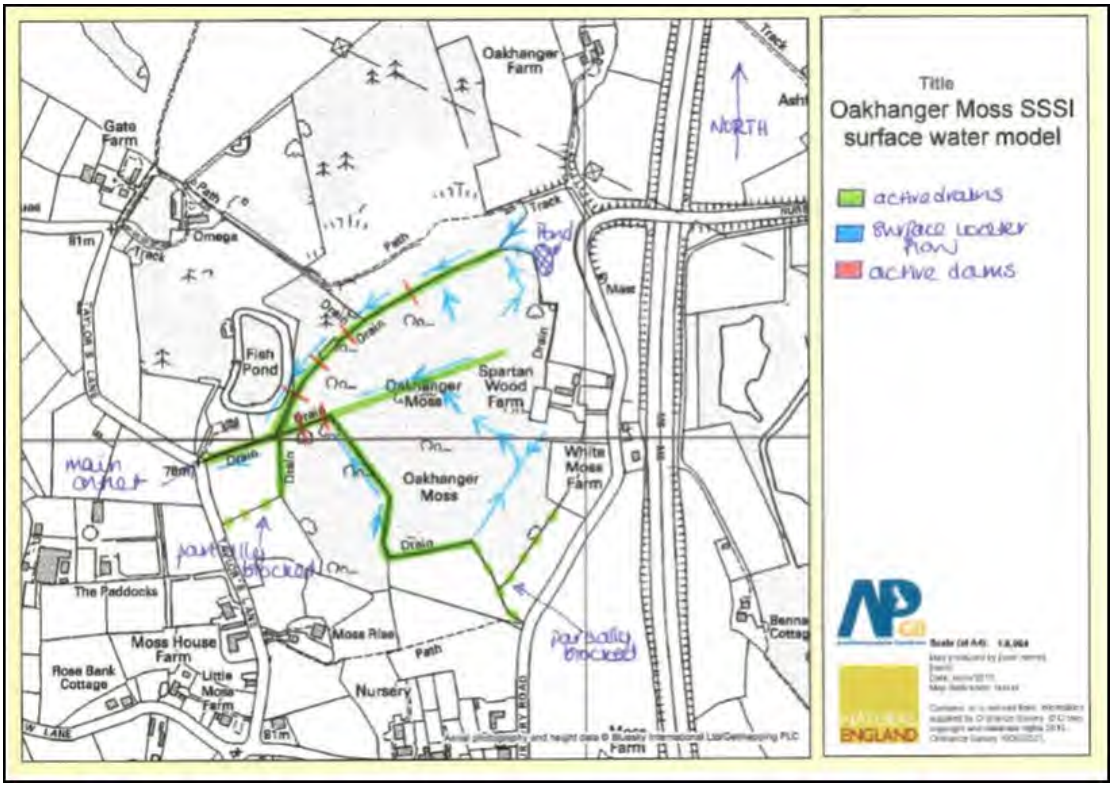


Figure 3: Surface Water Model for Oakhanger Moss SSSI showing active drains, active dams and presumed surface water flow

The open mire area (M2 with relic M18) was very dry despite the wet summer. The community was largely dominated by *Sphagnum fallax* and *Vaccinium oxycoccus* with only occasional *Eriophorum angustifolium* and *E. vaginatum*. *Calluna vulgaris* and *Erica tetralix* were only present in localised areas. The mire area failed its objectives due to lack of positive indicator species and the high cover of scrub that is reinvading the area. The two areas of M2 / M18 mire on the site are separated by an area of fen and this area is reverting back to wet woodland (see figure 5). The objectives set in 2007 still apply.

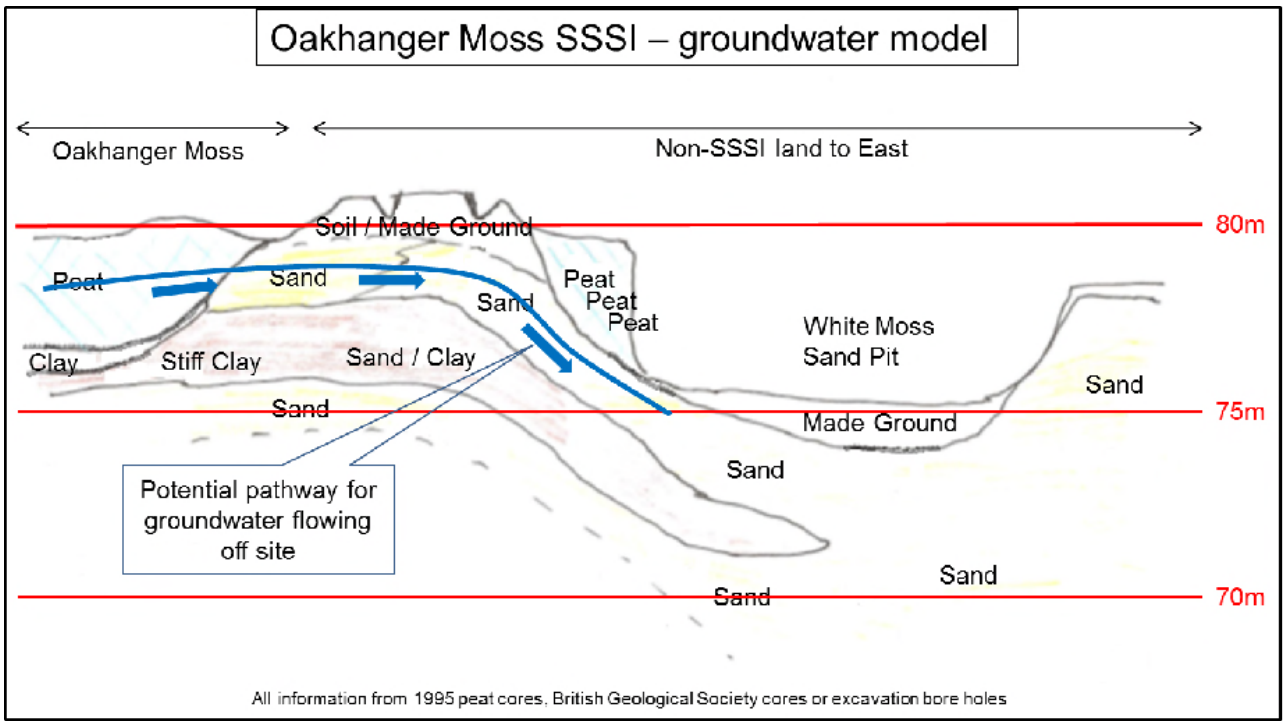


Figure 4: Ground Water Model for Oakhanger Moss SSSI showing potential pathway for groundwater seepage

The W4 / W5 wet woodland over much of the core and west side of the moss failed its objective for negative indicator species because of high bramble *Rubus fruticosus* agg. cover. However, key species such as *Carex acutiformis* (Lesser Pond Sedge) were still dominant in the wood with a canopy of *Alnus glutinosa*, *Betula pendula* and *Salix* spp. Other species noted within the S7 fen and W4 / W5 wet woodland areas were *Carex paniculata* (Great Tussock Sedge), *Iris pseudacorus*, *Mentha aquatica*, *Galium palustre* and *Comarum palustre*. The objectives set in 2007 for S7 and wet woodland still apply.

