Land off Meadow Lane and Church Way, Iffley

Ecosystem Services Assessment

February 2023

COMMISSIONED BY
Friends of Iffley Village

Written by: *Geoff Moxon MCIEEM*

Land off Meadow Lane and Church Way, Iffley
Ecosystem Services Assessment

THIS REPORT SHOULD BE TREATED AS CONFIDENTIAL AND/OR REDACTED BEFORE BEING MADE AVAILABLE FOR PUBLIC VIEW

[redacted]

February 2023

Bioscan Report No.
E2059-ESA-R1

BIOSCAN (UK) Ltd
[redacted]
Oxford [redacted]
[redacted]
E-mail: bioscan@bioscanuk.com

CONTENTS

FIGURES

1 INTRODUCTION

1.1. Background

1.1.1 Bioscan (UK) Ltd were commissioned by Friends of Iffley Village (FOIV) to undertake an ecosystem services assessment in relation to a proposed new housing development at Meadow Lane, Iffley (Oxford City Council planning ref 22/03078/FUL). FOIV has a particular remit for protecting Iffley and its conservation area, and they are objecting to the proposed development on account of the harms to the conservation area (and other resources) that the proposals entail.

1.1.2 Ecosystem services are the benefits provided by ecosystems that provide measurable economic and non-economic value for human society. They do not relate in any sense to the intrinsic value of the natural environment, upon which an economic value cannot realistically be placed. A separate independent ecological impact assessment report, Bioscan report E2059R1, deals with the intrinsic nature conservation value of the site and the significance of the impacts of the proposed development on biodiversity resources.

1.1.3 In relation to assessing the site's provision of ecosystem services, and the impacts upon that provision from the proposed development, the natural capital approach, overseen by the Natural Capital Committee and based on the concept of valuing services delivered by the environment, provides the key mechanism for the measurement of ecosystem services. This is by means of evaluating the costs and benefits of changes in land use arising from development.

1.1.4 This assessment examines the likely change in ecosystem services anticipated to arise from the proposed development. Sources of information have included the following:

- TEP dwg no. 8854.01.002 (General Arrangement Plan);
- TEP dwg no. 8854.01.001 (Illustrative Landscape Masterplan);
- TEP dwg nos. 88654.01.201 and 202 (Planting Plan sheets 1 & 2);
- ADP dwg no.s ADP-XX-XX-DR-A-1300 and 1301 (existing and future site sections);
- Ridge dwg no. 5015346/0501/P02 (surface water drainage plan);
- TEP dwg nos. D8854.03.001, 002 B & 003 B (arboricultural baseline and impacts plans) and the accompanying tree schedule;
- Various drawings scattered through the application submission material showing various proposals for delivery of footpaths, wildlife mitigation features and landscape planting within Memorial Field;
- TEP drawing numbers: G8854.01D.01 & 02 relating to protected species constraints and mitigation (compensation) proposals;
- TEP dwg no.s G8854.011B, 012B and 013C (within the BNG assessment) showing the applicant's depiction of the baseline position and future position in the context of BNG assessment;
- WLC dwg WLC619-1300-001 R5 showing the indicative lighting strategy;

- Ridge dwg no.s 5015346/RDG/XX/XX/XX/C/0001 & 0002 showing proposed visibility splays at the Meadow Lane and Church Way entrances to the proposed development.

1.1.5 The planning application (redline) boundary of the scheme is shown at Figure 1, which also shows the distribution of the various habitats on the site as taken from Bioscan report E2059R1. This is adjudged to be a more accurate representation of the baseline conditions on the site than the applicant's habitat map which (along with the surveys underpinning it) is subject to a number of habitat classification errors and omissions. For comparison purposes, the applicant's baseline habitat map is provided at Figure 2. The errors in the applicant's submitted information on ecology are discussed in report E2059R1 but for the purposes of assessing ecosystem services impacts, either baseline will deliver broadly the same results.

2 METHODOLOGY

2.1 Guidance

2.1.1 The assessment has been undertaken employing the following guidance, links to which can be found in the 'references' section at the back of this document:

- The Green Book (HM Treasury, 2022) and supplementary guidance
- Defra's Value Transfer methodology (eftec 2010)
- World Resources Institute – Weaving Ecosystem Services into Impact Assessment (Landsberg et al, 2013)
- Natural Capital Protocol (Natural Capital Coalition, 2016)

2.2 Data sources used

2.2.1 The primary sources of information on the ecosystem services offered by the site in the baseline (pre-development) state are the reports 'Ecological Impact Assessment for Land off Meadow Lane, Iffley' (The Environment Partnership, September 2022) and Bioscan's independent EcIA report (E2059R1). Additional information was also gleaned from the applicant's Biodiversity Net Gain Design Stage Report_V2 for Meadow Lane, Iffley (The Environment Partnership, December 2022) and Arboricultural Impact Assessment (TEP, December 2022).

2.2.2 Additional contextual information on 'cultural' services and the site's interrelationship with adjoining areas was taken from various Oxford City Council studies of Green Infrastructure, landscape character and the Iffley Conservation Area, in particular Oxford City Council's Green Infrastructure studies of 2017, 2019 and 2022.

2.2.3 Collectively, these sources provide a sufficient understanding of the baseline conditions on the site in terms of habitat and vegetation types, quality and condition, to inform a broad assessment of the ecosystem services generated by the site habitats. However, it should be noted that the applicant's submission material has been noted to be incomplete or deficient in a number of respects, such that the baseline value and condition of the site has not been thoroughly determined at the time of writing. The assessment proceeds on the basis of the information available, but we advise that it may need to be subject to revision in the future, as the various issues with the application material are remedied. At that stage, costed assessments of pre- and post-development ecosystem services may be able to be provided.

2.3 Defining and Evaluating Existing Ecosystem Services Provision

2.3.1 Based on the sources provided at 2.2 above, and following the guidance referenced at 2.1.1 above, the following main ecosystem components form the baseline for the assessment, representing the baseline resources on or otherwise relevant to the site that are most likely to be subject to high magnitude change:

- Long-established circumneutral grassland (mainly good quality semi-improved neutral grassland) associated with long-unploughed soils and natural drainage. The applicant's information suggests this represents some 88.5% of the site, but the true figure is likely higher[1]
- Areas of tall ruderal and bramble scrub. The applicant suggests this occupies 11.5% of the proposed development footprint, but the true figure is likely to be lower[2]
- Mature scrub, hedgerow and trees (oversailing[3] 23% of the proposed development footprint). This figure is less contentious.

2.3.2 Other habitats are deemed likely to be affected in addition to the above. For example, the applicant's EcIA, BNG and AIA submissions proceed on the basis that the wet ditch and associated woodland running along the site's western boundary will not be affected. That claim is challenged in Bioscan's independent EcIA on the grounds that this feature is likely to be impacted by surface water drainage works.

