

Year One in the Dorn and Glyme Valley

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As planting of the first 100 ha of a new scheme on Blenheim Estate neared completion, estates director Roy Cox and Nathan Fall of Nicholsons Lockhart Garratt shared the lessons learned and what they will carry forward on future projects.

THE 12,000-acre Blenheim Estate encompasses a 2,000-acre World Heritage Site comprising Capability Brown-designed parkland and SSSI designation for ancient oak woodland and two lakes with wading birds, 2,000 acres of mixed woodland with a sporting and productive element, young crops releasing approximately 200 tonnes of timber a year, plus 8,000 acres of arable land and grassland.

In 2010, the World Heritage Site welcomed 300,000 visitors. Following the introduction of its 'annual pass' scheme and an increase in events, visitor numbers increased to over a million in 2019. Given the estate's rural nature, over 90 per cent of visitors travelled by fossil fuel-based transport.

Estates director Roy Cox, who has been with the estate for eight years, said: "The Dorn and Glyme rivers merge in the valley to the north, running into two lakes in the World Heritage Site. The Queen's Pool and Great Lake were last dredged 130 years ago. Soil erosion from arable crops has added (on average) an inch of silt each year (the July 2007 storms adding 7 inches of silt during one flood event), causing

agricultural phosphates and nitrates to build up, creating a sink effect."

In 2016, monitoring water quality (with Natural England) showed Queen's Pool to be hypereutrophic (lacking oxygen), tipping the SSSI status into 'Unfavourable and Declining'. Roy said: "We began building a case to dredge the lakes. Without it, they would revert to a wetland and 'Britain's finest view' (according to Randolph Churchill) would have been lost."

In 2019, a carbon assessment carried out by consultancy Pilio (emerging from Oxford University's Environmental Change Institute) measured a baseline carbon footprint of 32,000 CO₂e (carbon dioxide tonnes emitted) across the estate's three businesses (visitors, land and property). "This is twice that of a typical UK service business and includes Scope 3 emissions

(results of activities from assets not owned or controlled by the reporting organisation, but that the organisation indirectly impacts in its value chain). 60 per cent of this footprint is visitor travel and unsurprising when a visitor attraction survives by bringing people to you."

Blenheim Estate is committed to carbon neutrality by 2027.

From 2027 to 2050, it will remove a further 230,000 CO₂e through a range of ambitious projects outlined in a Green Report (www.blenheim.org/books/2021/green/). "On an estate like Blenheim, woodland creation was always going to be a part of our 'neutrality'."

Under the Countryside Stewardship Scheme (CSS), a landscape plan to improve the water quality in Queen's Pool was designed in conjunction with local forestry company Nicholsons Lockhart Garratt, by mapping the areas most at risk of soil erosion,

FROM CONCEPT TO PLANTING, WE SHOWED IT IS POSSIBLE TO CREATE WOODLAND IN ONE YEAR. IT WAS INCREDIBLY STRESSFUL AND THERE WAS NO ROOM FOR ERROR.

coinciding with the land most unsuitable for food production: riverbanks and steep slopes (over 3 and up to 5 degrees). "This provided the areas on which to plant woodlands, locking up many of those problems," said Roy.

Although unsuccessful in securing funds through the Green Recovery Challenge Fund (2020), the plan illustrated the wide range of benefits that woodland planting at this scale - 270,000 trees growing in nine new woodlands across the Dorn and Glyme Valley (D&GV) sequestering 20,000 tonnes of carbon in the first 25 years - could hypothetically deliver.

Placing the plan with the not-for-profit Forest Canopy Foundation (FCF), a corporate partner looking to invest in woodland creation carbon offsets was found in Morgan Sindall Group (MSG), and in Nicholsons Lockhart Garratt (NLG) a woodland-creation 'expert provider' to plant and manage the resource for an agreed period.