See figure 5 for detailed survey and target notes.

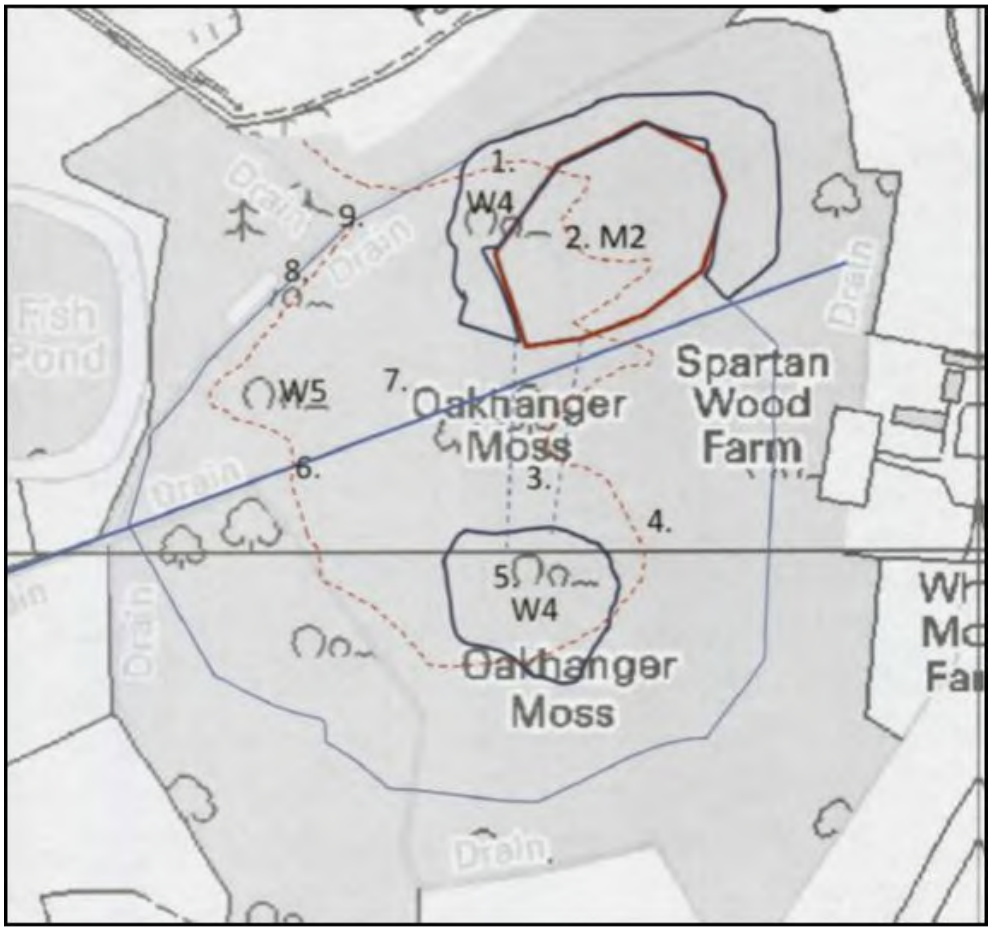


Figure 5: Detailed map and target notes taken from 2014 condition assessment of Oakhanger Moss SSSI

Notes:

1. W4 woodland with ground cover of *Sphagnum fallax* and *S. squarrosum*
2. M2 open mire dominated by *S. fallax* and *Vaccinium oxycoccus* with occasional *Eriophorum angustifolium*, *E. vaginatum*, *Calluna vulgaris* and *Molinia caerulea*. Despite a very wet summer, the area was very dry and was scrubbing over with birch.
3. Area of cleared W5 woodland that had been cleared prior to 2007 visit. This area is very dry and heavy scrubbed up with birch, willow and alder.
4. W5 woodland with ground cover of *Carex acutiformis* and localised *Carex paniculata*. This area is very dry, with little open water. Bramble is an issue.
5. W4 woodland on an area of relic open mire. This area has a ground cover of *Sphagnum fallax*, *Vaccinium oxycoccus* and *Erica tetralix* with occasional *Eriophorum angustifolium*, *E. vaginatum*, *Calluna vulgaris* and *Molinia caerulea*. It was noted that cover of *Erica tetralix* has increased since last visit in 2007.
6. *Sphagnum* filled ditch. Water levels were about 10-15 cm lower in the ditch than at ground level within woodland. *Sphagnum* had rafted across the ditch to form a floating mat with open water / unconsolidated peat below. It is suspected that this ditch is still flowing actively beneath the mat and is draining the moss.
7. W5 woodland is much wetter than the 2007 visit. The area is flooded with vegetation dominated by *Carex acutifiormis*.
8. Plastic piling dams. The water levels are the same on either side of dam suggesting they are not working. The piling was not cover with peat or keyed into banks.
9. As per 8.

Definitions of Favourable Condition for designated features of interest

These definitions relate to all designated features on the SSSI, whether designated as SSSI, SPA, SAC or Ramsar features.

Name of Site of Special Scientific Interest (SSSI)	
Black Firs & Cranberry Bog SSSI	
Names of designated international sites	
Special Area of Conservation (SAC)	
Special Protection Area (SPA)	
Ramsar	Midland Meres and Mosses Phase 2
Relationship between site designations	
Black Firs & Cranberry Bog SSSI is just one small (11ha) part of the much larger (1593ha) archipelago Ramsar site (Midland Meres and Mosses Phase 2).	

