

**Researching SHINE evolution: how can the
SHINE methodology be updated so SHINE can be
used to inform woodland creation proposals?**

**Project E: Insights from local historic environment
services creating SHINE records**

Bedford Borough Historic Environment Team

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SUMMARY

This report sets out the background to, methodology employed for, results and analysis of key issues arising, and recommendations and conclusions of the Forestry Commission-funded Project E: Insights from local historic environment services creating SHINE records, undertaken by the Bedford Borough Historic Environment Team within targeted areas ('sub-areas') of Bedford Borough (the 'Study Area').

The project was broken down into three key strands of work within six designated sub-areas comprising: (i) the identification of existing 'Monument' records held within the Historic Environment Record which overlap with Forestry Commission mapped 'Low Risk Areas for Woodland Creation' and are not already SHINE-ed but are suitable for having a SHINE record created; (ii) the enhancement of existing SHINE records following a similar process in the overlapping areas and (iii) the mapping of discrete areas of historic woodland using historic cartographic sources, and their designation as a SHINE record.

It has demonstrated a number of obstacles arising with the current SHINE methodology when applied to woodland creation, including from the polygon and data standards in mapping 'Monument'/SHINE record' extents, the lack of facility to record former and extant historic woodland landscape character types within SHINE record data, and the lack of scope for the use of SHINE to reflect historic landscapes and their sensitivity to/opportunities for woodland creation more generally. The report also highlights potential problems with the capacity of individual HERs to carry out the level of work required to provide the extent and quality of SHINE data best needed to facilitate woodland creation which takes into account historic landscapes including previous types of woodland and tree planting.

Potential solutions have been identified on how best to resolve these issues, in particular the current limitations of SHINE in addressing historic landscapes, but also for helping HERs optimise funding bids and project outcomes which include SHINE enhancement and data creation. Key recommendations include greater flexibility in polygon creation, the creation of standalone GIS 'opportunity' layers mapping former extents of historic woodlands and types from historic maps to be supplied to/or created by the Forestry Commission, the review of the existing SHINE data structure perhaps to include historic landscape types and their sensitivity to/opportunities for woodland creation, and the integration of SHINE data creation/enhancement into future Historic England funded projects which include data accession into HERs, such as AIM.

1. INTRODUCTION

This report sets out the background, methodology, results and analysis of key issues, recommendations and conclusions for the Forestry Commission-funded *Project E: Insights from local historic environment services creating SHINE records*. It was undertaken by the Bedford Borough Historic Environment Team within targeted areas ('sub-areas' henceforward) of Bedford Borough (the 'Study Area' henceforward). This project is part of a wider portfolio of projects being undertaken by the Forestry Commission and external partners, which fall under the umbrella heading and primary aim of, '*Researching SHINE evolution: how can the SHINE methodology be updated so SHINE can be used to inform woodland creation proposals?*'; it is envisaged that the Bedford Borough results and recommendations will feed not only into the wider outcomes of Project E but also other projects being undertaken to meet the Forestry Commission's primary aim.

The project was carried out in accordance with the project brief (Forestry Commission, 2022) and responding approved project design (Clarke, 2022) and broken down into three key strands of work within the designated sub-areas comprising: (i) the identification of existing 'Monument' records held within the Historic Environment Record which overlap with Forestry Commission mapped 'Low Risk Areas for Woodland Creation' and are not already SHINE-ed but are suitable for having a SHINE record created; (ii) the enhancement of existing SHINE records following a similar process in the overlapping areas and (iii) the mapping of discrete areas of historic woodland using historic cartographic sources, and their designation as a SHINE record.

SHINE records were originally created for the Study Area in 2009 by the former Bedfordshire County Council Historic Environment Service just prior to Bedford Borough Council becoming a unitary authority in the same year with its own dedicated historic environment service. The latter have since added new, or enhanced existing SHINE records, as part of its provision of specialist advice on environmental stewardship schemes. At the beginning of this project, there were 914 SHINE records in total within the sub-areas (see section 2).

