To: **Planning Department, Oxford City Council**

Date: **16 May 2016**

Re: **Planning Application 16/00968/FUL**
Land West of 75 Town Furze, Oxford, Oxfordshire OX3 7EW,

Erection of 4 x 4 bed dwelling houses (Use Class C3). Erection of garage. Provision of private amenity space and car parking spaces.

Objection to development from The Friends of Lye Valley (FoLV)

Introduction

The application site is entirely greenfield (abandoned garden). Just outside the application limits, immediately down slope, is a section of the Lye Valley SSSI South Fen Unit 2, which is also owned by the applicant. The Lye Valley SSSI South fen section (Unit 2) is a very small site, listed as only **0.5375ha** on the Natural England website (https://designatedsites.naturalengland.org.uk/).

The proposed development site (0.24 hectares quoted) sounds small, but is, in fact, large in proportion to the tiny SSSI unit area. A 0.24 hectare development site might have minimal impact on a very large SSSI such as nearby Shotover and Brasenose Woods, but this is a very different scenario and the potential impact of this development on the South Fen would be major. **The development site is nearly half the size of the whole SSSI unit 2 and is hydrologically connected.**

A The importance of the SSSI, policies and laws that should protect it, and the duty of Oxford City Council to protect biodiversity

The Lye Valley SSSI is of national importance and the alkaline fen habitat it contains is of international importance (EC Habitats Directive, Priority Annex I Habitat Alkaline Fens, H7230). Present on site are species that are dependent on the rare calcareous, alkaline, valley-head, spring-fen, specifically the **Black Bog-rush – Blunt-flowered Rush** National Vegetation Classification type **M13**, along with a number of rare and nationally scarce invertebrates which breed in the wetland habitat. It is the most improved calcareous fen site in Oxfordshire and holds an important reservoir of rare plant species now extinct in all other county calcareous fen sites. Crucial to the fen's survival is its complex hydrology and hydrochemistry. The Lye Valley South Fen SSSI unit 2 is very small and very vulnerable, yet it is a key site in any long-term plans to restore and link fen habitats on the Lye Valley as a whole.

See Appendix for a report by J A Webb giving more detail on the habitat and current biodiversity status of the South Fen, along with the 'Vision for the Valley' in production by FoLV.

A (i) SSSI Designation and the Law

Any area designated a Site of Special Scientific Interest (SSSI) has protection under UK law. **The Wildlife & Countryside Act 1981** (amended and strengthened by the **Countryside and Rights of Way (CROW) Act 2000**) provides national protection for SSSIs, placing a statutory duty on Local Authorities to further the conservation and enhancement of SSSIs both in carrying out their operations and in exercising their decision-making functions. Oxford City Council is subject to this Act because it is a public authority.

Under Section 28G of the Act, Oxford City Council has a duty to "take reasonable steps… to further the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which the site is of special scientific interest".

Section 55 of the Act addresses offences on SSSIs. It clearly states that it is an offence for a public body to "*Carry out or authorise operations likely to damage a SSSI…." and to "Fail to minimise any damage to a SSSI…"*

Furthermore, section 40 of the Natural Environment and Rural Communities (NERC) Act, 2006 states:

- Every public authority must, in exercising its functions, have regard… to the purpose of conserving biodiversity; and
- Conserving biodiversity includes… restoring or enhancing a population or habitat.

Therefore Oxford City Council would be wilfully acting against its legal duties, if the development of 'Land west of 75 Town Furze' and its SUD scheme failed to protect the Lye Valley SSSI South Fen from any future harm. The Council would be committing an offense against the Wildlife & Countryside Act 1981 (as amended) and be acting against the direction of the Government's Biodiversity 2020 ambitions.

A (ii) Relevant Core Strategy Policies:

Core Strategy Policy CS2

"**Previously developed and greenfield land**": Development on brownfield land is prioritised, with greenfield sites only eligible:

a) If specifically allocated as part of the Local Development Framework (in fact, **this site was explicitly rejected in Oxford's latest Housing Land Availability Assessment published in December 2014 –** see 'rejection of proposed site 97' in the report and discussed separately here) or

b) If required in order to fulfil rolling 5-year housing targets. As the Oxford City Council Annual Monitoring Report, published Nov 2015, makes clear, projected additional building over the next few years (including sites at Barton Park, Littlemore, Northern Gateway) will easily *exceed* targets over the 5-year period in question.

In addition, the Oxfordshire Strategic Housing Market Assessment report of Dec 2014, cited by the applicant as supportive of their argument, actually led to a large scale review of greenbelt land outside the city and a cross-district agreement with neighbouring District Councils resulting in significant extra provision to address Oxford's housing need. **There is therefore no justification or requirement to consider this site, and the Council's own Core Strategy clearly argues against it.**

Furthermore, this is not a neutral site whose development would have no significant impact. CS2 also stipulates that greenfield land will not be allocated for development, if it would cause harm to a site designated for its ecological value. The following is therefore also pertinent:

Core Strategy Policy CS12

The proposed development is immediately contiguous to the Lye Valley South Fen SSSI, a rare habitat of national significance. Damage to this site would be inevitable. Previous applications for development on this site (and others nearby) have been repeatedly and consistently rejected owing to expert concern about impact on this rare and fragile habitat.