Version control information	
Version	Final
Prepared by	Tom Holland
Date of this version	11th January 2017
Date of generic guidance on favourable condition used	Common Standards Monitoring Guidance for Lowland Wetlands Habitats Version August 2004 CSM guidance for Freshwater Lakes Version March 2015 CSM guidance for Woodland Habitats Version February 2004
Other notes/version history	Consultation draft 17th July 2006 by Sandra Wilson

Definitions of Favourable Condition: notes for users

Definitions of Favourable Condition

The definitions comprise one or more condition definitions for the special interest features at this site. These are subject to periodic review and may be updated to reflect new information or knowledge. They will be used by Natural England to determine if a site is in a favourable condition. The standards for favourable condition have been developed and are applied throughout the UK.

Standards for favourable condition are defined with particular reference to the specific designated features listed in Table 1, and are based on a selected set of attributes for features which most effectively define favourable condition as set out in Tables 2, 2a and 3. When an SSSI's features meet these attributes, then they are said to be in 'favourable condition'.

Explanatory text for Tables 2 and 3

Tables 2, 2a and 3 set out the measures of condition which we will use to provide evidence to support our assessment of whether features are in favourable condition. They have been tailored by local staff to reflect the particular characteristics and site-specific circumstances of individual sites. Quality Assurance has ensured that such site-specific tailoring remains within a nationally consistent set of standards. The tables include an audit trail to provide a summary of the reasoning behind any site-specific targets etc. In some cases the requirements of features or designations may conflict; the detailed basis for any reconciliation of conflicts on this site may be recorded elsewhere.

Use under the Habitats Regulations

The Definitions of Favourable Condition (DFCs) are used to periodically measure and assess the condition of both notified SSSI features and designated European Site features.

Where SSSIs also form part of a European Site (such as a SAC or SPA), a separate document containing specific European Site Conservation Objectives will have been prepared. These objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and the Habitats Directive 1992. They are for use when either the appropriate nature conservation body or a competent authority is required to make an 'appropriate assessment' of the likely effects of a proposed plan or project on the integrity of a European Site under the relevant parts of the respective legislation. The European Site Conservation Objectives are available from the Natural England Publications Catalogue.

The concepts of 'site integrity' and 'favourable condition' are similar and the assessment of a feature's condition will measure attributes that also represent aspects of a site's ecological integrity. However, the periodic determination of a feature's condition is separate from a judgement about the effect upon a site's overall integrity. This is because the DFCs do not represent a comprehensive or definitive list of all of the elements that might contribute to site integrity, merely those that are most appropriate to monitor in order to rapidly determine the present condition of a feature. The full range of factors that are components of a site's integrity, and which may need to be considered by an appropriate assessment, will be specified in the European Site Conservation Objectives. Some of the information contained within the DFCs may however contribute to such assessments.

Table 1 Designated Interest Features

Broad Habitat type / Geological Site Type	Designated features	Description of the feature for clarification	SSSI notified interest features	SAC qualifying interest features	SPA qualifying interest features dependency on specific habitats			Ramsar criteria applicable to specific habitats			
					Annex 1 species	Migratory species	Waterfowl assemblage	1. Representative, rare, or unique example of a natural or near-natural wetland type	2. Vulnerable, endangered, or critically endangered species or threatened ecological communities	5. Regularly supports 20,000 or more waterbirds	6. Regularly supports 1% of the individuals in a population of one species / subspecies of waterbirds
Basin fen (lowland)	M2 - Sphagnum cuspidatum/recurvum (fallax) bog pool community	Open area of Cranberry Bog including Schwingmoor.	*					*			
	M18 – *Erica tetralix* – *Sphagnum papillosum* raised mire										
Dystrophic lakes	Natural dystrophic pool	Pool within Cranberry Bog									
Wet woodland	W5 *Alnus glutinosa* – *Carex paniculata* .	Wet woodland on Black Firs and as part of the Cranberry Bog lagg.									

NB. Features where asterisks are in brackets (*) indicate habitats which are not notified for specific habitat interest (under the relevant designation) but because they support notified species.

Audit Trail

Rationale for interpretation of the citation including any other information you have used and advice received from Designations Team/Specialists (any supporting information should be stored in the site file on RM8)**.**

On the criteria sheet, the vegetation of the schwingmoor and oligotrophic basin mire interest feature is identified as M21 *Narthecium – Sphagnum* mire.
According to Chris Walker (2001) the vegetation of the schwingmoor is more similar to M2 *Sphagnum cuspidatum/recurvum* community and/or M18 *Erica – Sphagnum* community. M2 and/or M18 is the usual vegetation found on schwingmoors, so its presence (and setting targets it) makes more sense than a presence of (and setting targets for) M21.
On the criteria sheet, the vegetation of the lagg interest feature has been identified as 'alder woodland Peterken type 7Aa' (which Rodwell says is synonymous with W6 and W7) and alder woodland Peterken type 7Ba (which Rodwell says is synonymous with W5).
Correspondence with Ruth Hall (NE Freshwater specialist) confirms the identity of Black Mere as a dystrophic pool, but one that may have high alkalinity – see email copied below:

_____

From: Hall, Ruth (NE) **Sent:** 19 January 2017 11:43 **To:** HOLLAND, Tom; Diack, Iain (NE); Butters, Rebecca (NE)
Cc: Madgwick, Genevieve (NE) **Subject:** RE: Request for advice - dystrophic pool at Black Firs and Cranberry Bog SSSI
Hi Becky and Tom,
Please excuse the single response to you both, as you are both asking similar questions I am trying to be efficient.
As this site looks like an atypical high alkalinity dystrophic lake I would be happy with you using an alternative TP target. Tom you are right 35 ug/l would be appropriate if the average water depth is greater than 3m. If it is shallower I would go with 50 ug/l. My caveat to this is that the high alkalinity status is based on the hydrological understanding of the site and a single alkalinity measurement recorded on the phone call note. Consequently if future alkalinity (not pH) readings were undertaken and this measurement was found to be spurious we would reconsider our TP target. You will also need a TN target of 1.5mg/l in the absence of sufficient data suggesting it is nitrogen limited. I would also stick with the dystrophic species target as suggested as in dystrophic water bodies light will be the limiting factor and they are often species poor or as in this case have no macrophytes but an interesting invert assemblage (if not a feature in itself this could be noted under local distinctiveness). However if with recovery in nutrient status you did gain some macrophytes you could then amend the FCT. I would be happy with a pH target of between 7 and 9 as per eutrophic lakes as it appears to be high alkalinity, however it is worth noting that these are only guideline values as they can vary with seasonality, time of day and photosynthesis occurring in the water. They have been included in csm to give an indication of what to expect rather than as hard and fast targets due to their variability. If I haven't answered anything, please feel free to get back in touch and sorry not to have had the chance to chat the other day Becky.
Ruth

Other Notes (include here any features of local distinctiveness)

The criteria sheet (and other papers prepared alongside the citation for the 1986 renotification) lists four uncommon plants that might be considered as indicators of local distinctiveness – *Hottonia palustris, Cicuta virosa, Carex elongata* and *Thelypteris palustris.* Of these only *Hottonia palustris* and *Cicuta virosa* are mentioned on the citation. Lockton (2006) has mapped the location of *Cicuta, Carex elongata and Hottonia* and these are copied below and included as indicators of local distinctiveness.