2.3.3 Similarly, the application submission claims inconsistent figures for hedgerow and tree loss than Bioscan's independent assessments arrive at. The application submission is also ambiguous about impacts on the adjacent Memorial Field and presents biodiversity net gain calculations that have not, as yet, been able to be independently checked due to the applicant withholding their detailed calculations, but which appear to be subject to error. These discrepancies and omissions should be taken into account when reading subsequent sections of this report and it should be noted that their resolution is likely to trigger a requirement for a revised ecosystem services assessment.

2.3.4 At this stage however, the ecosystem services provided by the above habitats were classified into four categories in accordance with the methodology used in the Millenium Ecosystem Assessment (various authors, 2005) (website link provided at end of document), and as defined in **Table 1** below:

Table 1. Description of the Different Types of Ecosystem Service

Type	Description	Example
Provisioning	Material or energy outputs from ecosystems.	Food (crops, livestock, fisheries, wild foods), fresh water, fibres (timber, cotton), fuel (e.g. wood fuel), genetic resources, biochemicals / pharmaceuticals
Regulating	Regulating ecological processes.	Air quality regulation, climate regulation, water regulation, erosion regulation, water

[1] This assessment proceeds on the basis of this figure, as taken from the applicant's submission material, but it should be noted that this is considered to be an artificially conservative figure due to the applicant erroneously mapping grown-out and unmanaged representations of the neutral grassland on the site as a different habitat ('tall ruderal').
[2] See note above – by extension, the figure for 'tall ruderal' is considered artificially inflated.
[3] N.B. Oversailing habitat area is double counted with habitats present beneath the canopy, thus the figure of over 100%.

		purification & waste treatment, disease regulation, pest regulation, pollination, natural hazard regulation
Cultural	Non-material benefits people obtain from contact with ecosystems.	Spiritual and religious values, aesthetic values, recreation & ecotourism, science & educational benefits
Supporting	Features that make it possible for the ecosystems to provide other ecosystem services.	Habitat provision, biodiversity, water cycling, nutrient recycling, soil formation

2.3.5 In addition to the above, the assessments (both the applicant's and FOIVs) of impacts on heritage, landscape and visual impact and impact on the adjoining Oriel Field and Meadow Lane 'Quiet Route', assist with providing a baseline for assessment of ecosystem services in the 'cultural' category. Similarly, studies in relation to hydrology, ground conditions and air quality, as presented as part of the planning application, and independently reviewed by consultants appointed by FOIV, assist with the assessment of services in the 'regulating' category, albeit with certain limitations (e.g. in terms of comprehensive understanding of local processes). Provisioning services can be assessed based on the known historic management of the site and on matters such as the degree of public access.

2.4 Taking Account of Avoidance, Mitigation and Compensation

2.4.1 Avoidance, mitigation and compensation measures embedded into or proposed as part of the scheme (e.g. by virtue of design, or committed mitigation) in order to obviate, reduce or eliminate environmental effects will logically have varying ameliorative effects on the magnitude and significance of changes to ecosystem services provision. Such measures are considered as part of this assessment in order to evaluate net change and whether it is positive or negative. Comments may be provided on the certainty that can be attached to the success of such measures, as currently defined.

2.5 Arriving at a Quantitative and Qualitative Assessment of the Change in Ecosystem Services Provision as a Result of the Scheme

2.5.1 The final stage of assessment presents a measure of the overall change in ecosystem services provided by the study site before and after development (i.e. comparing its current ecosystem services with the ecosystem services anticipated to arise from the site after completion of the scheme). This is done by the means of tables particularising and (where possible) quantifying net change. Positive changes are colour-coded green, negative changes are colour-coded red, and neutral or non-significant changes are not coloured. Consideration is also given to how the baseline conditions might change over time in the absence of the scheme (i.e. the likely future baseline in a 'do nothing' scenario).

3 ECOSYSTEM SERVICES – BASELINE PROVISION

3.1 Habitat types and condition

Circumneutral grassland

3.1.1 The site consists mainly of good quality semi-improved grassland, although there are small areas of reduced diversity, and pockets of disturbance. These habitats are all assessed to fall under the main habitat category of 'circumneutral grassland' in ecosystem services terms.

3.1.2 Surveys by Bioscan noted the presence of thirteen indicator species of higher quality neutral grassland within the site (only five of which were recorded by TEP). In Bioscan's view the site meets sufficient criteria to be considered for designation as an Oxford City Wildlife Site on habitat quality alone.

3.1.3 The total area of this habitat is estimated at c.0.67ha – around 75% of the site.

Bramble scrub and tall ruderal

3.1.4 Areas of bramble scrub and tall ruderal (e.g. nettle) occupy more disturbed areas of the site, in particular what is believed to be a former manege area in the north-western part.

3.1.5 The total area of this habitat is estimated at around c.0.08ha, or around 9% of the site.

Mature scrub, hedgerow and trees

3.1.6 The site is bordered by a mature grown-out hedgerow along Meadow Lane, by a belt of mature woody vegetation along the brook along its western side and is subdivided by a remnant hedgerow. Other boundaries include hedgerows and fences associated with property boundaries, but often with significant mature trees. The trees within the site include four trees awarded Category A (high quality) status by TEP, and numerous category B (moderate quality) trees (Arboricultural Impact Assessment, TEP, December 2022). Tree condition methodology does not necessarily or fully align with ecosystem services value – for example it places significant weight on likely future longevity, which is largely unrelated to current value – but is used here as a convenient proxy for grading the free-standing trees. It should be noted that Bioscan dispute some of the tree condition category attributions in the applicant's AIA For extant and/or relict hedgerows, whether they qualify as 'Priority' habitats or as 'Important' hedgerows is also relevant to assessing their ecosystem services function and value (the hedgerows on the site qualify as 'Priority' habitat).

3.1.7 The total area of trees, shrub and hedgerow, measured by canopy extent, is around 0.22 hectares, or around 24% of the site[4].

Other habitats

3.1.8 The only other habitats recorded within the site redline include a redundant stable building, small areas of recently disturbed ground and two small stands of Japanese knotweed – all of which have minimal value in ecosystem services terms – and sections of old limestone walling, which do have some measure of ecosystem services value, both as a habitat and in a cultural sense.