For Blenheim, the FCF's brokerage of 'blended finance' (a mix of private carbon investment and public grants) means that, "woodlands, for the first time in a long time, are not just the right thing to do for the land, but they also make economic sense. Converting agricultural land to woodland can now achieve comparative yields in excess of 3-4 per cent (marginal agriculture yields 1.5 per cent) before factoring in timber production, illustrating that you can do the right thing and improve the financial performance of poor agricultural land by planting woodlands through these mechanisms."

The D&GV scheme was the first to go ahead under the new England Woodland Creation Offer (EWCO). As a 'Canopy Carbon+' woodland (woodlands sequestering carbon plus), it qualifies for five of the six stackable payments: 'nature recovery', 'flood risk', 'water quality', 'riparian buffer' and 'social benefits' (recreational access/

woodlands close to settlements). The sixth, 'air quality' is not yet quantifiable.

ON SITE, NEARING END OF YEAR 1

Although hoping for an August 2021 start, the grant contract was finally issued in October. From start to finish, permissions came through in 10 months. "Relatively quick, given its size," said Nathan Fall of NLG.

The first site we visited was Hordley Forest School, a shallow, wind-free amphitheatre nestled in the hillside, surrounded by a large semi-circle of whips bisected by rides and pathways edged in oaks.

In a rolling programme of works, ground-preparation teams sub-soiled former arable sites along slope contours, direct-drilled a shade-tolerant orchard grass mix and scratched out shallow planting rows. NLG fencing teams then secured each site with a deer fence, ready for their hand-planting teams to begin.

At this site, the oaks planted were grown on from acorns collected from veteran trees in Blenheim's SSSI High Park and planted out by Blenheim's in-house forestry team, including the two young foresters on Blenheim's Forestry Apprenticeship Scheme.

From the amphitheatre, views across the valley illustrate the woodland story. To the west, below newly-planted Quarry Wood on the river valley's far slope, a mixed-age wet woodland (with a lone block of 20-year-old Christmas trees just above the floodplain) grows in the valley bottom at the confluence of the Dorn and Glyme rivers. To the north, a small water meadow is managed for conservation. The flat land immediately to the south will host the Forest School building. "The established woods give children the context of how these new woodlands will look in 20-30 years' time," said Nathan.

This site has hosted a number of 'planting days'. VIP visitors have included Minister Prentis, Minister Pow and project

enablers (senior representatives of the FC, Natural England and the RPA), Graham Edgell, Morgan Sindall Group's director of sustainability and procurement, and FCF 'expert provider' partners.

In March, 200 MSG staff (from across all business divisions), a Beaver Scouts group and local schoolchildren got involved during eight planting days. Via email, Graham Edgell said: "Morgan Sindall staff were eager to contribute to the planting process. Enhancing communities, which is a key commitment of the responsible business strategy, saw four local schools accept an invitation to participate in the outdoor experience and plant trees while being given a guide to life as a forester."

As we reached Tittenford Bridge Wood, at the north end of the valley, it was threatening to rain, a prospect Nathan welcomed. We watched as a planter planted, canes were firmed and spirals spiralled. Conifers planted at 1.6 metres spacing within the rows bleed in wispy lines into broadleaf plantings. Nathan said: "Initially, we considered using a machine for planting, but the soils were considered too stony. Blenheim and MSG wanted their project to be 'plastic-free' so we are using Rainbow Bio-spiral (corn starch) tree guards. They are relatively untried in a real-world environment but have, thus far, proved effective."

Species are planted in groups of 25-50 plants, ensuring "the faster growers don't dominate and that in 50 years' time all of the scheme's 27 species are represented."

Lines of shade-tolerant orchard grass seed mix are taking off. "They are stabilising the ground, stopping the immediate soil run-off, and starting carbon sequestration in the soil." The clover-rich mix provides biodiversity gains, food for pollinators and foraging birds, and less open ground for weeds to seed into. "Once planting has finished, we enrich the rides with



Main: A view of newly planted trees and Woodstock.

Left: Tittenford Bridge Wood: Site access via a meandering track.

Left top: Blenheim's estates director Roy Cox.