The applicant references an out-of-date survey of the SSSI undertaken in 2009 and implies the habitat is in poor condition. **In fact, since 2010 there has been an active and successful programme of management undertaken by Oxford City Council in partnership with Natural England** involving volunteers from Friends of Lye Valley and Oxford Conservation Volunteers **(which the owner of the site is well aware of, as he has given permission for relevant management to be carried out).**

Recent surveys (**see Appendix 1**) evidence significant habitat and biodiversity improvements over the last 7 years. As there is already an active and effective management contract in place (renewed in the last year), the suggestion by the applicant that putting a management plan into place will improve the biodiversity of the site is quite ludicrous.

A (iii) Previous rejection of this site for development

This application site 'Land West of Town Furze' is part of an area (previously listed in Oxford City Council planning website documents as '**Site 97, 'Land adjacent to Lye Valley'**) that is one of the sites rejected for development in 2011 before or at the Pre-options Stage of the Sites and Housing Development Plan Document, which was finalised and adopted in February 2013.

See specifically the document on sites rejected before or at the DPD Pre-Options consultation at:
http://mycouncil.oxford.gov.uk/documents/s126/dpd%20appendix.pdf

See, **in the above document,** Appendix 4, page 197 and map on page 202.

Site 97 was a larger proposed site which actually covered the Lye Valley South Fen SSSI unit 2 at that stage. Even though this current proposal for Land West of Town Furze does not cover the SSSI, it immediately abuts it, so the comments in the document are still relevant.

We quote the reasons for the rejection of this site from the document '**Sites and Housing DPD, Background paper 2, Green Infrastructure and Biodiversity Issues' dated June 2011**. This does not seem to be easily available currently on the web but will be in Oxford City Council's archive. We quote from the table on page 2, with regard to Site 97:

'*Reason for Rejection - Effect on the Lye Valley SSSI and significant loss of trees*'.

As the boundary of site 97 included part of the SSSI, the document goes on to state:

'Yes, boundary could be amended however ***development on the remainder likely to adversely affect groundwater flow into the Lye Valley SSSI'*** (our emphasis)

Oxford City Council has already stated its position on development on this site and we in FoLV endorse their view that because of the adverse effects on groundwater flow there should be no development.

B Biodiversity information on the site in supporting documents – unassessed importance of the proposed development site for the species of the SSSI

Management work to improve the SSSI fen has been ongoing for the last 7 years, including opening it up to the SSSI boundary (see detail in Appendix 1). Conditions have changed and ecological surveys presented with this application from 2014 do not reflect the current ecological value of the development site. Rough grassland and scrub on higher, drier, ground are very important as complementary habitats (willow scrub, tall-herb vegetation) to the short, open, fen of the SSSI downslope. The development site is important to some of the species (e.g. specific flies, moths, beetles) that breed in the short fen habitats, as these may need to visit nearby flowers for food (nectar and pollen) to complete their life cycles. The rough grassland and scrub of the proposed development site may also support species in its own right. **The Ecological Assessment in October will be too late to be of use in identifying any of these species.** The ecological integrity of the fen habitat as a whole is incomplete without a range of habitats including short fen, tall herb and woodland / scrub habitats.

The Tree Survey presented with this application suggests felling pollard willows on the SSSI margin. This would be damaging, as these old trees are potentially of great ecological value; for example, they provide breeding sites for some of the rare invertebrates recorded in the fen (see detail in Appendix).

C. Ground water flow, hydrological and hydrochemical issues.

C (i) Fen Catchment

The area designated for proposed development is a green vegetated area on sloping land, which is a crucial buffer and rain catchment to the SSSI and most likely includes the springs that supply water to the fen. No detailed, accurate, map of the springs exists. **The swale infiltration structure proposed could easily be in the spring zone.**

As it is so small (just over half a hectare), the South Fen is extremely vulnerable to damage from influences outside its designated SSSI limits. It has no protected buffer land upslope. This development site, at 0.24 hectares, is, of course, only a small proportion of the calculated total rain water catchment of the South Fen, but this development site is large in proportion to the area of the South Fen and in the most critical position to affect it. Thus it will have a disproportionately significant importance on the SSSI in terms of effects on the fen's hydrology.