Table 1A Location of Reportable Features

Reportable Feature	Designation (SSSI/SAC/SPA)	Unit No 5	6	7	8
Basin fen (lowland)	SSSI	✓	✓	✓	✓
Dystrophic lakes	SSSI	✓			
Wet woodland	SSSI	✓	✓	✓	✓

Table 2 Habitat Extent Objectives

On this site favourable condition requires the maintenance of the extent of each habitat type (either designated habitat or habitat supporting designated species). Maintenance implies restoration if evidence from condition assessment suggests there has been a reduction in extent from the baselines specified below.

Habitat Feature	Estimated extent (ha) and date of data source/estimate	Site Specific Target range and Measures	Comments
Basin fen (lowland) - *Cranberry Bog*	The peat body within the Cranberry Bog part of the SSSI covers about 2.6ha. • Since notification, the schwingmoor has covered about 0.25ha; • The M2/M18 vegetation has covered covers about 0.3ha; • The modified wooded lagg has covered about 1.4ha; • And the the agriculturally improved part of the modified lagg east and south-east of the dystrophic pool has covered about 0.6ha	The basin mire should cover 2.6ha including at least 1. 1ha of oligotrophic or dystrophic ombrotrophic habitat (M2 *Sphagnum* / M18 *Erica-Sphagnum* and dystrophic pools) 2. At least 0.5ha of oligotrophic or mesotrophic or high-value eutrophic lagg (which might be largely comprised of wet woodland, represented by W2 *Salix-Phragmites* wood, W4 *Betula-Molinia* wood, W5 *Alnus-Carex* wood or maybe W6 *Alnus-Urtica* wet woodland). The presence of *Potentilla palustris and Cicuta virosa* suggests the presence of high-value open fen communities resembling S24 or S27 might not be impossible. 3. No more than 0.6ha of eutrophic lagg (e.g. S5 Glyceria swamp, S28 *Phalaris* swamp; OV26 *Epilobium hirsutum* swamp) concentrated in the area east and south-east of the dystrophic pool.	
Dystrophic lakes	Since notification, the dystrophic pool covers about 0.2ha.	1. Dystrophic pool or pools should be present. 2. The pool area should be at least 0.2ha, unless terrestrialisation/succession replaces the the dystrophic pool with oligotrophic schwingmoor or raised bog. This process seems unlikely to occur for a long-time (if ever). It hasn't happened yet. Terrestrialisation of such a deep-water pool is thought to be unlikely to happen. Only if the pool were to silt-up (become shallower) would terrestrialisation become likely or possible (as occurred at Cors y Llyn, Radnor – see A Wetland Framework for Impact Assessment at Statutory Sites in England and Wales, 2009).	
Wet woodland (*Black Firs*)	The peat body within the Black Firs part of the SSSI covers about 3.6ha.	1. Black Firs should be dominated by at least 2.6ha of whatever high-value semi-natural wetland habitat regenerates once water levels are raised (and a more natural hydrological regime is restored). It is assumed that this will be some form of wet woodland (JBA, Black Firs and Cranberry Bog SSSI Ecohydrological Conceptualisation, 2014) but is it not possible that some form of oligotrophic and ombrotrophic habitat (e.g. more M2/M18) could form in parts of the basin? If wet woodland does regenerate JBA consider W5 *Alnus-Carex* to be the most likely community.	

Audit Trail
Rationale for habitat extent attribute (Include methods of estimation (measures), and the approximate degree of change which these are capable of detecting).
I measured the area of the peat body (2.6ha on Cranberry bog and 3.6ha on Black Firs) with WebMap from the British Geological Survey/National Soil Research Institute (NSRI) data layer. I measured other habitat areas using a combination of John Martin's 1989 habitat map, Colin Hayes's 1983 habitat map and aerial photos on WebMap. An attempt has been made to try and allow for wetland development and ontogenesis – e.g. terrestrialisation of the dystrophic pool beneath an expanding schwingmoor. Wet woodland could appear anywhere in the lagg of Cranberry bog (i.e. units 5, 6 and 7) as well as the Black Firs basin (unit 8)
Rationale for site-specific targets (including any variations from generic guidance)
Other Notes

Table 3 Site Specific Habitat/Geological Condition Objectives

To maintain the **Basin Fen** at **Black Firs and Cranberry Bog** in favourable condition. Favourable condition is defined in terms of the following site-specific standards.

Details of any geographical variation or limitations to where the favourable condition standards apply.					
Interest Feature	**Attribute**	**Measure**	**Site-specific Targets**	**Comments**	**Use for Condition Assessment?**
Basin fen (lowland) – M18 – *Erica tetralix – Sphagnum papillosum* raised mire M2 – *Sphagnum cuspidatum/ recurvum* bog pool community	Habitat composition	A baseline map, showing the boundary of the bog and any associated lagg fen, should be used to assess any changes in extent. Aerial photographs can offer a convenient means of rapidly assessing extent.	Conserve the components of the Cranberry Bog's habitat, whilst allowing for natural/semi-natural succession and wetland development/ontogenesis - e.g. terrestrialisation of the dystrophic pool to oligotrophic schwingmoor; or the succession of the schwingmoor to a raised bog (wetmec 1 - domed Ombrogenous Surface). Before and since notification Cranberry bog comprises: 1. a oligotrophic, ombrotrophic, more-or-less flat, floating raft (schwingmoor); 2. an open body of dystrophic water; 3. a ditched mesotrophic-eutrophic lagg. A Wetland Framework for Impact Assessment at Statutory Sites in England and Wales (2009) has identified Cranberry Bog as a schwingmoor or ombrogenous quag (WETMEC 2a). The report also says 'stratigraphical data suggest that WETMEC 1 [i.e. raised bog or domed ombrogenous surface] can develop from WETMEC 2 [schwingmoor]'.	''Bog' is taken here to be the peat deposit supporting typical bog vegetation, irrespective of the actual vegetation community and the condition of that vegetation.	YES
	Habitat structure – exposed substrate	Aerial photographs can offer a convenient means of rapidly assessing these. It may also be necessary to make a visual assessment using a structured walk or transects.	Total extent of exposed substrate/peat across the area assessed should be no more than 1%. There should be no obvious modification to structural features (e.g. vegetation cover, surface patterning and natural drainage) in relation to the established baseline. Although active raised bogs might show natural structural variation and surface patterning, reflecting hydrological gradations, the surface relief of schwingmoors might be relatively flat and uniform apart from some shallow pooling(?). This flattish surface might be damaged by artificial activities such as drainage, burning, grazing, vehicular access and peat digging.	A high frequency and cover of exposed substrate will usually be undesirable and may indicate, *inter alia,* over-grazing, and water scour.	