Strategic significance

3.1.9 As well as the ecosystem provisioning resources present within the site boundary, and on immediately adjoining land that will fall within the zone of influence of the land-uses changes precipitated by development, the location of the site in a wider strategic sense is relevant to its provisioning value. For example, the site sits at the junction of three wildlife corridors within the City, which undoubtedly contribute to its carrying capacity for flora and fauna and the related services they provide. It also abuts undeveloped land to the west forming part of the Thames floodplain, and subject to various designations in recognition of the extant value and enhancement opportunities this undeveloped land provides in terms of regulatory, provisioning, cultural and supporting services. Indeed, it forms a logical extension to these designated areas. In accordance with the principles of green and blue infrastructure, and why it is important, the total of these areas is greater than the sum of its parts. This is recognised in Local Planning policies by reference to the importance of undesignated areas of open space outside those identified and zoned as an outcome of the various GI studies undertaken locally. It is salient in this context that, while the site has previously been zoned as important open space, its absence from more recent GI mapping and designation appears largely due to lack of access, rather than lack of importance.

[4] It will be noted that the area totals add up to greater than 100% - this is because areas of grassland over-sailed by tree cover are double counted.

4 ASSESSMENT OF CHANGE

4.1 Future of the site and its ecosystem services without the scheme

4.1.1 In the recent past the site was grazed by horses, and more recently it has been cut for hay. In the absence of the scheme, it is considered likely that these practices would continue or be reinstated, maintaining the site in a state similar to the current baseline. Alternatively, were grazing and cutting management not to continue for any reason, it is anticipated that the site would gradually scrub up, ultimately becoming woodland via the process of natural succession. An alternative proposal for a 'Meadow School' has been put forward by local residents but as this does not as yet have Council/landowner support, it is not considered at this stage.

4.2 Description of the scheme, including design mitigation

4.2.1 The scheme seeks planning permission for '*residential development (Use Class C3), access arrangement and public open space, landscaping, associated infrastructure and works including pedestrian and cycle routes*'. It is proposed that 32 houses and associated gardens, road and footway infrastructure and small areas of open space will be built on the site. The density of the development will be high, with correspondingly few areas of open space. Impacts will include removal of the internal hedgerows, partial (and in due course likely full) removal of the Meadow Lane hedgerow (potentially with replacement by a smaller feature) and partial loss of the stone wall along Church Way. Wildlife will be displaced and views across the site from Meadow Lane, Church Way and other adjoining areas such as Oriel Field will be comprehensively changed by the presence of built form, related infrastructure, artificial lighting and formal landscaping, and the perception of the site will also become one of an urban locational with associated noise and dominant human presence.

Assessment of change - circumneutral grassland

4.2.2 The landscape proposals show the retention (or more likely loss then reinstatement) of approximately 0.12 hectares of grassland and approximately 0.2 hectares of mixed scrub on the final layout[5] (total 0.32 hectare). While these are portrayed as retention and/or replication of semi-natural habitats, there are various reasons why this is unlikely to be achievable, related to their close proximity to development, their future use, and the type of future management.

[redacted]

[5] Exact values not stated in Biodiversity report, and the applicant's BNG Metric 3.1 calculations have not yet been received, so measured as accurately as possible from aerial mapping at this stage.

4.2.4 The long-term proposals for Memorial Field are uncertain. Any habitat gain has to be balanced against the loss of good quality existing grassland habitat there. Consequently, in advance of further detail, the proposals for Memorial Field have not been fully factored in to this assessment at this stage, although comment is provided where relevant.

4.2.5 The applicant provides an in-combination output figure from its application of Metric 3.1 to the application proposals of a **net loss of biodiversity of -62.04%** (-5.55 units). It recognises that this fails relevant national and local planning policy tests.

4.2.6 In an effort to overcome this policy barrier, the applicant states that it intends to offset this net biodiversity loss. It refers to a quote having been provided by the Trust for Oxfordshire's Environment (ToE) for a payment of £19,200 per unit[6] to be made for offsite compensatory habitat, in order to bring the development up to the minimum level of 5% net gain in biodiversity required by policies in the Oxford Local Plan. No details of exactly what will be implemented by the Trust for Oxfordshire's Environment have been provided (other than a mention that they will need to focus on other neutral grassland creation due to the metric trading rules not being satisfied, given an overall loss of -7.68 units of habitats with medium distinctiveness which cannot be replaced or offset). As such, the proposed offset component cannot currently be assessed in ecosystem services terms and is not considered further at this stage.

4.2.7 Assuming an equivalent condition of neutral grassland can be reinstated in the small areas intended on-site – which is doubtful for the reasons given above - the net loss of circumneutral grassland after mitigation is 0.859 – 0.32 = 0.539 hectare.

Mature scrub, hedgerow and trees

4.2.8 The Arboricultural Impact Assessment (TEP, December 2022) states that the following trees will be removed as part of the proposals:

- 8 individual trees (comprising ash, crack willow, walnut, hawthorn and elder, and including a Category B hawthorn).

- 4 groups of trees, comprising approximately 0.0554 hectare (554m^2) (including horse chestnut, ash, hazel, sycamore, damson, crack willow, western hemlock, hawthorn and elder, and including the loss of 0.0240 hectare (240m^2) of Category B trees (8-10 individual trees)).

4.2.9 This equates to a loss of just under 12% of the existing canopy (a figure which includes the Memorial Field compensation site, so will be significantly higher within the redline boundary).

4.2.10 The proposed compensation for this is:

[6] Equating to over £100,000 in total.

- Planting of 35 small trees (<5m at maturity); total canopy area at planting 27.5m^2, 'potential' canopy area after 25 years 366.7m^2

- Planting of 6 medium trees (5-15m at maturity); total canopy area at planting 12.6m^2; 'potential' canopy area after 25 years 452.4m^2

- Planting of 6 large trees (>15m at maturity); total canopy area at planting 4.7m^2, 'potential' canopy area after 25 years 471.2m^2

4.2.11 In total this will give a canopy cover of 0.00448 hectare at planting, and of 0.12903 hectare after 25 years. It is stated that after 25 years this will result in a net gain of approximately 0.055 hectare of canopy cover, meaning that at the time of planting there will be a net loss of (0.055 – (0.12903 – 0.00448) =) 0.06955 hectare (695m^2).

4.2.12 However, TEP's net canopy cover gain assessment only calculates the increase in canopy cover of the proposed planted trees over time. It compares this against a situation where the baseline remains static, and does not appear to take account of the increase in canopy cover which would have taken place over 25 years in the 'do-nothing' scenario, from growth of the existing tree resource within the site, which includes many young trees. On this basis, the statement that after 25 years there will be a net gain of 0.055 hectare of canopy cover appears founded in false comparison and therefore challengeable.

4.2.13 It is also noted that TEP state: *'The proposed planting comprises more trees than would be removed'.* Independent surveys by Bioscan disagree with this statement and identify that when individual trees within the 'groups' identified in the AIA are counted, over 50 trees will be lost, while only 47 new trees will be provided, amounting to a net loss of quantum. The figures provided in TEP's AIA for hedgerow loss also appear readily challengeable when cross referred to the requirements for sightlines and highways design.