The key features of the fen's hydrology are a good, slow, continuous, gentle water flow to the springs, plus the critically important water chemistry features of continual very high alkalinity and high calcium or iron in combination with low nitrate and very low phosphate amounts in the issuing spring water. The continuance of these springs (undamaged) is essential for the health of the fen habitat. Spring flow protection **in perpetuity** is required. The fen needs as large an area as possible of adjacent green habitat with permeable soil to ensure it receives the right amount and right type of water. **There is no proof that artificial drainage systems (SUDS) can replicate these natural processes.**

The proposed development lies within the calculated rainwater catchment of the South Fen (unit 2) of the Lye Valley SSSI, as defined by C. Lamberth in his Hydrology Report to Oxford City Council dated 2007. See http://www.oxford.gov.uk/Direct/72511FINALAssessmentofhydrologicalimpactofdevelopmentonLyeValleySSSI.pdf).

The whole point of this hydrological study was to assess which areas in the adjacent Lye Valley and Golf Course would be unsuitable for housing because of potential damage to the hydrology of the Lye Valley SSSI. To protect the spring flow to all of the present, extremely rare, calcareous alkaline fen habitat in the Lye Valley **in perpetuity** the principle of '**Catchment Protection or Groundwater protection zones'** should apply as discussed in this report. The specific rainwater catchment for the South Fen SSSI unit was requested by Natural England and has been calculated and supplied by C. Lamberth. The delimited area is already approximately 50% built over in nearby estates, with impermeable hard surfacing of buildings, paving or roads.

Thus, due to restriction of water infiltration as a result of previous development, the South Fen SSSI springs are already not producing sufficient water to completely protect this rare habitat.

In order to provide the recommended catchment/groundwater protection, all remaining currently green, fully permeable, vegetated areas (gardens, verges, playing fields, allotments etc.) within the rain water catchment need to remain as green and as *completely freely* permeable as they are today. Any form of development (even with mitigation SUDS) on this catchment would affect groundwater and would be damaging. C. Lamberth states this on page 37 of his 2007 report:

> '*Groundwater protection zones are not fully mitigated by the use of SUDS and development within these areas should be restricted or eliminated'.*

C (ii) Buffers and protection zone for springs

In this proposed development, the projected location of a SUDS water infiltration swale has no borehole or infiltration study data. It is located in an area right down at the SSSI margin and thus may contain peat, part of the historic fen habitat. If this were so, it would be ecologically very damaging to carry out any form of excavation in this area. Spring flow patterns to the SSSI would certainly be disrupted.

The recommended buffer or protection distance for springs is **50 metres** (pers. comm. hydrologist Curt Lamberth). An undeveloped buffer zone with no ground disturbance of at least this distance is necessary to ensure no detrimental change to the spring flow or chemistry. This distance above the SSSI would encompass most of the proposed development site and make the development unviable.

C (iii) Recent beneficial change in spring flow to the SSSI

An important new change to the SSSI is the **increased contribution of spring flow to the South Fen from the development site since March 2016**. From March-May 2016, grant-funded agreed management of marginal ditch damming/bunding by Oxford City Council workers and FoLV volunteers to divert water previously running past the fen onto the nearby surface has occurred. This is remediating sections of the fen that were previously too dry (see Appendix for location of this activity and discussion). Whereas before this activity the proposed development site might have contributed less than a sixth of the total spring water flow to the South Fen, the recent assessment of the newly-wetted zone indicates that now **at least 40% of the water reaching the fen originates from the proposed application site via ditch diversion.** This is all water that used to flow off the application site via the ditch and be lost to the Boundary Brook (where no doubt it would have augmented the brook's flooding potential).

The proportion of the whole SSSI now benefitting from good quality spring water from the proposed development site has recently very much increased. Therefore it is even more important that no damage, disruption or chemistry change to this flow occurs, because a bigger proportion of **the SSSI would now be impacted.**

C (iv) Site Topography, run-off and SUDS

The Application's supporting documents state there is a 20m drop in height from the road edge of Town Furze down (over the SSSI fen) to the Boundary Brook, over a linear distance of 160m. From the topographical contour map supplied with the application, it appears there is a height drop of 6.5m from the edge of the road, over the application site, down to the southern edge, which is actually also the north-east edge of the SSSI fen.

This is sloping ground, where considerable overland flow of water may already be expected because of the topography. The current vegetation cover of rough scrub and trees is ideal for the fen downslope as it will slow down and limit any overland flow and allow more rainwater penetration via root channels into the ground. The loss of a high proportion of this vegetation cover with any development will increase surface run-off (and potential problems with erosion) and, by reducing infiltration, decrease the supply of water to the fen springs. However, a mitigation SUDS collection and infiltration scheme is proposed.

C (v) Issues which may stem from proposed mitigation SUDS

A SUDS mitigation interception swale is proposed for this development but here such mitigation would not just have to deal with the more usual and easy job of reducing flood risk by intercepting and storing run-off water (normal SUDS role). **It would have far more complex and difficult tasks to perform** – namely to protect the adjacent fen springs by ensuring their water flow pattern and critical water chemistry remain unchanged. SUDS mitigation for such a challenging role is, as yet, nationally completely unproven. There are no working successful examples of SUDS to protect critical spring flow and water chemistry to a calcareous alkaline valley-head spring-fen. **No evidence or proof of successful functioning exists and this is required before general acceptance of such systems**.