Table 3 Site Specific Habitat/Geological Condition Objectives – (basin fen continued)

Interest Feature	Attribute	Measure	Site-specific Targets	Comments	Use for Condition Assessment?
Basin fen (lowland) – M18 – *Erica tetralix – Sphagnum papillosum* raised mire M2 – *Sphagnum cuspidatum/ recurvum* bog pool community	Vegetation composition: positive indicators - vascular plants	Visual assessment of cover and frequency, using structured walk or transects and recording quadrats	Targets for the mire expanse only: 1. At least 3 of Calluna vulgaris, Erica tetralix, Eriophorum angustifolium, E. vaginatum & Trichophorum cespitosum constant, with a combined cover not exceeding 80%; 2. No single species > 50% cover; 3. At least one of *Andromeda polifolia, Drosera rotundifolia, Empetrum nigrum, Narthecium ossifragum* and *Vaccinium oxycoccos* at least frequent Target for those areas of Lagg fen dominated by wet woodland 1. 80% of ground flora cover referable to the relevant NVC community, most of which is most likely to be W4 – *Betula pubescens – Molinia caerulea* woodland.	The vegetation of the mire expanse (or open quaking surface vegetated with M18/M2) should comprise an inter-mix of bryophytes (predominantly *Sphagnum* spp), graminoids and dwarf shrubs, with no one group dominating at the expense of others on 'active' sites. Although *Sphagnum* may predominate on hyper-oceanic sites. *Molinia* may be abundant on the bog margin (rand) of active sites and more widely on degraded sites. It is likely that the lagg fen at Cranberry Bog will be dominated by wet woodland. The most common plant community within this wet woodland is likely to be W4 – *Betula pubescens – molinia caerula* woodland or W6 *Alnus-Urtica* woodland.	YES
	Vegetation composition: positive indicators - bryophytes	Visual assessment of cover, using structured walk or transects and recording quadrats	Targets for the **mire expanse only**: *1.* At least 2 of the following spp. constant, with a combined cover >20%: *Sphagnum capillifolium, S. magellanicum, S. papillosum, S. tenellum* 2. *Sphagnum cuspidatum* and/or *S. pulchrum* at least occasional A Wetland Framework for Impact Assessment at Statutory Sites in England and Wales (2009) says 'Some of the WETMEC 2 [i.e. schwingmoor] surfaces do support *S. magellanicum* and *S.papillosum*, but these are often not major constituents, and many examples are lawns of *Sphagnum recurvum [fallax]*'. If some of these WetMec 2 sites occur in areas where *S. magellanicum* and *S.papillosum* do not appear to be constrained by air pollution, then is it not likely that it is hydrological factors that limit *S. magellanicum* and *S.papillosum* and promote *S. recurvum [fallax]* rather than nutrients? In which case is a target of >20% hummock-forming *Sphagnum* a sensible target?	Expectations for Sphagnum **cover** vary widely across the country, but **some** *Sphagnum* should be scattered across all sites. *S.cuspidatum* cover is a surrogate indicator for year-round high water table position. *S. cuspidatum* present in at least 10% of quadrats, or at least occasional indicates 'unfavourable recovering' condition, where the other targets are not achieved (particularly important for degraded bogs).	YES

Table 3 Site Specific Habitat/Geological Condition Objectives – (basin fen continued)

Interest Feature	Attribute	Measure	Site-specific Targets	Comments	Use for Condition Assessment?
Basin fen (lowland) – M2 – *Sphagnum cuspidatum/ recurvum* bog pool community M18 – *Erica tetralix* – *Sphagnum papillosum* raised mire	Vegetation composition: indicators of negative change - bryophytes	Visual assessment of cover, using structured walk or transects and recording quadrats	*Polytrichum* spp., other than *P. alpestre* no more than occasional		YES
	Vegetation composition: indicators of negative change - non-woody vascular plant species	Visual assessment of cover, using structured walk or transects and recording quadrats	1. No more than 1% cover of the following on the bog surface (subject to exceptions in comments column): *Phragmites australis, Phalaris arundinacea, Glyceria maxima, Epilobium hirsutum, Urtica dioica, Pteridium aquilinum, Rubus fruticosus, Juncus effusus, Deschampsia cespitosa, Cirsium* spp. 2. Invasive non-native plant species should be absent or no more than rare (if present at baseline).	This target applies to the whole bog, not just the mire expanse. The plants listed are indicators of enrichment or of drying out of the bog. Phragmites is acceptable around upwellings or their equivalent on ditched bogs.	YES
	Vegetation composition: indicators of negative change – undesirable woody species	Visual assessment of cover of the whole feature, using structured walk or transects Aerial photography may be a useful aid though not for seedlings.	1. On the mire expanse, trees and shrubs (*Betula, Salix, Rhododendron, Pinus* species, other gymnosperms) no more than rare and < 5% cover 2. On the bog margin and lagg semi-natural woodland, with a canopy cover of 30-90%, will be allowed to develop.	Invasion by woody species and their development to healthy maturity may indicate drying out and/or enrichment. Trees and shrubs will exacerbate drying out. *Salix* spp. and *Myrica* gale can occur on raised bogs, but scrub generally constrains itself to areas where it receives a source of nutrients (e.g. near water that has passed through or over a mineral soil). As a result, it often is found close to or on the 'rand' of the raised bog, where it is more acceptable. It is envisaged that Cranberry Bog's highly modified lagg fen (and most of whatever rand may exist) will be dominated by wet woodland, if and when favourable condition is achieved. This means the mire expanse will be surrounded by an almost continuous, 10-20 wide border of wet woodland, which is likely to largely cover whatever rand may exist or have developed once FC is achieved. As such the generic target (<10% tree and scrub cover) for the rand has been modified.	YES