4.2.14 Lastly, 13 of the 29 (45%) trees proposed to be planted – as listed on the planting schedule do not comprise native species. Some examples of non-native species included on the planting schedule include golden rain tree *Koelreuteria paniculata* (introduced from eastern Asia), ginkgo *Ginkgo biloba* (introduced from China) and bald cypress *Taxodium distichum* (introduced from the United States), as well as garden cultivars such as *Carpinus betulus* 'Streetwise'. Not using a native planting scheme significantly detracts from the ecological benefits provided by the replacement trees.

Indirect effects

4.2.15 The zone of influence of the development appears to have been incompletely defined, such that indirect effects are anticipated on the ecosystem services functions of adjoining and nearby areas, including the Quiet Route (well-being), Memorial Field (direct losses and negative change); the adjoining ditch (direct losses and negative change) and the wider local GI network (reduced biodiversity carrying capacity and general degradation).

4.3 Assessment of change in ecosystem services

Circumneutral grassland

4.3.1 **Table 3** overleaf summarises the ecosystem services provided by circumneutral grassland (and associated soils) on site both before and after development and in accordance with the methodology previously described, and sets out how it is anticipated that these would be affected and/or change as a consequence of the scheme.

4.3.2 Much of the information is necessarily qualitative rather than quantitative, due to the absence of specific studies on factors such as the contribution the site currently makes to downstream water quality and other regulatory factors, however the limitations of each individual assessment are noted within the tables, in order to convey the certainty of outputs in each case.

4.3.3 The final column in this table indicates whether there would be a likely net improvement in that particular ecosystem service (in which case the cell is shaded in green), a net decline in the provision (shaded in red), or little or no discernible change (no shading).

4.3.4 Much of the information in this table is derived from the UK National Ecosystem Assessment (UK NEA, 2011).

4.3.5 The overall conclusion is that impacts from loss of circumneutral grassland resource will be moderate to major negative and inadequately mitigated in all categories of ecosystem services.

Trees

4.3.6 Most of the disbenefits listed for circumneutral grassland in Table 3[7] will apply equally to the loss of trees and hedgerow habitats within the site, in particular those relating to impacts on public amenity, carbon sequestration, groundwater amelioration and air quality. These impacts act to compound the points noted in table 3.

4.3.7 The applicant proposes compensatory planting but a high proportion of the 'compensatory' trees comprise non-native species and following planting there will still be an initial significant reduction in tree canopy cover of 695m^2, which will take many years to match the existing tree canopy cover within the site.

4.3.8 The collective impacts on the ecosystem services provided by the site's existing tree, scrub and hedgerow cover are adjudged to be moderate negative in the short term and minor negative in the long-term.

[7](with the exception of the disbenefit associated with the loss of grazing / hay cut)

Table 3. *<u>Circumneutral grassland:</u> Ecosystem services before and after development*

Ecosystem Services	General Description of Ecosystem Services Provided by Circumneutral Grassland	Type of Benefit	Description of the Particular Ecosystem Services Provided within the Application Site	Qualitative / Quantitative Description of Change	Assessment of Change
Provisioning Services					
Food, fibre	Food / fibre provision from livestock / crops.	Food, fibre	Prior to the development proposals, the site was grazed by horses, and cut for a hay crop.	Development of the site for housing will mean it can no longer be grazed by livestock or cut for hay. This is considered a minor negative change due to loss of opportunities for local livestock provisioning.	Negative change
Food, fibre	Food for pollinators	Food for pollinators	The semi-improved grassland, tall ruderal and scrub within the site currently provide a food source for pollinators, which form part of a county-important assemblage of invertebrates.	Development of the site will greatly reduce its value for pollinators. As the site's invertebrate assemblage is of county significance, this appears likely to give rise to a negative change in the local context.	Negative change
Water supply	Storage of water and recharging of aquifers.	Water provision	The grassland and associated soils are likely to contribute towards water supply via the water cycle, but it is not possible to quantify this capacity in this report. The grassland and soils on the site, and the tree resource are likely to perform some degree of attenuation and recharge function, potentially providing some fractional degree of amelioration of downslope and downstream flood risk.	While the grassland and soils are likely to contribute towards water supply via edaphic storage and recharge, this cannot be quantified on current data. The site's geology appears to be relatively free draining in the upper part which may help sustain the local aquifer. The site and its soils are also likely to act as a sponge, slowing and holding back surface and groundwater movement into the adjacent and overlapping floodplain, and the adjoining brook. The applicant proposes that the surface water drainage scheme will replicate greenfield run-off rates, but various problems with the drainage proposals have been identified and they are bereft of SuDS features. This is likely to increase the flashiness of run-off from the site and diminish its regulatory function.	Negative change
Regulating Services					

Ecosystem Services	General Description of Ecosystem Services Provided by Circumneutral Grassland	Type of Benefit	Description of the Particular Ecosystem Services Provided within the Application Site	Qualitative / Quantitative Description of Change	Assessment of Change
Climate regulation	Carbon storage; maintenance of plant and soil carbon stores.	Climate regulation	The grassland is likely to contribute towards climate regulation, but it is not possible to quantify this capacity in this report.	In a wider context, the change in climate regulation from the loss of the grassland within the site is considered likely to be minor negative. The proposed planting scheme will not provide compensation for these net losses.	Negative change
Carbon sequestration	Carbon sequestration value and future potential.	Carbon sequestration	The grassland would be expected to contribute towards carbon sequestration. The figure for grazed grassland is 2.2 tCO_2-e /ha /yr[8], equating to around 1.2 tCO_2-e per annum over 0.539 hectare. That may be higher on this site which is currently ungrazed and subject to annual mowing. In addition there would be a loss of total existing carbon stock, estimated to be 446.2 C t / ha[9] for intermediate management intensity, = 240.5 tonnes of carbon for this site.	Loss of grassland would be expected to result in a decrease in stored carbon capacity of around 1.2 tCO_2-e per annum (in addition to one-off loss of 240.5 tonnes of carbon stock).	Negative change

[8] De Dayn, G.B. *et al.* (2011). Additional carbon sequestration benefits of grassland diversity restoration. Journal of Applied Ecology, 48: 600-608.
[9] Gregg, R., Elias, J.L., Alonso, I., Crosher, I.E., Muto, P. & Morecroft, M.D. (2021). Carbon storage and sequestration by habitat: a review of the evidence (second edition). Natural England Research Report NERR094. Natural England. York.