2. THE STUDY AREA

The over-arching Study Area is demarcated by the boundaries of Bedford Borough unitary authority (an area of 184 square miles) and contains the large urban historic settlements of Bedford and Kempston, the new settlement of Wixams, large villages such as Sharnbrook, and surrounding smaller villages and hamlets (see figure 1).



Figure 1: The project Study Area and its six Sub-Areas, overlaid on the Areas of Low Risk for Woodland Creation defined by the Forestry Commission

The Study Area has been divided into six Sub-Areas (see figure 1) for the purposes of targeting the three key strands of work across ‘regions’ with different characteristics and to allow for the comparative analysis of the results of the project and to inform how these differences may influence key conclusions and recommendations. The ‘regions’ or Sub-Areas were identified based upon a combination of topography, shared historic elements of landscape character type (LUC, 2020), and archaeological data. Note that Bedford Borough does not have a useable Historic Landscape Characterisation (HLC) on which to draw data from, and so the Landscape Character Assessment (LCA) has been utilised in this instance. Given their value in characterising landscapes, a key element of this woodland creation project, it may indeed be worth giving LCAs and the National Character Areas (NCAs) a more prominent role than the HLCs as a starting point for understanding landscape character in future study areas (Natural England, 2014). Although they may lack some of the finer details of the HLCs, the LCAs and NCAs arguably represent an end-point palimpsest of historic landscapes as they

have survived to the present, and are as great an element in considerations of how woodland might contribute to landscape character as the sometimes mixed bag of HLC outcomes. In addition to this, geological mapping offers further supplementary information which is of value to the understanding of the landscape and potentially as a layer in the final model for woodland creation advice.

Rationale for the Identification of Sub-Areas

The Sub-Areas are large and are broadly based upon a simplification of landscapes of similar historic character evolution (especially woodland type and coverage), although the complexity of historic landscapes within the Borough means that some areas could easily have fitted into more than one Sub-Area. Early proposals for Project E suggested focusing on individual areas smaller than the eventual Sub-Areas, but in their entirety, not just targeting the Low Risk Areas for Woodland Creation. However, informed by further discussion with the Forestry Commission, the optimum approach was considered one targeting all Low Risk Areas for Woodland Creation across the borough to enable a comparative analysis of the results between Sub-Areas and to inform how these differences may influence key conclusions and recommendations.