Table 3 Site Specific Habitat/Geological Condition Objectives – (basin fen continued)

Interest Feature	Attribute	Measure	Site-specific Targets	Comments	Use for Condition Assessment?
Basin fen (lowland) – M2 – *Sphagnum cuspidatum/ recurvum* bog pool community M18 – *Erica tetralix – Sphagnum papillosum* raised mire .	Indicators of local distinctiveness – micro-topography*	% length of transects intersecting bog pools or other microtopographic features.	No reduction in extent of microtopographic features.	Although active raised bogs might show natural structural variation and surface patterning, reflecting hydrological gradations, the surface relief of schwingmoors might be relatively flat and uniform apart from some shallow pooling(?). This flattish surface might be damaged by artificial activities such as drainage, burning, grazing, vehicular access and peat digging.	YES
	Indicators of local distinctiveness	Presence of uncommon plant species in the lagg - *Hottonia palustris, Thelypteris*	Uncommon plant species mentioned in the citation (i.e *Hottonia palustris* and *Cicuta virosa*) should be present somewhere on the site. Uncommon plant species mentioned in the criteria sheet (*Carex elongata* and *Thelypteris palustris*) should be present somewhere on the site.	Maps in the annex to show the most frequent locations for these plants. *Thelypteris* hasn't been recorded on the site since before notification.	No

Table 3 Site Specific Habitat/Geological Condition Objectives

To maintain the **Dystrophic Pools** at **Black Firs and Cranberry Bog** in favourable condition. Favourable condition is defined in terms of the following site-specific standards.

Details of any geographical variation or limitations to where the favourable condition standards apply.

Interest Feature	Attribute	Measure	Site-specific Targets	Comments	Use for Condition Assessment?
Dystrophic Lakes	Characteristic species of dystrophic lakes	Structured sampling	No loss of characteristic species present at the site (i.e. *Drepanocladus* spp., *Eleogitan fluitans, Juncus bulbosus, Menyanthes trifoliate, Nymphaea alba, Potamogeton polygonifolius, Sparganium angustifolium,* aquatic *Sphagnum, Utricularia* species).	No aquatics ever recorded in the pools at Cranberry Bog, so the target is always passed. With advice from Ruth Hall, TP and pH targets tailored for the site.	YES
	Alien/locally absent species		No high-impact alien species established (i.e. self-sustaining populations). Standard c hecklists of species are based on those used for WFD assessments. For other species, a site will be assessed as unfavourable when there is good evidence that any non-native species or locally absent species is causing species is causing an impact on site integrity.		
	Filamentous algae		Cover values of 3 for filamentous algae in no more than 20% of samplings points (boat and wader survey combined)		
	Macrophyte structure		Presence of characteristic zones of vegetation No deterioration in extent from baseline situation.		
	WFD biological tools	DARLEQ/ CPET	At least Good Ecological Status (with high confidence) OR If High status, no deterioration.		
		LAMM	High ecological status		
	Dissolved Oxygen	GES	>7.0mg L^{-1}		
		HES	>9.0mg L^{-1}		
	pH		7-9		
	ANC		>40ueq L^{-1} (annual mean)		
	Total Phosphorus		Maximum annual mean of 35 ug L^{-1}		
	Nitrogen		Annual mean TN concentration should not exceed 1.5mg L^{-1} No deterioration from baseline.		
	Hydrology		No deterioration in hydrological regime compared with the baseline.		
	Substrate		Maintenance of natural and characteristic substrate for the lake type		
	Shoreline		Near-natural planform in >95% of shoreline length & near-natural slope profle in >95% of the length of the shore & the structure & material of banks should be near-natural with < 5% affected by hard engineering or 0-10% by soft engineering.		
	Sediment load		Maintenance of the natural sediment load		

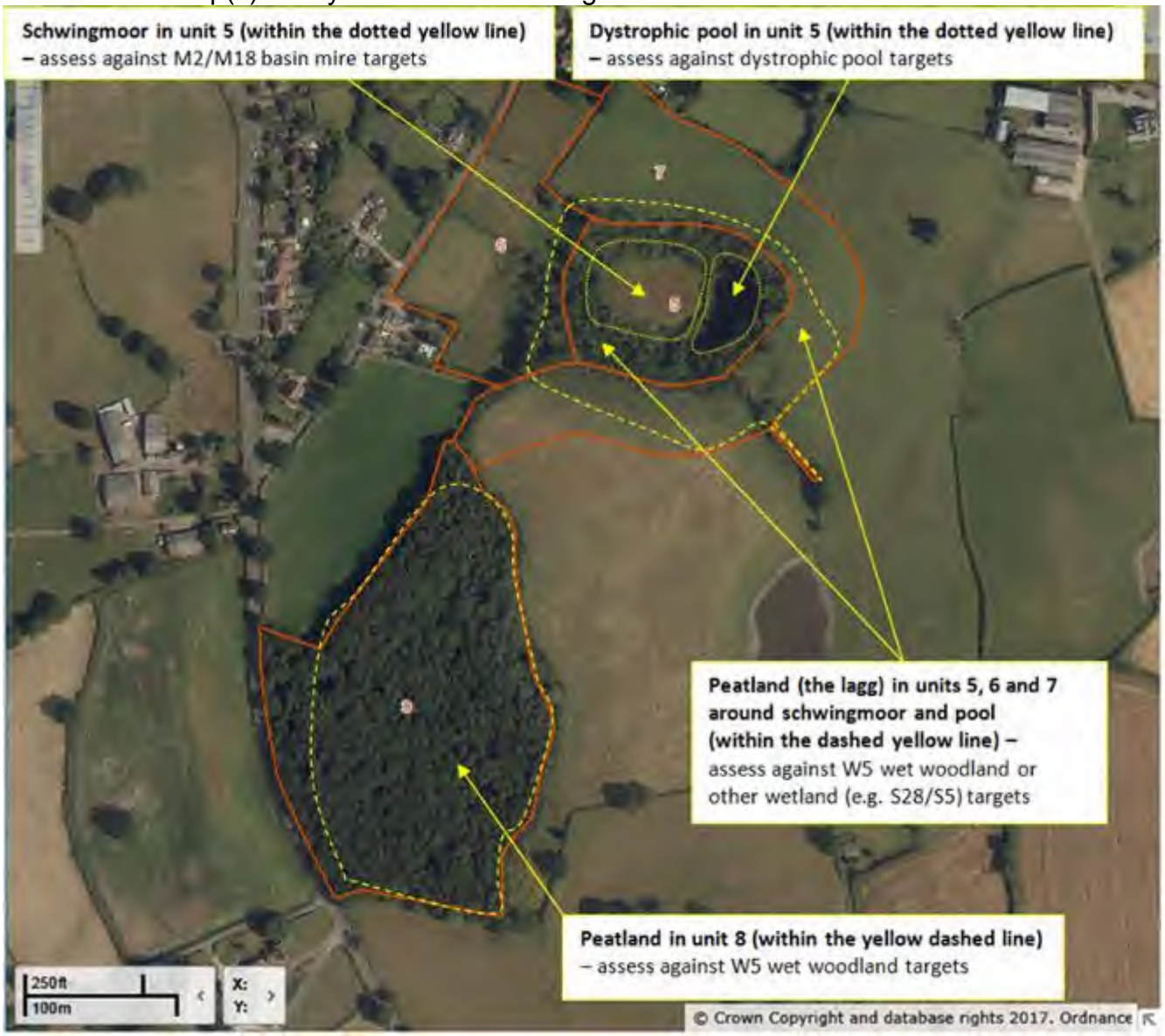
Table 3 Site Specific Habitat/Geological Condition Objectives