The recently agreed housing development on Oxford City Council land at Warren Meadow off Warren Crescent is adjacent to the North Fen section of the Lye Valley SSSI. It has an infiltration SUDS agreed that is **entirely experimental**, the first of its kind, and it requires an agreed rigorous maintenance schedule for the lifetime of the development. A condition of this housing development is that the **SUDS should have its functioning monitored** to ensure that no damage from development run-off occurs to the adjacent spring-fed fen. It will be a number of years (maybe 10 or more) before this monitoring reveals evidence of either successful protection of the fen or damage. Costs of maintenance and monitoring are likely to be significant. If damage to the fen occurs, remediation is likely also to be expensive (assuming it is even possible – it may not be).

Hydrochemistry and the proposed SUDS
Water with a very high level of dissolved calcium (supersaturated) and high alkalinity or, in other areas, a high level of dissolved iron, is required from the fen springs to support the rare wildlife. Very low nitrate and phosphate levels are also required. Water from roofs and paved areas in this development will be simply the chemistry of rain water (slightly acidic) and have no calcium or iron. Water arriving at the very edge of the SSSI from the swale from this development will inevitably have the wrong chemistry.

Water delivery rate to the fen and the proposed SUDS
When rain is falling, water will be delivered very quickly from roofs and paved areas to the swale position downslope, which is right on top of the springs, but **slow seepage** to these springs, not fast delivery, is required by the SSSI. The springs may be overloaded by water that has had no opportunity to achieve the right chemistry by slow percolation through the soil of the slope, so the fen springs will be over supplied with water that is too much like the chemistry of rainwater and deficient in the chemicals required.

Potential for spring pollution - proposed SUDS and sewer network
Pollution of the springs with chemicals from cars parked on the permeable paving (oil, petrol, diesel, antifreeze etc. and including soluble phosphate-rich detergent from car-washing) is also a possibility.

Phosphate is a very significant chemical in this context – it must remain **critically low** in spring water for the health of this rare alkaline fen habitat, which needs the lowest of low phosphate levels, ie water quality equivalent to that of a chalk stream.

Serious Water quality issues for springs in the North Fen SSSI unit 1 related to development sewerage network have recently been identified.

A simple water chemistry survey of springs near to the housing development in the North Fen SSSI Unit 1 close to the fen has shown evidence of pollution (Freshwater Habitats Trust Citizen Science water surveys test kits, spring 2016, data supplied by FoLV to Oxford City Council and Natural England on 12.05.2016). Previously allowed development next to this fen has been proven to damage spring water quality, as it has a **high nitrate level**. It might be said that new sewers in a new build would not have the leak problems of old pipework but all sewers need joints between sections. Can there be any assurance that leaks will never occur in 100+ years' time?

C (vi) Lack of future control over the SUDS for the proposed development, resulting in potential lack of future maintenance, lack of monitoring of functioning and lack of remediation and replacement as necessary

SUDS maintenance

These SUDS would have to work in perpetuity to prevent damage to the fen. Promises of annual maintenance might be made, but how would this be enforced **in perpetuity** with future ownership changes? All SUDS ultimately become less permeable over time without appropriate expensive maintenance. Also there would be little likelihood of **replacement** when they have become virtually non-functional due to silting up (in approx. 20 years for permeable paving).

SUDS monitoring

With a private development, there is no likelihood of the kind of **costly monitoring of functioning** that recently was made a condition for the agreed Oxford City Council Warren Crescent housing development near the North Fen Unit 1 of the Lye Valley SSSI fen.

Measurement of any damage to SSSI in the future if development in place

Water quality monitoring in the adjacent South Fen SSSI springs would be necessary for **at least a year before development commenced to get a normal baseline of flow and chemistry**. Then monitoring of these springs would have to continue for the lifetime of this development to detect any deleterious change. Who would carry this out and who would pay for it? Conditions and covenants may be put in place but how likely are they to achieve what is needed here?

In order to protect the adjacent SSSI South Fen area **in perpetuity,** FoLV must take the long view and therefore view all SUDS on private land, such as 'permeable paving' will ultimately become very much less permeable – approaching impermeable – over time *because essential maintenance cannot be enforced*. **Thus, such a development with SUDS cannot be regarded as ecologically 'sustainable' with regard to protection of the adjacent fen's hydrology.**

If monitoring of the South Fen spring water were possible with this development in place and showed damaging change in water volume or chemistry, what mitigation/remediation would be possible on private land and who would pay for it?

C (vii) Gardens in the proposed development – lack of control over future soil permeability and thus over hydrology

Future private owners of any of the four large houses proposed could legally extend their properties for 8 metres downslope into the gardens above the fen or impermeably pave them over completely, **without the need for any planning permission**. Therefore it is not possible to ensure that even the gardens of the four houses will retain the soft green vegetation, and thus the permeability currently present, to provide the rainwater infiltration that the adjacent fen requires in perpetuity. As the gardens would be on land **sloping down to the fen,** such extension or paving activities are more likely to result in a potentially damaging (erosive) sheet run-off overland water flow (an additional flow the SUDS is not sized to cope with) towards and into the fen, depriving it of the slow infiltration needed.