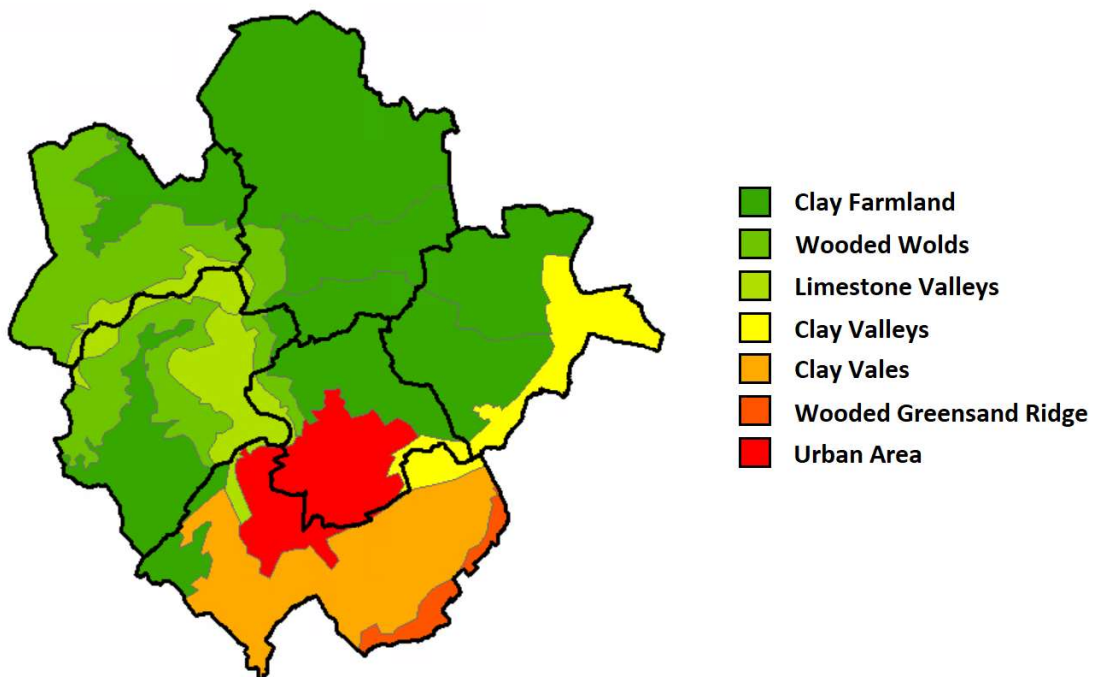


Figure 2: Sub-Areas overlaid upon identified Landscape Character Types (LUC, 2020)

To-date, the Marston Vale Sub-Area (see figure 1), being the home of The Forest of Marston Vale (a community forest), has been the main locale for woodland creation in the Study Area, and so work to create new or amended SHINE polygons within it is especially needed, assuming an increased role for this data for the purposes of woodland creation applications in the future. Meanwhile, the Eastern Wold Sub-Area has been seen comparatively few cases of woodland creation but offers the opportunity to explore encouraging applications in an area which historically had extensive woodland cover; this would accord with the SHINE Management Recommendation WDTP currently applied in Environmental Stewardship Schemes: *In areas where landscape history is important, consider restoring tree cover on previously wooded sites as per UK Forestry guidelines.*

The Sub-Areas are divided as follows:

Bedford

Bedford Borough Sub-Area (see figures 1&2) contains the parishes of Bedford, Brickhill, Clapham, Ravensden and Wilden. It covers the urban area of the town (as defined by LUC, 2020), as well as the fringe area of clay farmland to the north and north-east of Bedford in which larger developments have recently taken place on the southern slopes of the Thurleigh plateau. This area contains a relatively small part of the Forestry Commission's mapped Low Risk Areas for Woodland Creation, the largest sections being concentrated to the north of the town where agricultural land starts to appear. Archaeological features are present throughout the Sub-Area, although there is a concentration both in the Medieval town and its environs, with a spread of extant ridge-and-furrow and prehistoric to Romano-British cropmarks on the plateau slope.

Eastern Borough

The Eastern Borough Sub-Area covers the parishes to the east of Bedford, between the town and St. Neots, covering an extensive area of clay farmland with a fringe of clay valley along the Great Ouse (LUC, 2020) (see figures 1 & 2). It includes the historical Soke of Eaton (or Eaton Socon), with Great Barford being the largest single settlement. Outside of Great Barford, the region is distinguished by its mainly dispersed or linear settlements, with cottages and farmsteads spread along networks of roads, many of which run parallel with the myriad small valleys created by streams draining the watershed on the eastern side of the Thurleigh Plateau. It is possible that this distinct topography has led to the settlement morphology being altogether different in this part of the Study Area, as towards the west and on the Wold, drainage streams are altogether shorter. At present, the Low Risk Area for Woodland Creation in the Eastern Borough is very limited in extent, focused almost entirely around the former gravel quarry pits along the valley bottom.

Marston Vale

Marston Vale (see figures 1, 2 & 3), an area of urban fringe, post-industrial and agricultural land to the south of Bedford, contains the urban and rural parishes of Kempston, Wootton, Cardington, Cople, Willington, Shortstown, Cotton End, Wilstead and Biddenham. The Landscape Character Assessment (LUC, 2020) categorises the majority of the Marston Vale as clay vale, with smaller areas of urban development, clay farmland and wooded greensand ridge at its peripheries. This Sub-Area is home to the Forest of Marston Vale and has seen extensive areas of new tree planting carried across into Central Bedfordshire in recent years, extending from Willington in the east to the M1 at Brogborough in the west. It has been identified as mostly Low Risk Areas for Woodland Creation. The archaeology of the Vale includes extensive industrial and former military sites, particularly around Stewartby and Shortstown/Cardington, notably the airship hangars and former London Brickworks respectively, but also extensive pre-Medieval cropmarks to the south of Cople, Cardington and Willington.