Ecosystem Services	General Description of Ecosystem Services Provided by Circumneutral Grassland	Type of Benefit	Description of the Particular Ecosystem Services Provided within the Application Site	Qualitative / Quantitative Description of Change	Assessment of Change
Hazard (flood protection)	Flood protection. Vegetation moderates rainfall events and river and stream hydrographs.	Water flow regulation	The Meadow Lane Iffley Flood Risk Assessment and Drainage Strategy states "Environment Agency (EA) Zones 1, Flood Zone 2 and Flood Zone 3 extend into the site, although it should be noted that development is only proposed in Zones 1 and 2. The site has been assessed as having a very low or low risk of flooding from all sources… and [the development] does not increase the risk of flooding to other properties or elsewhere for the lifetime of the development. Surface water runoff from the new highway and driveways and roofs … will discharge to an existing highway drainage ditch on the western edge of the site." However, a review of the FRA carried out by Water Resource Associates (Dr JE Harvey, 2023) notes "The assessment of groundwater flood risk is wrong – simply assuming low risk because the permeable strata is classified as an aquifer is incorrect… Without additional information from the EA on predicted river levels, or surface water flow pathways based on topography or on-site groundwater levels, the consultants assessment of the overall risk of flooding is not valid".	Some doubt has been cast on the assurances set out within the flood risk assessment. And regardless, the conversion from grassland to hard surfaces will still undeniably result in a local increase in surface water runoff and/or the flashiness of discharge from the site. The applicant proposes to address this through predominantly non-SuDS measures which have a higher chance of failure.	Negative change
Water quality	Water purification, reduced pollution and storage of pollutants	Cleaner water	While this habitat is likely to contribute towards water quality, detailed monitoring would be required to quantify this contribution.	Foul water drainage from the site will exacerbate the situation at the local STW which is operating well over capacity. This may exacerbate the problem of untreated sewage effluent discharges into the Thames. The change from green surfaces and permeable soils to predominantly hard surfaces and subterranean piped surface water storage will inevitably increase pollution risk to the adjacent ditch and thence to the nearby Thames – potentially also creating an impact vector to the Iffley Meadows SSSI in flood conditions.	Negative change

Ecosystem Services	General Description of Ecosystem Services Provided by Circumneutral Grassland	Type of Benefit	Description of the Particular Ecosystem Services Provided within the Application Site	Qualitative / Quantitative Description of Change	Assessment of Change
Air quality	Interception and retention of airborne pollutants by plants and soil.	Air quality	It is likely that the grassland will contribute towards local air quality, though it is not possible to quantify this benefit.	In a wider context., the losses of grassland tree canopy would be unlikely to give rise to any significant reduction in air quality. Locally however, and particularly along Meadow Lane, the effective loss of this hedgerow would be likely to reduce air quality amelioration functions along a length of lane that would see a corresponding significant increase in road traffic.	Decreases in air quality from habitat loss considered unlikely to be significant.
Cultural Services					
Nature / landscape connections	Sense of awe from landscape; enjoyment of wildlife	Aesthetic amenity	Meadow Lane and Church Way are designated as part of a Principal Quiet Route for Active Travel, which runs between Littlemore and the City Centre and forms part of a circular walk through Iffley Village. The route is used extensively for walking, cycling, jogging and horse riding. There are several views across the site from this route, which enable passers-by to enjoy natural views, enhancing their experience.	Development of the site will destroy natural views across the site from Meadow Lane and Church Way, significantly impacting on enjoyment of nature by users of this route (one of its main attractions).	Major negative change
Science and education	Opportunities to learn about the natural world and cultural heritage; opportunities to learn about oneself through recreational activities	Education	The site is privately owned, and there is no known usage of the site for educational activities.	No significant effects anticipated.	No change
Tourism and recreation	Outdoor active tourism and recreational opportunities; tourism and recreation based on watching wildlife; field sports. Development of social networks through management of resources.	Tourism and recreation	As noted above, the Meadow Lane and Church Way Quiet Route is used extensively for recreation by walkers, cyclists, joggers and horse riders, who appreciate the quiet rural atmosphere and natural views along its length.	Development of the site is anticipated to detract significantly from the rural feel of this route, having a major impact on its recreational amenity for many people and potentially denuding the attractiveness of the Iffley Loop walk as one of East Oxford's attractions.	Major negative change
Sense of place and history	Preservation of natural/ environmental history and cultural practices; socially-valued landscapes.	Cultural/ historical heritage	Iffley Village is a quiet rural haven inside the Oxford ring road, and the site (views across which form part of the rural route from Littlemore to central Oxford) has significant social value for residents and visitors alike.	Development of the site will impact greatly on this socially-valued natural landscape.	Major negative change
Supporting Services					

Biodiversity	Biodiversity is an essential part of, and contributes towards, habitat dynamics.	Biodiversity	This section draws on information provided within the Land off Meadow Lane Iffley Ecological Impact Assessment (TEP, Sept 2022). Additional information from Bioscan surveys is also included in red where relevant. Habitats: The site comprises grassland, scrub and tall ruderal habitats. The grassland has been classed under the Priority Habitat Inventory as 'Good Quality Semi-improved grassland (non-priority).' As noted above, Bioscan have noted 13 indicators of higher quality neutral grassland, and assess the site would quality for designation as an Oxford City Wildlife Site. Invertebrates: Specialist invertebrate surveys recorded 636 species within the site, including 19 species of conservation significance and **'at least two species new to the county'**. Invertebrates are stated to be an important ecological feature at **district** level (though in light of the survey findings it could be argued that County level would be more appropriate). Bats: Given the habitats present (hedgerows, scrub and grassland in proximity to a watercourse), the site is likely to be utilised by foraging / commuting bats. The desk study noted 158 bat records within 2km, including 3 rare species: lesser horseshoe bat, Nathusius' pipistrelle and barbastelle. However, site surveys have only investigated bat roosting potential, with no surveys carried out to investigate bat activity, and no remote surveys (failing to comply with the Bat Conservation Trust Bat Survey Guidelines, 3rd edition). Bioscan surveys have confirmed 7 bat species on site, including occasional registrations from two rare species: barbastelle and Nathusius' pipistrelle. [redacted] Reptiles: Surveys noted the presence of 1 common lizard within the site. Bioscan have also recorded grass snake on site.	In accordance with Biodiversity Metric 3.1, the loss of the habitats within the site will result in a **-62.04% net loss of biodiversity** (and Metric trading rules are not satisfied due to an overall loss of -7.68 units of habitats with medium distinctiveness which cannot be replaced or offset). A site with 13 indicators of higher quality neutral grassland, assessed by Bioscan as qualifying for designation as an Oxford City Wildlife Site, will be directly impacted. Impacts on the key fauna of the site are anticipated to occur due to removal of habitat. Works will be carried out under a CEMP, and specific mitigation strategies have been prepared. However, the mitigation for invertebrates is assessed by Bioscan to be insufficient to avoid residual impacts on invertebrates from habitat loss (given the importance of this site for invertebrates). And no bat activity surveys have been carried out, making it impossible for decision makers to assess impacts from the development on bat activity. [redacted]	Major negative effect, due to significant impacts on biodiversity, and residual impacts on invertebrates (valued at district level and including species new to the County). Insufficient data to assess impacts on bat activity. [redacted]