The **extreme rarity of the calcareous alkaline fen habitat at risk** in this very important catchment area has led Friends of Lye Valley to conclude that SUDS cannot be considered an adequate mitigation measure to protect the South Fen springs **in perpetuity**. The precautionary principle should apply in this most sensitive of sites.

D. Effect on the future of wetland habitats in the whole valley and increased flood risk

Allowing development on this site would set a **damaging precedent for development** on green areas to the west of Lye Valley Road, along its whole length, on areas of high ground with a steep slope into the valley and brook.

Any development and further loss of permeable green space here will result in increased surface water run-off, further erosion of rare fen habitat and further flooding problems in the area or downstream (Cowley Marsh/Barracks Lane/Florence Park area).

This would also compromise the long term 'Vision for the Valley' that FoLV are producing at present. This features a proposal to remediate habitat to good wetland, wherever possible, and to reconnect the North and South SSSI units with wetland adjacent to the Lye Brook (see Appendix). This proposal includes reducing flood risk in the brook by retaining water to wet-up dry relic wetland areas up and down the valley next to the brook.

Keeping the whole east side of Boundary Brook (garden land west of Lye Valley Road) permeable and green will ensure there is minimal run-off to the brook.

The whole of the green area west of Lye Valley road needs to remain an undeveloped 'Natural Ecologically Sustainable Infiltration Drainage System', which, with further work, will be of very substantial use in reducing flooding in housing areas further downstream adjacent to Boundary Brook.

National Planning Policy Framework and Planning Practice Guidance 9 discuss the '**Presumption in favour of sustainable development',** which is mentioned in the application documents. In a location near such a wetland SSSI, any proposed development needs to be '**Sustainable' in an ecological sense**, not in the common practical sense of managing run-off and reducing flooding risk. In the light of the discussion above about hydrological issues and potential damage to the South Fen SSSI, FoLV contend that this application cannot be viewed, **in an ecological sense**, as a 'sustainable development' at all, therefore the presumption for development as in PPG 9 should not apply.

We ask that the Committee refuse this application on all the above grounds.

Yours sincerely

The Committee of the Friends of Lye Valley (FoLV):

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http://www.friendsoflyevalley.org.uk/

Appendix

A.
The following comprises extracts from a full report with accompanying species lists for 10 years of survey work carried out on the South Fen SSSI unit by Dr Judith Webb from 2006 to 2016, which was supplied to Natural England on 10 May 2016 by Dr Webb:

Lye Valley SSSI South Fen unit 2 – Biodiversity present and evidence of significant habitat and biodiversity improvements over the last 7 years *Abridged version by Judith A Webb, 16.05.2016*

The South Fen is a very small site (Natural England website lists it as **5.375ha**) under 5 separate ownerships, but in this small area survives an astonishing plant diversity, with many rare and scarce wetland species of calcareous, alkaline fen. Invertebrate diversity is expected to prove to be as good as the plant diversity, when more comprehensive data has been achieved.

Importance of the site

The South Fen section of the Lye Valley SSSI site is an example of rare calcareous alkaline fen on a remaining depth of just over a metre of peat and tufa. The remaining short calcareous fen vegetation was assessed in 1991 by Wanda Fojt of English Nature in her '***Comparative survey of rich calcareous fens of Oxfordshire'*** as **National Vegetation Classification (NVC) type M13b 'black bog rush - blunt flowered rush'** (the rarest of the three subtypes within this classification). It is still identifiable as this NVC type and current assessment of the remaining resource of this rare fen type throughout all England reports the total area of M13 fen remaining as only **19.1 hectares, of which the South Fen contributes just over half a hectare** (TRATT, R., PARNELL, M., EADES, P. & SHAW, S. (2013) 'Development of Inventories for Annex 1 habitats 'Alkaline Fens' and 'Transition Mires & Quaking Bogs' in England', Report to Natural England).

Whilst not all of the SSSI is currently M13, the whole area is remediable to M13 in the near future.