Figure 3: The extent of the Forest of Marston Vale (© <https://www.marstonvale.org/our-story>)

Great Ouse Valley

The Great Ouse Valley Sub-Area (see figures 1 & 2) contains the parishes which lie within the extensive northern Great Ouse meander between Turvey and Bromham. The river broadly arcs to the north, to the east, and back south to Bedford in a course which contains numerous smaller back-and-forth meanders that in-turn define the boundaries of individual parishes within the limestone valley. It is a predominantly rural area, with only Bromham in the south reaching any great size. Historic river crossings at Harrold and Turvey Bridges demonstrate an area defined by the river, with villages situated at some distance behind associated meadowland. A core of clay farmland overlooks the limestone valley and wooded wold. Archaeologically, the Sub-Area blends villages of Medieval (perhaps Late Saxon origin) with Iron Age/Romano-British settlement cropmarks, and prehistoric cemetery and ceremonial sites scattered across the floodplains. It has a comparatively moderate amount of land identified as Low Risk Areas for Woodland Creation.

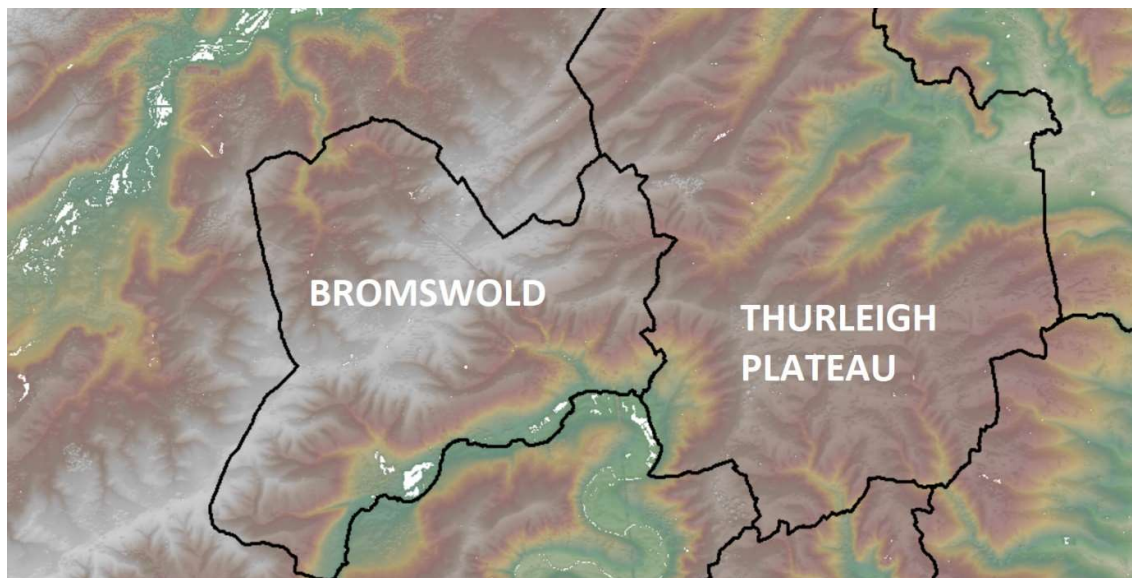


Figure 4: The two 'upland' Sub-Areas overlaid on a heightmap derived from Environment Agency lidar