Ecosystem Services	General Description of Ecosystem Services Provided by Circumneutral Grassland	Type of Benefit	Description of the Particular Ecosystem Services Provided within the Application Site	Qualitative / Quantitative Description of Change	Assessment of Change
			Otters: Otters are stated to be an important ecological feature at local level on a precautionary basis. Bioscan have confirmed, via old spraint, at least occasional/transient use of the ditch adjoining the site. Birds: The scrub within the site has clear potential for nesting birds. Bioscan have recorded a locally significant breeding bird assemblage. Hedgehogs: Stated to be an important ecological feature at local level on a precautionary basis.		
Soil	Vegetation facilitates soil formation, and soil decontamination.	Soil formation, quality and function	The grassland within the application site will contribute towards providing healthy soils and associated C-sequestration.	The site's soil resource will be significantly impacted by cut and fill operations and losses beneath hard surfaces. This will not be compensated for.	Major negative change
Natural cycles	Vegetation facilitates geochemical processes essential to life (nutrient cycling, water cycling, carbon dioxide fixation and oxygen production).	Natural cycles	The vegetation within the application site will contribute towards natural resource cycling, though this contribution is not possible to accurately quantify.	Impacts on natural cycles from the removal of grassland within the site are not anticipated to be significant at anything above the immediate site level.	Negligible change

Other habitats

4.3.9 The ecosystem services impacts from losses of stone wall habitat will be negligible in most cases, but may be elevated to minor in terms of cultural appreciation and well-being benefits of the walls as an integral part of views and experience.

Offsite effects

4.3.10 It appears from the application submission that the intention is that Memorial Field will be opened up to public access as part of the proposals. This is expected to have some limited positive effects in terms of public access, leisure and appreciation and enjoyment of nature, balanced against negative effects, including damage or displacement of biodiversity from recreational disturbance and associated impacts, introduction of tarmac or other bound surface paths and shading effects on existing circumneutral grassland. [redacted]

4.3.11 On balance the net offsite effect on the ecosystem services provided by Memorial Field is assessed to be minor-moderate negative, due to the benefits of opening the site up to public access being outweighed by loss of biodiversity and suburbanisation of the environment.

4.3.12 The brook to the west of the site will also be impacted by the development proposals, although this is not specifically acknowledged or assessed in the application submission. At the very least, damage and/or disruption to this feature is likely to arise from the construction of a surface water outfall and as a consequence of excavations associated with establishing connections to the sewer network. It is very likely that follow on impacts including dredging, re-profiling and associated tree loss will further impact on this feature and in the operational phase, impacts on water quality and habitat condition from eutrophication and other pollutants (even if the proposed two-stage interceptor is functional) will likely deteriorate its condition and value. These effects on ecosystem services are adjudged to be minor-moderate negative.

4.3.13 The overall degradation of the local GI network from indirect loss of carrying capacity, diversity, fragmentation and quantitative diminution of priority and other higher value habitats is adjudged as moderate negative.

5 SUMMARY OF ECOSYSTEM SERVICES CHANGES

Taking into account the key factors discussed in **Table 3** and section 4 above, the key benefits and disbenefits of the scheme in terms of impact upon ecosystem services are assessed to be as follows:

5.1 Disbenefits

5.1.1 The net residual ecosystem services disbenefits of the scheme after mitigation / compensation are adjudged to be as follows:

- Major negative change to nature / landscape connections (aesthetic amenity) due to urbanisation of a much-loved area and a much used rural route.
- Major negative change to recreation and well-being from impacts on the amenity of walkers, cyclists, joggers and horse riders. Associated minor negative impacts on tourism.
- Major negative change to sense of place and history from removal of or damage to socially-valued landscapes.
- Major negative change to biodiversity (applicant's own assessment predicts -62.04% net loss of biodiversity), residual impacts on a county important invertebrate assemblage, and no survey information provided to enable assessment of impacts on bat activity.
- Minor negative change to local livestock provisioning opportunities by removal of habitat previously used for grazing and hay cuts
- Negative change (quantum unknown) from reduction of food for pollinators
- Minor to moderate negative change on carbon sequestration arising from loss of grassland, scrub and tall ruderal habitats (estimated 1.2 tCO_2-e per annum).
- Minor to moderate negative change to flood regulation from increased surface runoff.
- Minor to moderate negative change to water quality from removal of grassland and introduction of non-SuDS surface water drainage scheme with limited pollution control capacity.

5.2 Benefits

5.2.1 No net ecosystem services benefits are assessed to arise from the scheme. Net benefits to 'access to nature and amenity' from the opening up of Memorial Field are adjudged as likely to be outweighed by the losses at that site occasioned by proximity to the development site, associated loss of rurality and suburbanisation from formal paths, planting and street furniture and net loss of biodiversity due to excavations and remodelling.

6 CONCLUSIONS

6.1 The proposed scheme would result in significant loss or degradation of the ecosystem services provided to the local area by the site in its baseline state. These losses are particularly pertinent in relation to impacts on the many users of the adjoining publicly accessible areas of Meadow Lane and Church Way (and indeed Oriel Field), in terms of access to and appreciation of nature / landscape, tourism / recreation and sense of place / history terms, as well as impacts on such users' experience from the net loss of biodiversity from the locality that the development would entail.

6.2 The conclusions of this report have implications for assessing the performance of the development proposals against a suite of relevant national and local planning policies and strategies for green infrastructure, healthy places and wellbeing.

6.3 National policy recognises the need for the planning system to recognise and protect ecosystem services provision. Para 174 of the NPPF states:

> *"174. Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *…*
>
> *b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and* ***ecosystem services*** *– including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland"*

6.4 Green infrastructure and the ecosystem services it proves, have a particular role to play in the delivery of ecosystem services in urban areas. The NPPF recognises this at paras 20(d), 92(c), 154(a) et al and instructs Local Planning Authorities to take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure at para 175.

6.5 Guidance on the implementation of this national policy compunction on local authorities and others has recently launched in the form of the Green Infrastructure Framework, published by Natural England in January 2023[10].

6.6 This is part of the Government's 25-year plan to address the interrelated biodiversity, climate and wellbeing/health crises and underlines the role that good quality GI has to play in improving urban and rural environments. The Government recognises that good quality GI is important for health and wellbeing, air quality, nature recovery and for delivering net zero targets, as well as for adapting to climate change by providing urban cooling and reducing flood risk. It can also help to address issues of social inequality and environmental decline, whilst also making better places to live.