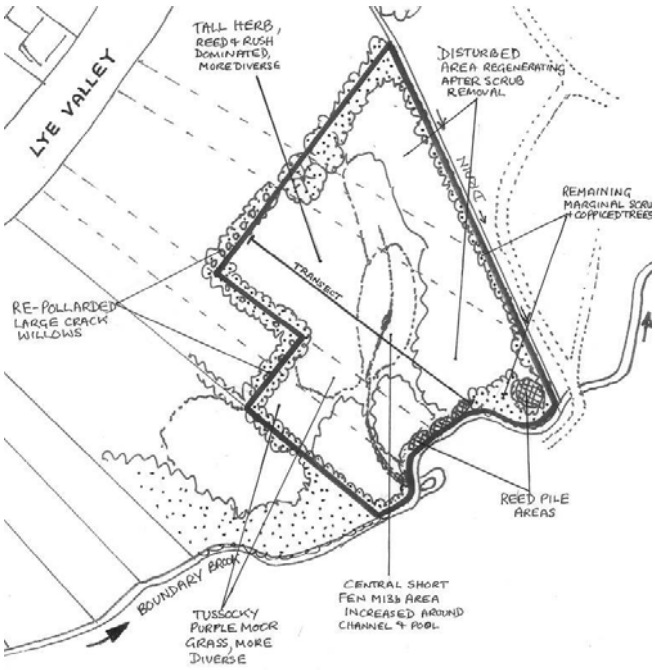
Once it was part of an extensive wetland – the old '**Hogley bog' of the 1600s and 1700s** (see sketch map **Appendix Page IV**), which until about 1910 stretched all the way along the Boundary and Lye Brook to the North Fen SSSI area, when extensive grazing ceased. Due to 100 years without grazing or other management the area of main short diverse fen plant interest in this southern unit had declined to a small central zone by 2006, when I first saw it. The margins at that time were dominated by invading scrub and reed. Remedial management started in 2009 with removal of all trees and scrub within the site margins.

Since 2009 this Natural England grant-funded work in conjunction with work of volunteers from the Oxford Conservation Volunteers and FoLV has improved habitat condition greatly. In my opinion, this is the **most improved alkaline fen** area in the county over the short time it has had remedial management. This is in comparison to my knowledge of the current status of other Oxon fens that are being remediated, especially Cothill Fen SAC, where I work closely with Natural England as a species recorder and voluntary adviser.

On the surface of the fen can be seen the complexity of its hydrochemistry, resultant from spring flow. There is a pattern of either iron oxide deposition (orange or mirror-like deposits, resulting from spring water mainly from the Beckley Sands) or whitish tufa deposition (Calcium carbonate, spring water mainly from the Headington Corallian limestone) over the whole fen surface. The small central pool is iron oxide dominated; in other areas pure white tufa carpets the surface, but other areas are mainly peaty. The spring line is to the north-east of the fen SSSI limits, **for the most part actually some way upslope, within the private gardens above the fen.**

This South Fen unit has an on-going problem of drying-out towards the Boundary Brook due to erosion (from flash flooding) of the brook bed to a depth of 2m next to the fen. This has lowered the hydrological gradient in the adjacent peat and consequently the peat is too dry here for wetland plants, so that they are restricted to zones farther away. However, Natural England grant-funded remedial wetting-up of dried-out peat areas is almost complete. Since March 2016 a drain taking spring water away on the south side of the fen has had sheet dams or natural bunds constructed along its length. Currently, almost all the spring water previously lost into that drain is now directed onto nearly half of the fen, re-hydrating a large area. The result is that the surface is wet and there are shallow pools on peat areas that were once dry. This is the ideal situation. The response of the vegetation to this extra water will take some months, but it is expected that the key species of rare M13 vegetation type will now be able to expand their populations into the re-wetted zone.

The bunding of this drainage ditch and diversion of its water means that any overland or spring flow from the southernmost land ownership strip (currently under a planning application for housing) is now going to directly impact the SSSI (previously this water went past it). **This raises the importance of the southern-most ownership strip in the future health of the whole SSSI, as it now contributes far more spring water to the SSSI than before.**



Sketch map of SSSI South Fen unit 2 following from remedial tree and scrub removal and reed and rush cutting and raking. Note north is to the left, south to right of the diagram. Ditch/drain that has recently been dammed is to the right edge of the site over the hedge.

Current biodiversity

The site holds 135 flowering plant species in total, 97 of which are in the calcareous fen and not marginal hedges or trees. Of these 135 flowering plants, **22 species** are on the county **Rare Plants Register**. Considered as a proportion of only the fen plants on site, the **proportion of county or nationally rare flowering plants is 23% (the rare ones are all wetland species).**

Additionally **14 flowering plant species** are on the **England Red List**.

For one small sedge and one small rush, this is almost the **only site left in Oxon** (dioecious sedge and few-flowered spike rush). It is the only native Oxon site left for the bog bean, the only site in the valley (or the whole city) for southern marsh orchid. It has the biggest population of **grass of Parnassus** in the Lye Valley (max 120 flowers to date) and this is one of only 4 sites for it in the whole county. Oxon is now the southern limit of grass of Parnassus in England, this species having been lost from many lowland counties south of here and under threat in several more. The **first national record for grass of Parnassus was from Lye Valley in 1570** by Matthias de Lobel. Therefore this is a botanically historic, iconic population.