Western Wold

The Western Wold/Bromswold Sub-Area (see figures 1, 2 & 4) is located mostly on the Bromswold, an area of upland which crosses the boundary of the unitary authority into Northamptonshire. Historically abundantly wooded, this region of upland forms the watershed between the Great Ouse and Nene valleys, and still contains a mixture of ancient woodland and Medieval and Post-Medieval parkland. It is split down the middle by the watershed, with Podington and Wymington to the north, and Harrold, Odell, Sharnbrook and Knotting and Souldrop to the south. Forty Foot Lane, an ancient routeway, forms a physical division between the two areas of settlement on either side of the

watershed. The landscape character assessment (LUC, 2020) characterises this Sub-Area as predominantly wooded wold, with clay farmland along the Northamptonshire border and a strip of limestone valley along the Great Ouse on the southern boundary.

Archaeologically, prehistoric and Iron Age/Romano-British sites extend across the valley slope and plateau top, intermingled with woodland. A Medieval deer park once covered much of the wold around Harrold, with ancient woodlands at Odell, Souldrop and Knotting separated by Post-Medieval parkland surrounding Colworth House. The Western Wold is also home to former RAF Podington, its runways now used for motorsports including as a drag racing track.

Eastern Wold

The Eastern Wold/Thurleigh Plateau Sub-Area (see figures 1, 2 & 4) contains the part of the Bromswold which leads north-east towards Cambridgeshire along the Northamptonshire border, as well as small valleys which form the watershed of the River Kym, and the upland section of the Thurleigh Plateau. Much of the area has been identified as a Low Risk Area for Woodland Creation and offers a number of opportunities based upon the mapping of historic woodland to support this. Melchbourne and Yelden, one of the largest parishes in the north contains a substantial wooded parkland, whilst Keysoepark Wood once existed as an extensive ancient woodland at the centre of the Sub-Area. Archaeologically, the area is defined by a mix of linear Medieval settlement, and Iron Age/Romano-British farmsteads and extensive ridgetop settlements, the latter particularly along the ridges separating the stream channels feeding the River Kym/Till.

3. METHODOLOGY

Within the project design, three key strands of work were identified. The first two strands focused upon the examination of potential SHINE candidates assessing existing Monument records for suitability, their creation ('Strand 1'), or the amendment of existing SHINE monuments ('Strand 2') to better reflect the historic environment interest of areas within the designated Low Risk Areas for Woodland Creation. 'Strand 3' sought to add value to the project brief through, and as scoped out in the project design, the task of identifying former areas of historic woodland from cartographic sources, again within Low Risk Areas'. The three strands were set-out in the project design as follows:

"Key Strand 1: This will be based upon the examination of all existing 'Monument' records in the Bedford Borough Historic Environment Record HER (BBHER) within the Low Risk Areas for Woodland Creation in the overarching 'Study Area' that are not already SHINE-ed, to identify records suitable for SHINE-ing in accordance with established workflows, data standards and selection criteria."

“Key Strand 2: In addition to the estimated 482 new Monument records to be considered for SHINE-ing, there are 322 existing SHINE records within the ‘Study Area’ which may be suitable for enhancement or revision due to fresh information generated by recent HER enhancement projects for the borough such as the National Mapping Programme (NMP), National Record of the Historic Environment (NRHE) to local authority Historic Environment Records (HERs) (NHRE to HER), or other new sources of information such as the Environment Agency LIDAR 1m and 2m resolution data.”

“Key Strand 3: Furthermore, there are areas of the ‘Study Area’ which historically contained tracts of woodland. These areas which have mostly not been SHINE-ed previously (or in a significant number of cases, even been mapped as Monuments given a lack of a useable HLC for the borough), are identifiable from historic mapping (...). ...We aim to add to the HER all areas of historic woodland (including historic woodland and orchards as part of the monument layer, in lieu of a functional HLC for Bedfordshire) within the ‘Study Area’ that can be traced from these sources and create associated SHINE records. The mapping of areas of historic woodland and its designation as a SHINE record will support the identification of sites for woodland plantation in areas which have historically been wooded. Currently, there is a countryside stewardship historic environment option WDTP, for which the entry reads as follows: “In areas where landscape history is important consider restoring tree cover on previously wooded sites as per UK Forestry Standard guidelines” and this would also seem to fit with woodland creation opportunities.”