Left below: A map of some woods visited with Nathan Fall in the Dorn and Glyme Valley. Castle Wood and Stratford Bridge Wood will be planted next season.

WOODLAND CREATION

wildflowers to further increase biodiversity and to please site users." Spot-spraying around each tree began this spring.

Above us, a singing skylark ascended (in February). Of the intensively farmed arable Cotswolds limestone soil, strewn with limestone chunks, Nathan said: "This ground will dry out very quickly if we get a dry spring."

Looking down into the valley from Upper Dornford Wood, pollarded willows line the River Dorn and the deliberate 'flooding' that is the result of the Blenheim Estate's floodplain management to reduce peak water flows from the cultivated fields opposite. "We are helping by planting woods on top of the far slope and mirroring that over here."

Water quality sensors will be installed along both rivers and should hopefully indicate improvements.

Seven of the nine proposed woodlands were due to be planted this season. By April 1, 13.7 km of fencing was erected and 193,500 trees planted. The remaining woods will be planted next year.

When asked if planting 84 per cent broadleaf and only 16 per cent faster-growing conifers is a missed opportunity both for homegrown timber and for storing more carbon, Nathan said: "The yields of broadleaf planted here (Yield Class 6 to 8 in lowland England) are very low when compared to faster-growing, productive conifers. But to say this is to lose sight of the political climate we are planting in. Taxpayer money is spent on the wider benefits that broadleaf woodlands bring, for nature and people. We have tried to get the balance right.

"Up until grant permissions were given last October, it was all theoretical. What you see now is the 'proof of concept', planting a new woodland at scale in lowland England, something lacking for years until now."

All 'Canopy Carbon+' woodlands are independently audited by Grown in Britain (GiB) and under the Woodland Carbon Code. Having passed GiB's Canopy Design audits before planting, the first post-creation audit will take place this summer.

Dougal Driver, GiB's CEO, is delighted with this project, the first developed under its new 'Canopy' design and auditing metric. He said: "It brings together a wonderful GiB-certified estate and one of our biggest strategic partners in Morgan Sindall. We are also impressed by the input of the 'expert

provider' Nicholsons Lockhart Garratt and the overarching match-making of the Forest Canopy Foundation."

Graham Edgell summarised: "The collaboration between a landed estate, a forestry company, and a construction and regeneration business has delivered seven woodlands - climate-resistant and plastic-free. Quite an achievement in less than 18 months from the initial concept. We now look forward to completing the additional two woodlands later this year, creating a legacy for generations to come."

LESSONS LEARNED (EXPERT PROVIDER)

Converting a woodland-creation scheme:

Converting a scheme designed under the CSS to the new EWCO highlighted a fundamental flaw. If the land proposed for new planting has been taken out of a previous agricultural scheme (CSS, European funding), it was ineligible for EWCO (UK funding). "To their credit, the FC and RPA ironed out the issues fairly quickly," said Nathan.

Conversion also highlighted a woodland design issue. Under the CSS, the scheme's conifer element was homogeneous, being easier to manage and to concentrate the fire risk. "Under EWCO, these non-native blocks were too big, not intimately mixed, and didn't qualify for a Biodiversity Area Payment. Instead of planting 2,000 stems per ha, we had to plant at 2,500 and Blenheim is foregoing that element of the biodiversity grant income linked to the conifer areas."

Archaeology: The two woods yet to be planted are near the (Roman) Akeman Street, now, in part, a public highway and public footpath. "We naively assumed that because the fields were

intensively cultivated for 80-plus years (with no scheduled monuments and shallow underlying geology) that we had chosen low-risk planting locations. However, woodland creation is considered a land-use change similar to building houses.

Archaeologists (as statutory consultees) wanted a 'proof of absence' rather than 'proof of presence'.

Geophysical surveys were carried out at considerable cost and we are awaiting decisions from Historic England and the FC on whether we can plant within the original proposed footprints next year."

The Woodland Creation Planning Grant was unused. "Had we used it, we would have discovered the archaeological issues early



on, but it would not have speeded up the planting process and it is likely that nothing would have been planted this winter as a consequence."