[10] https://www.gov.uk/government/news/natural-england-unveils-new-green-infrastructure-framework

6.7 A major objective of the strategy is to deliver the creation or improvement of GI where existing provision is poorest and where there are opportunities for these important assets to be better managed for the environment and to deliver a wider range of multifunctional benefits. The site presents itself as a major candidate for improving local provision, as recognised in the support for the alternative Meadow School proposal out forward by local residents and endorsed by local schools. Conversely its loss to development would significantly compromise the achievement of local GI targets, including the targets of the adjacent CTA.

6.8 At local level, the adopted Local Plan 2036 already recognises the importance of ecosystem services, including those associated with extant GI features. For example, in relation to trees, paragraph 5.21 of the Local Plan, part of the preamble to Policy G7, states:

> *"Trees perform a number of important functions. Individual trees, groups of trees, areas and woodlands can have amenity value relating to the character and appearance of a site and its setting. The urban tree population as a whole is also important in terms of* ***ecosystem services*** *such as reducing flooding, modifying the urban heat island effect, supporting biodiversity, reducing air pollution and carbon sequestration and storage. In cities these benefits often correlate to the tree canopy cover of the tree population, or 'urban forest', as a whole. Therefore developments should incorporate established trees as well as the planting of new trees. In addition to protecting existing trees that are important for amenity in an area, consideration should be given to protection and enhancement of tree canopy cover".*

6.9 The latest version of the *Oxford City Council Green Infrastructure Study* (July 2022) similarly states:

> *"Good quality GI [Green Infrastructure] can provide multiple social, environmental, and economic benefits (also known as* ***ecosystem services****), which are essential in helping to combat the climate, nature and health crises. By protecting, restoring and creating good quality green infrastructure, we can help ensure that a network of healthy ecosystems and semi-natural areas is managed as a coherent and multifunctional resource i.e., the same area of land is able to perform several functions and offer multiple benefits, such as providing clean air and water; flood prevention, pollination, wildlife habitat, carbon capture and storage, providing space for recreation and connection with nature (among others)."*

6.10 The importance of ecosystem services, and their conservation and enhancement, to the delivery of Local Plan objectives is further highlighted by the following statement:

> *"Optimising the multifunctionality and resulting benefits provided by GI within the city will help the Council achieve their vision set out within 'Oxford City Council – Our Strategy 2020-24', which is:*
>
> *'Building a world-class city for everyone by creating successful places in which to live and work, supporting our communities and addressing the climate emergency, we will build a fairer, greener city in which everyone can thrive'.*

6.11 The City Council's 2022 GI study concludes by recommending that the City Council use the Local Plan process to, in the first instance "protect what we have", stating:

> *"Local Plan policy should continue to protect the overall GI network. The more detailed analysis in this report helps to understand where the highest priority areas for protection are likely to be. For example, sites that:*
>
> *• Have nature conservation, heritage or cultural value*
>
> *• Are important in avoiding deficiencies in accessibility or quality (those sites that scored highly in the quality assessment, and where gaps in access would be created or worsened).*
>
> *• Provide high levels of multifunctionality.*
>
> *• Fall within areas of need e.g., areas of high deprivation, poor air quality or flood risk.*
>
> *Development proposals will need to protect as well as contribute to new and existing GI. The starting point will be the protection and enhancement of existing GI on site and ensuring GI links (both for people and wildlife) with the surrounding area. GI must be embedded into the layout of new development from initial project thinking, identification of constraints and opportunities identified in the master planning process, through to implementation, management and maintenance. Development proposals should be guided by best practice standards for GI, which includes Natural England's GI Standards Framework and the Building with Nature Benchmark.*
>
> *Development that will cause material or demonstrable harm to the functioning of the GI network should not be permitted, unless mitigation or compensation can be provided to ensure the overall multifunctionality and connectivity of the GI network is maintained.*
>
> *…*
>
> *The Council should continue to work across its service areas, and externally with partners locally, regionally and beyond to drive collaborative action to protect existing GI and natural capital. This could involve nominating 'GI champions' across relevant council service areas, who advocate a GI approach – protecting and enhancing GI in order to optimise the benefits provided to society, the environment and the economy.".*

6.12 The importance of GI to well-being and sense of place is further reflected at County level. For example, Oxfordshire County Council's Prevention Framework Report[11] states, at page 36:

> *"Access to green spaces and the natural environment are fundamental to both individual wellbeing and planetary health. Investment is required to develop and maintain green spaces so that they feel safe, are attractive to people of all ages, and promote biodiversity".*
>
> *And at page 37 of 'Healthy Place Shaping'[12]:*

[11] https://mycouncil.oxfordshire.gov.uk/documents/s48508/HWB_SEP2619R02%20-%20Prevention%20Framework%20Report.pdf

[12] https://www.oxfordshire.gov.uk/residents/social-and-health-care/public-health-and-wellbeing/healthy-place-shaping

"[The Council will] support good practice in the stewardship of green and blue spaces, with investment to increase their attractiveness to people of all ages and to sustain their biodiversity."

6.13 On any level of assessment, the site presents itself as a clear opportunity for Oxford City Council to put into practice its policies on protecting the ecosystem services associated with high value open spaces in the city. There can be no clearer demonstration of the Council's commitment to "*protect what we have*" as part of its efforts towards realisation of the overarching vision of "**a world-class city for everyone**" and "**a fairer, greener city in which everyone can thrive**". As discussed in Bioscan's EcIA and in other documentation, it is unfortunate that the site was allocated for development only as a consequence of failures of assessment and consultation. The allocation is in direct contradiction of past rejections by the City Council on the basis of clear and acknowledged harm to the Iffley Conservation Area of exactly the type now proposed. With the benefit of more robust information, the site's high performance against the above criteria for 'protecting what we have' is indisputable. Its nature conservation, heritage and cultural value is high, the alternative vision proposed by local residents for a 'Meadow School' has highlighted unmet need for wildlife experiences and education, the site provides high levels of multi-functionality and it plays an as yet unquantified role in ameliorating local flood risk.