All three strands of work were undertaken in accordance with the existing historic environment sector SHINE process workflow guidelines (produced by Exegesis), SHINE site selection criteria and detailed methodologies and standards (using HBSMR software) for assigning SHINE status, creating/editing SHINE records, assigning significance and form, digitizing polygons and exporting/uploading SHINE records to the SHINE/HEFER portal.

4. RESULTS FROM SHINE CREATION AND ENHANCEMENT FOR LOW RISK AREAS FOR WOODLAND CREATION

Prior to the beginning of the project, 914 SHINE records were recorded in Bedford Borough’s HER for the Study Area as a whole and 5458 HER monument records with polygons, meaning that only c.17% of the latter had an associated SHINE record. Of those without a SHINE record, many were quickly identified as not suitable for SHINE-ing under the existing methodology due to their nature/type e.g. building, findspot, or with no associated cropmark features/uncertain extent, and were excluded from further consideration (see below). However, this left a not insubstantial number of Monument records potentially suitable for SHINE-ing, mainly because they had been created anew (since the creation of

the original SHINE data in 2009) based on the results of a borough-wide National Mapping Programme (NMP)/Aerial Investigation and Mapping (AIM) project integrated into the HER, or had been amended in response. Between 2010 and 2022, relatively little change was made to the SHINE layer, with 148 monuments amended, of which only 28 were wholly new creations. This reflects the relatively complete coverage of sites as they were known prior to the accession of NMP material into the HER, and minimal opportunities within HEFER applications to make substantial changes to the overall database. This latter issue has mainly related to the tendency for Countryside Stewardship applications to fall in broadly similar areas, or in areas excluding known heritage sites (potentially a conscious decision on the part of applicants) which has limited scope for adding the NMP derived data in any great quantity.

In detail, within the over-arching HER 'Monuments' data (5458 records), those monuments with the specific sub-category of 'MONUMENT' (which includes cropmarks and earthworks as the most SHINE-able features under the current methodology) totalled 1553 records or c.28% of the 'Monument' total.

Of these 1553 suitable for SHINE-ing, 914 or 59% had already been SHINE-ed. The focus for SHINE creation as part of Project E was therefore at this point on the remaining 41%, and for amendment, on the existing 59%. These records were then narrowed down further to 961 which were the number of Monument records corresponding with Low Risk Areas for Woodland Creation (see figure 5).

The NMP/AIM project was a key source of primary material for the purposes of creation/amendment supplemented by new/amendments to existing Monument data derived from the Heritage Information Access Simplified (HIAS) NRHE-to-HER (National Record of the Historic Environment-to-Historic Environment Record) project. The various phases of these projects have taken place in the last five years, and so provide a new source of, and more up-to-date material than was available during the main original programme of SHINE creation. This is to the benefit of not only this project, but wider agri-environment responses going forwards.

Note that 'lost/destroyed' ridge and furrow whilst recorded by NMP/AIM and often included as a 'Monument' in the HER, has been excluded from SHINE-ing through employing its recorded status (e.g. destroyed) in the NMP/AIM data, coupled with its status on the Bedford Borough Ridge and Furrow database, and in conjunction with its absence on the Environment Agency LIDAR.