The South fen unit was the last site in the valley for rare **black bog rush** which was seen by Francis Rose in 1983, and may yet recur. There is a very large population of blunt-flowered rush, Juncus subnodulosus. There are 4 species of orchids on site, with Nationally Scarce **marsh helleborine orchids present in very large population – over 1000 flowering, many more vegetative.**

In total 20 species of mosses or liverworts have so far been recorded, including **at least 8 very scarce in the county or nationally.** The most abundant mosses of the calcareous tufa areas are common species such as Calliergonella cuspidata and Cratoneuron filicinum, but there are important quantities of the typical and scarce 'brown mosses' of such calcareous fens, such as **Campylium stellatum** and **Scorpidium cossonii**.

Most importantly**, 42 flowering plant species have been recorded as new to the site since the start of the Natural England facilitated better management of scrub removal, willow pollarding and reed cutting and raking from 2009.**

Many of these new plant species have arisen from the seed bank, thus **'back from the dead'.** Examples are**: lesser spearwort, marsh valerian, ragged robin, bugle, bristle club-rush, distant sedge, yellow loosestrife, marsh woundwort, brooklime, watercress**

Others, like some sedges, may have been present in just a leafy condition in shade of scrub (difficult to identify) and have now flowered (become identifiable) with increased light and wetness (examples are: **bottle sedge, flea sedge, dioecious sedge, tawny sedge, meadow thistle**). There is hope yet for the re-appearance of important species such as **butterwort** (last seen here by Wanda Fojt, in an Natural England survey, 1991) and for **black bog rush** (last seen here by Francis Rose in 1983).

Some valuable rare plant species have shown great population expansion since better management started in 2009 – **bog pimpernel, common cotton grass** and **broad-leaved cotton grasses, marsh valerian** and **marsh lousewort**. Increases in commoner species like bugle are very beneficial nectar sources to spring insects.

The site has a small population of the invasive Himalayan balsam on some margins. However this is now regularly kept out of the fen proper by 2-3 pulling sessions a year carried out by volunteers of Friends of Lye Valley.

Fungi

An interesting range of fungi is present, the rarest of which is the **alder bolete, Gyrodon lividus,** for which this is the only Oxon site according to the records of the Fungus Survey of Oxfordshire (I am the Recorder for this group). This species is a mycorrhizal associate of alder trees on the brook margin.

Animals

Notable vertebrates found so far include common frog and grass snake.

Invertebrate data is still very preliminary, as survey work has been restricted to observation and sweep-netting from occasional visits, combined with a small amount of hand searching and rearing from materials like moss mat and water-logged deadwood. **Glow-worms** are present along with a good population of the tiny **marsh whorl snail, Vertigo antivertigo**, which is very scarce in Oxon.

Despite the very limited coverage, the assemblage is indicative of a valuable invertebrate site. The whole Lye Valley has a large number of historic (pre-1938) invertebrate records, which include a good number of rare species. Better surveys by a range of methods are now needed to see if these species still survive. Nationally, calcareous seepage fen sites are known to host a range of rare to uncommon invertebrates that can **persist often in very small areas,** as long as there has been long continuity of spring flow with appropriate water chemistry, beneficial management and without any damaging operations.

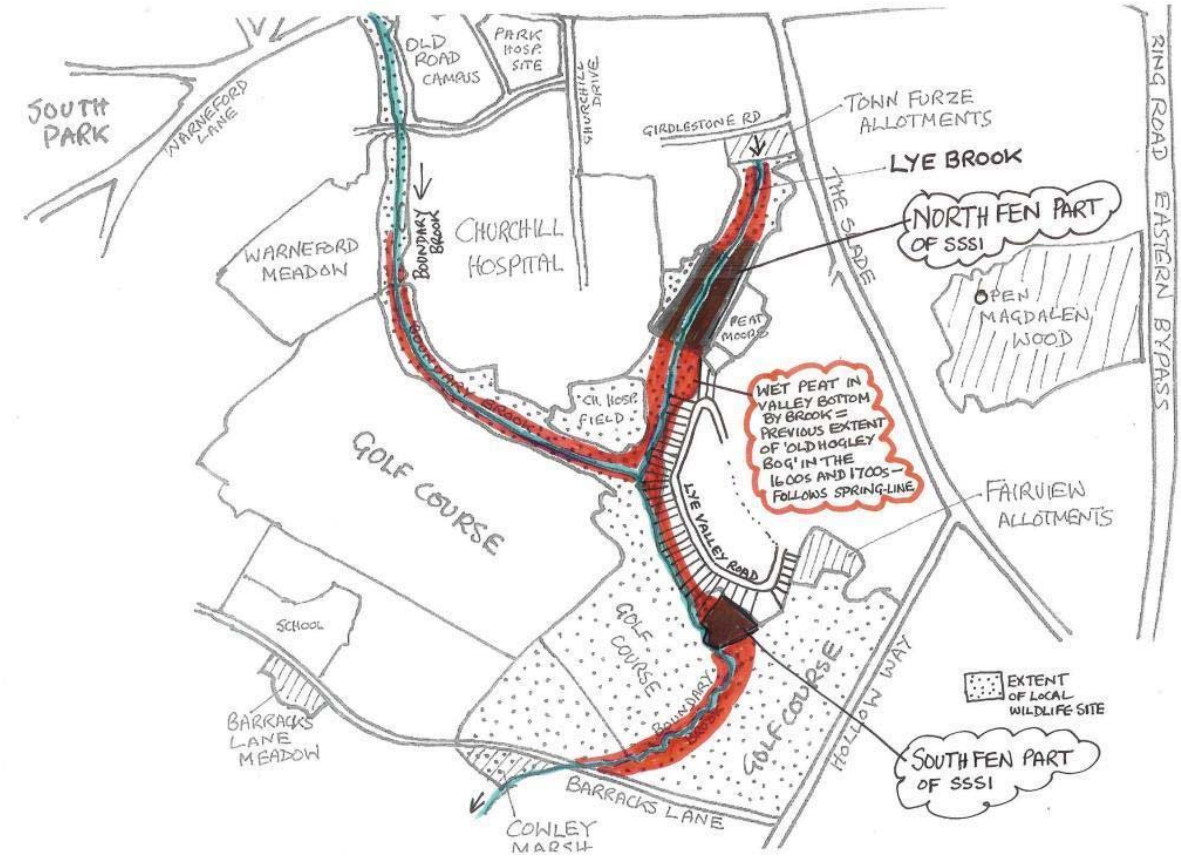
A small number of rare or nationally scarce insects have been recorded between (2006 and 2016). Two Red Data listed invertebrates, the **water penny beetle Eubria palustris** and the cylindrotomatid cranefly, **Triogma trisulcata** are dependent on fen with water-logged moss mat or shallow pools. Other than that, the **Section 41 (UKBAP) southern yellow splinter cranefly, Lipsothrix nervosa** was reared from water-logged deadwood in a tufa-forming shallow water area.