To maintain the **Wet woodland** at **Black Firs and Cranberry Bog** in favourable condition. Favourable condition is defined in terms of the following site-specific standards.

Details of any geographical variation or limitations to where the favourable condition standards apply.					
Interest Feature	**Attribute**	**Measure**	**Site-specific Targets**	**Comments**	**Use for CA?**
Wet woodland W5 – Alnus glutinosa – Carex paniculata woodland	Structure and Natural processes	Assess by field survey using structured walk and/or transects.	At least the current level of structural diversity maintained. • Understory (2-5m) present over at least 20% of total stand area • Canopy cover present over 30-90 % of stand area • At least three age classes spread across the average life expectancy of the commonest trees. • Some areas of relatively undisturbed mature/old growth stands or a scatter of large trees allowed to grow to over-maturity/death on site (e.g. a minimum of 10% of the woodland or 5-10 trees per ha). • A minimum of 3 fallen lying trees >20 cm diameter per ha and 4 trees per ha allowed to die standing.	.	Yes
	Regeneration potential	Assess by field survey using structured walk and/or transects.	• Signs of seedlings growing through to saplings and young trees at sufficient density to maintain canopy density over a 10 yr period (or equivalent re-growth from coppice stumps). • No planting. • Regeneration not limited by deer browsing – signs of moderate-heavy browsing absent		
	Composition: Trees and shrubs	Assess by field survey using structured walk and/or transects.	• At least 95% of cover in any one layer of site-native species. • Oak and/or Ash present and providing at least 30% cover in the canopy of mature stands over feature as a whole. • Death, destruction or replacement of native woodland species through effects of introduced fauna or other external unnatural factors not more than 10% by number or area in a five year period.		
	Indicators of local distinctiveness	Assess by field survey using structured walk and/or transects, or as appropriate to feature.	• 80% of ground flora cover referable to any semi-natural wet woodland community (e.g. W1- W7). • Distinctive elements such as *Carex elongata* to be maintained and expanded. • Patches of transitions maintained in extent and at appropriate locations.		

Audit Trail
Rationale for limiting standards to specified parts of the site
Rationale for site-specific targets
With advice from Ruth Hall, TP and pH targets tailored for the dystrophic pool. (See email correspondence copied below Table 1 above). Generic targets for woody species on M2/M18 retained, but with regard to woody cover, the Wetland Framework for Impact Assessment at Statutory Sites in England and Wales (2009) says *'woodland is often perceived as undesirable, partly on the basis that in Britain ombrogenous surfaces are thought naturally to be treeless. However, it is far from certain that bog woodland vegetation is not a natural condition of WETMEC 2'*. Ground flora targets for wet wood are kept loose (i.e. any wet woodland ground flora) because it is not known what vegetation community will appear following restoration of the Black Firs peatland habitat.
Rationale for selection of measures of condition (features and attributes for use in condition assessment) (The selected vegetation attributes are those considered to most economically define favourable condition at this site for the broad habitat type and any dependent designated species).
Other Notes