REFERENCES

De Dayn, G.B. et al. (2011). Additional carbon sequestration benefits of grassland diversity restoration. Journal of Applied Ecology, 48: 600-608. Available at: https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/j.1365-2664.2010.01925.x

eftec (2010). Valuing Environmental Impacts: Practical Guidelines for the Use of Value Transfer in Policy and Project Appraisal. Available at: https://www.gov.uk/government/publications/valuing-environmental-impacts-guidelines-for-the-use-of-value-transfer

Gregg, R., Elias, J.L., Alonso, I., Crosher, I.E., Muto, P. & Morecroft, M.D. (2021). Carbon storage and sequestration by habitat: a review of the evidence (second edition). Natural England Research Report NERR094, Natural England, York. Available at: http://publications.naturalengland.org.uk/publication/5419124441481216

HM Treasury (2022). The Green Book. Available at: https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

Landsberg et al. (2013). Weaving Ecosystem Services into Impact Assessment. Available at: https://www.wri.org/research/weaving-ecosystem-services-impact-assessment

Natural Capital Coalition (2016). Natural Capital Coalition. Available at: https://capitalscoalition.org/capitals-approach/natural-capital-protocol/?fwp_filter_tabs=guide_supplement

UK NEA (2011). UK National Ecosystem Assessment. Available at: http://uknea.unep-wcmc.org/Resources/tabid/82/Default.aspx

UK Natural Capital: ecosystem accounts for freshwater, farmland and woodland (Office of National Statistics (ONS), 2017). Available at: https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/uknaturalcapital/landandhabitatecosystemaccounts

Various authors (2005). Millennium Ecosystem Assessment. Available at: https://www.millenniumassessment.org/en/index.html

Figures

FIGURE 1

Key

- Study area
- Ownership boundary
- SI — Semi-improved neutral grassland
- pSI — Poor semi-improved neutral grassland
- Non-native shrub
- Plantation woodland
- Wet woodland
- Tall ruderal
- S — Disturbed ground/spoil
- Built structure
- Significant non-woodland trees and shrubs
- Priority native hedgerow
- Non-priority hedgerow
- Fence
- Wall
- Wet ditch

Title
Habitat map

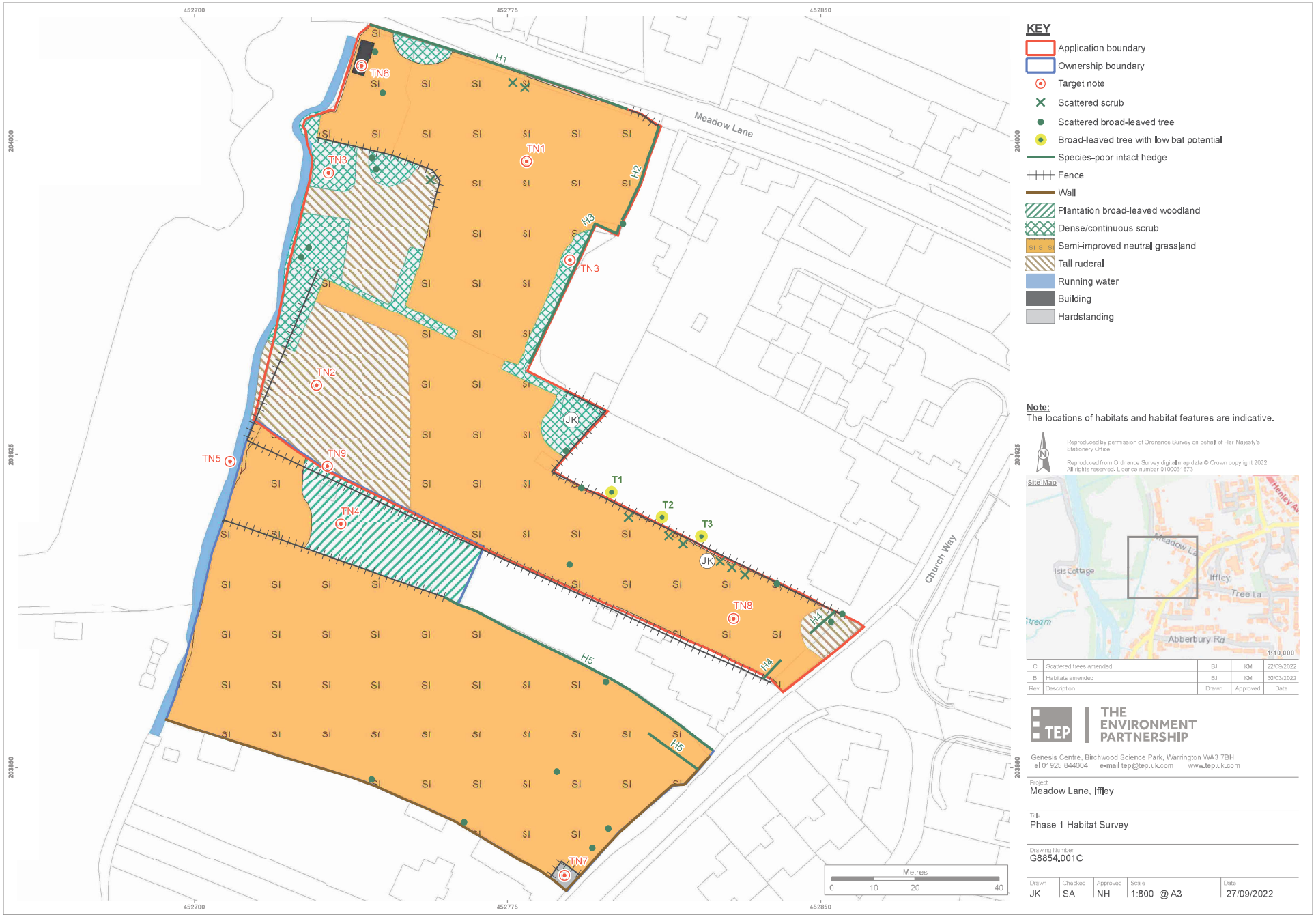
Project	Client
Iffley	Friends of the Fields

Drawing No.	Revision	Project No.
Figure 1	-	E2059

Drawn	Checked	Date
RB	DW	February 2023

Bioscan (UK) Ltd
[redacted]
Oxford
[redacted]
[redacted]
bioscan@bioscanuk.com
www.bioscanuk.com

FIGURE 2



KEY

- Application boundary
- Ownership boundary
- Target note
- Scattered scrub
- Scattered broad-leaved tree
- Broad-leaved tree with low bat potential
- Species-poor intact hedge
- Fence
- Wall
- Plantation broad-leaved woodland
- Dense/continuous scrub
- Semi-improved neutral grassland
- Tall ruderal
- Running water
- Building
- Hardstanding

Note:
The locations of habitats and habitat features are indicative.

Rev	Description	Drawn	Approved	Date
C	Scattered trees amended	BJ	KM	22/09/2022
B	Habitats amended	BJ	KM	30/03/2022

THE ENVIRONMENT PARTNERSHIP
Genesis Centre, Birchwood Science Park, Warrington WA3 7BH
Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Meadow Lane, Iffley

Title
Phase 1 Habitat Survey

Drawing Number
G8854.001C

Drawn	Checked	Approved	Scale	Date
JK	SA	NH	1:800 @ A3	27/09/2022

Bioscan (UK) Ltd
The Old Parlour
Little Baldon Farm
Oxford
OX44 9PU

Tel: +44 (0) 1865 341321
Fax: +44 (0) 1865 343674

bioscan@bioscanuk.com
www.bioscanuk.com