Ground-truthing soil carbon: Carbon values are currently being sampled. But, given the rates of soil carbon sequestration in new woodland, it will be at least five years before they are re-measured and the results compared.

Roy suspects the transition from arable land to woodland will lock up "as much carbon (in the soil) as woodlands would sequester. The measurement is immature and quite subjective but, given the opportunities to influence climate change in a big way, it is an area we hope academics will continue to focus."

Operational challenges: Nathan said: "NLG has the people and the expertise. The difficulty can sometimes be whether the supply chain cooperates and the weather lets us operate. Some plant suppliers delivered later than expected, due to pickers and graders self-isolating. January was dry and we are concerned about the lack of moisture for the conifers on exposed sites (most are exposed)."

February's storms (Dudley, Eunice and Franklin) caused site access issues (boggy

and Nathan had to secure each site "to stop rubbish blowing all over West Oxfordshire". All canes and spirals pushed over were straightened and firmed shortly after.

"From concept to planting, we showed that it is possible to create woodland in one year. It was incredibly stressful, on the regulators, the managers and the contractors, and logistically, there is no room for error."

In future, a two-year window will likely be used. "We would ideally love to be getting trees in the ground quicker, but with climate change, multiple restrictions and regulations, sadly this is not possible."

LESSONS LEARNED (LANDOWNER)

Tree species and sourcing: Roy said: "Look at the tree species, not only for your soil type and resilience to disease, but resilient to a climate which is two degrees warmer than currently.

"Source trees early. Some being planted were ordered two years ago, most a year ago. UK forestry needs to address provenance and growing enough young trees to meet demand. To plant another 358 ha woodland, I will need 600,000 trees. Where will they come from?"

Plastics: "For an estate with legacy in mind, we take a long-term lens to projects. When looking back, we would not want woodland littered with plastic for our communities. Going plastic-free added 8 per cent to the overall project cost. By doing this at a scale, we are 'pump-priming' that industry." He thinks the costs will come down over time.

Public perception of vermin control: "The public's perception of fencing took me by surprise. Some view fencing as excluding people from the countryside. Address this early. Explain the reasons why, particularly for vermin control in those early years, and that after 10 years it will come down (following establishment)."

A GREENER FUTURE

Further initiatives to incrementally offset Blenheim Estate's carbon emissions beyond 2027 include renewable energy and further woodland-creation projects, this time across agricultural land around the River Evenlode (running into the River Thames), again, targeting watercourses and land unsuitable for food production.

Beginning in 2024, planting will occur in two phases. Roy said: "Planting up to (a total) 500 ha is the right level of ambition

relative to our overall footprint and we are beginning to create corridors through the estate along the lines of the old Wychwood forest."

These next schemes are projected to sequester 22,000 CO₂e over 30 years. An additional 12,000 tonnes of carbon could be locked up in hedgerows, species-rich grassland, wilder areas and community orchards. For the FCF, Ed Bradbury said there is no current standard to verify these additional tonnes.

"The FCF delivered something no other consultancy has as yet been able to offer, linking together well-grounded woodland design with aligned partners wanting to do the right thing, striking the right balance of objectives for all partners," he said. "As a landowner, saying 'I believe significant woodland planting is part of how we reverse climate change,' we were able to design woodlands that showcased the best of all the partners involved."

Roy has since been overseeing the last of the vegetation clearance around Queen's Pool. Starting in April, 340,000 m³ of silt is being removed in what is England's largest inland dredging project. "It would be great if it rained for the next two months. It has been a particularly dry winter."



Far left: Plantings of birch, hornbeam and oak (back) at the Hordley Forest School site. This site has hosted a number of 'planting days'.

Left top: Nathan Fall, woodland manager responsible for getting the project in the ground for 'expert providers' Nicholsons Lockhart Garratt.



Left below: Western red cedar, planted among the stony ground at 1.6 metres spacing within the rows, bleed in wispy lines into broadleaf plantings.

Circle: A planter plants, canes are firmed and spirals spiralled.