Annex 1 Map(s) of key areas for monitoring



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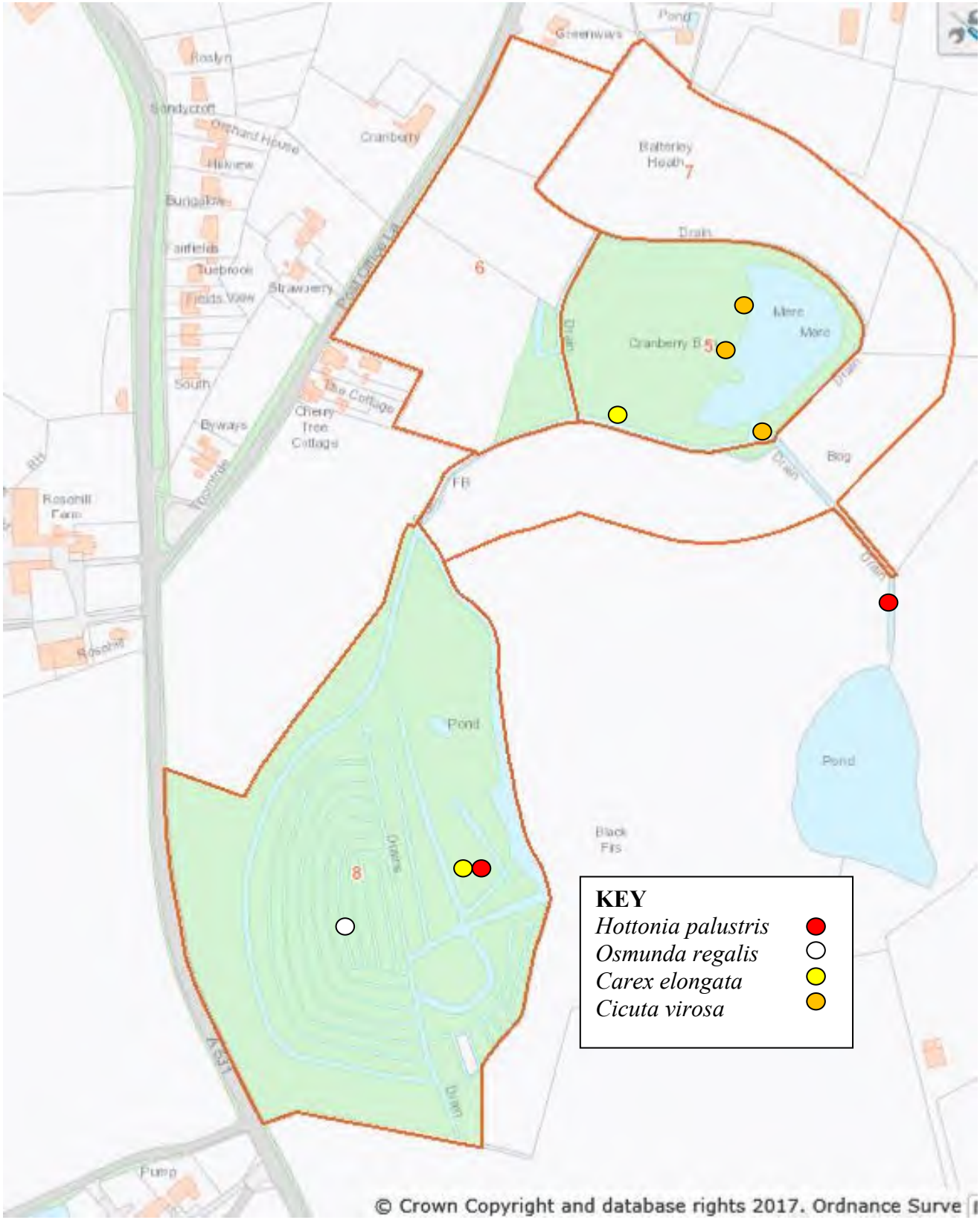
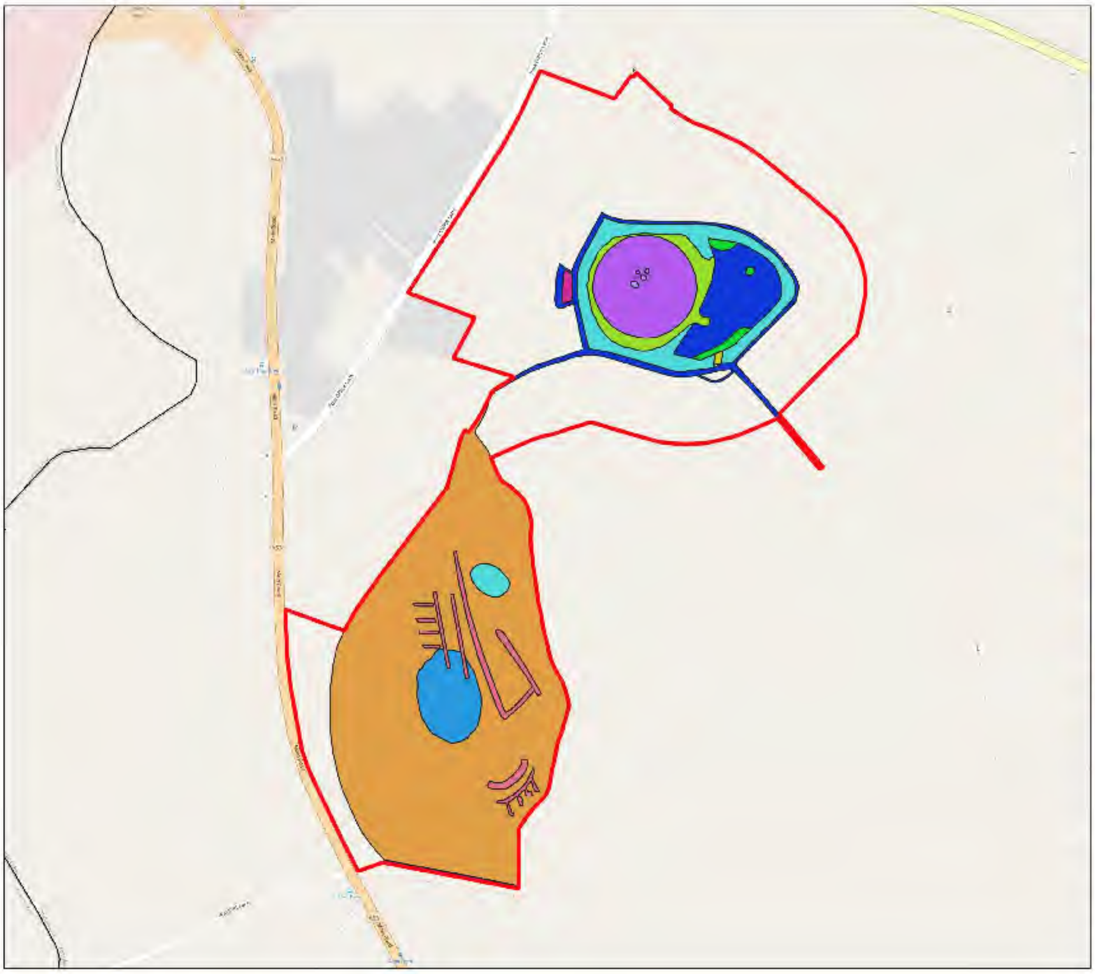


Location of rare plants (indicators of local distinctiveness target)

Appendix D – Staffordshire Ecological Records Office – Phase 1 / NVC Map Black Firs and Cranberry Bog SSSI



Staffordshire Ecological Record

Black Firs and Cranberry Bog SSSI / SWT Reserve

Phase 1 / NVC map

2005 survey data

Key

SSSI boundary

Habitat key (NVC communities unless otherwise stated)

- A111 (Phase 1)
- F11 (Phase 1)
- F21s (Phase 1)
- G1 (Phase 1)
- M02a
- M02b
- W04
- W04a
- W05
- W06
- W10

The Wolseley Centre, Wolseley Bridge, Stafford ST17 0WT
Tel: 01889 880101 Fax: 01889 880101
Email: info@staffs-ecology.org.uk

SER/24/616

Habitats Regulations Assessments

Sustainability Appraisals

Strategic Environmental Assessments

Landscape Character Assessments

Landscape and Visual Impact Assessments

Green Belt Reviews

Expert Witness

Ecological Impact Assessments

Habitat and Ecology Surveys

Biodiversity Net Gain

Eagle Tower

Montpellier Drive

Cheltenham

GL50 1TA

T: 01242 525222

E: enquiries@lepusconsulting.com

www.lepusconsulting.com

CHELTENHAM

Lepus Consulting
Eagle Tower
Montpellier Drive
Cheltenham
Gloucestershire GL50 1TA

t: 01242 525222
w: www.lepusconsulting.com
e: enquiries@lepusconsulting.com