Mention may be made of such Notable/Nationally Scarce flies present such as: **Spania nigra, Oxycera pygmaea, Vanoyia tenuicornis, Dicranomyia lucida, Thaumastoptera calceata, Leptomorphus walker, Zophomyia temula, Pherbellia nana**. Most of these depend on wet calcareous short fen vegetation. The banded general soldierfly **Stratiomys potamida** caught on site is not confirmed as breeding and this species is now so common that 'Local' status seems more appropriate than the Nationally Scarce it used to have. The notable short wing beetle **Glaphra umbellatarum** and the Notable buprestid beetle **Agrilus viridis** are presumably breeding in old trees on the site margins. The Jewel cuckoo wasp **Trichrysis cyanea** also seems to be uncommon or rare. One session of moth trapping has been carried out, which produced a long list of species, one of which (the Black Neb **Monochroa lutulentella**) appears to be Nationally Scarce B.

B A proposal from FoLV 'Vision for the Valley' (draft)
Crucial role of the South Fen SSSI unit in the future of the entire Lye Valley alkaline fen wetland and habitat improvement plans up and down the valley. Survival of SSSI units 1 & 2 into the future

Whilst very small in size and not publically accessible, the SSSI South Fen unit 2 will have a crucial role in the future in supporting the populations of the rare and threatened species that are being helped in the North Fen Unit 1 of the SSSI (600m distant), which is now accessible to all for wildlife appreciation. Friends of Lye Valley (FoLV), who are the main volunteer group working in the valley, have proposals (in their 'Vision for the Valley') for the brook corridor between the two parts of the SSSI to be targeted for habitat remediation wherever possible, to provide '**stepping stone'** shorter habitat sites on old fen peat (relics of the old 'Hogley Bog', which extended the length of the valley in the 1600s and 1700s) to enable more mobile species to move from one calcareous fen unit to the other of the whole SSSI, freely. This will help the genetic pool of populations currently isolated in the two fen units and give them a greater chance of resilience in the face of climate change and other pressures. '**Bigger, better, more joined-up'** is definitely the aim here (Lawton Review, 2010).

FoLV will first seek arrangements with owners of portions of relic fen to achieve management of short fen for wildlife in these garden sections on a voluntary basis. We also propose to apply for funding to set up a trust to buy and manage small ex-fen bits of bottoms of gardens all the way up and down the valley – connecting the two portions of SSSI fen and involving any relic bit of the old Hogley bog. Consequently, the survival of the South Fen unit in an undamaged state is of very high importance for more than just that small area; therefore the precautionary principle of no further catchment development is appropriate.



Lye Valley sketched to show the extent of old 'Hogley Bog' in the 1600s and 1700s coloured red. Position of the current North Fen unit 1 and South fen Unit 2 of the Lye valley SSSI indicated darker.

References:

Lawton, J., (2010) Making Space for Nature: A review of England's Wildlife Sites and Ecological Network. Submitted to the Secretary of State, the Department for Environment, Food and Rural Affairs.

Fojt, W. (1991) '*Comparative Survey of rich calcareous fens of Oxfordshire*', unpublished English Nature Report No. 139