Work on the specific creation of new, and the amendment of existing SHINE records and polygons ('Strands 1 and 2') from an initial 961 Monument records took 18 working days, averaging 16-18 created or amended per day (no change to the other records or they were further excluded on suitability grounds – the checking process accounting for the remainder of the time), with a degree of

variation introduced by the complexity of historic environment features and density in particular areas (see figure 6). The rate is relatively low compared to other equivalent projects due to the methodology, which utilised the comparatively small study area to take a more in-depth look at, for example, the surviving extent of ridge and furrow earthworks based upon the most up-to-date lidar from the Environment Agency. Similarly, more care was able to be given to creating more compact, representative SHINE polygons in areas of more complex cropmarks, with examination of both the NMP and the Borough’s collection of aerial photography consulted during this process. Preliminary preparation for, and investigation of, certain parts of the Study Area as a ‘test’ ahead of the formal start of the project also allowed for greater than expected efficiency during the SHINE creation/amendment phases. This rapid work in the early stages demonstrated the practicality of a slower but more methodical approach across the rest of the study area, and allowed for more detailed work on the experimental landscape-level methodologies explored further below.

TOTAL	CATEGORY
886	SHINE monuments created during initial phase of digitised SHINE creation prior to 2010
148	SHINE monuments created or amended between January 2010 and November 2022
28	Wholly new SHINE creations during this January 2010 to November 2022 period
961	HER Monuments with polygons on Low-Risk polygon layer at outset
259	Pre-existing SHINE polygons on Low-Risk polygon layer at outset
481	HER Monuments with polygons overlaying SHINE on Low-Risk at outset
480	HER Monuments with polygons not overlaying SHINE on Low-Risk at outset
300	SHINE records created or amended during the work carried out for Project E
251 (83%)	SHINE records amended as part of Project E (with percentage of total Project E work)
49 (16%)	New SHINE records created as part of Project E (with percentage of total Project E work)

Figure 5: Totals established as part of the planning and execution phases of the project, broken down by colour coding into SHINE pre-2022 (blue), planning stage (green) and execution (yellow) categories

Prior to project inception, 481 monument polygons, c.50% of the eligible total (at that stage) of all Monuments overlying Low Risk Areas for Woodland Creation, were covered by SHINE polygons (see Figure 5 above). This of course included situations where multiple overlapping Monument features were covered by a single SHINE polygon, so in total there were 259 pre-existing SHINE polygons in Low Risk Areas for Woodland Creation.

Over the course of Key Strand 1, it became evident that of the 961 Monuments covering Low Risk Areas and considered eligible for SHINE-ing, a further number would not meet the SHINE criteria and had to be excluded. This included, for example, ancient enclosures identified from Inclosure Maps

(and where historic boundaries may survive), place-name and other types of historic landscape evidence.

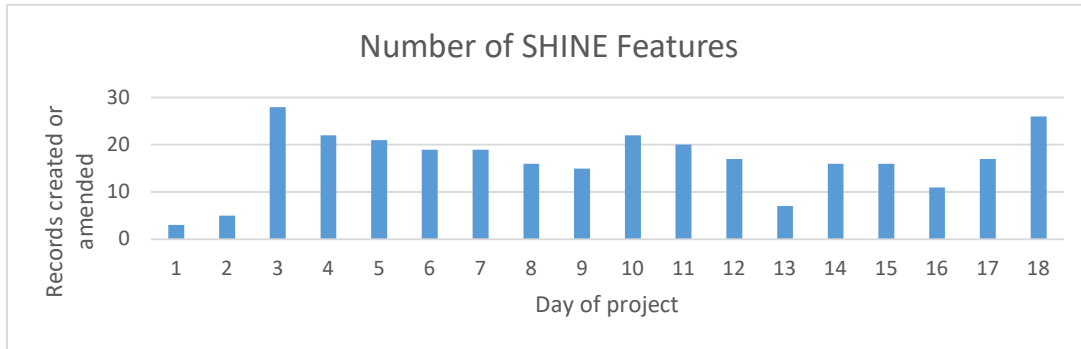


Figure 6: Daily totals for new or amended SHINE records/polygons for Key Strands 1 and 2.

Ultimately, 300 SHINE records and polygons were created or amended within the Low Risk Areas, predominantly based upon earthwork and cropmark evidence of Medieval and Iron Age/Romano-British date respectively, and almost entirely NMP/AIM-derived features (see figure 7). Of the 300, 49 were new creations (16%), the remaining 251 (83%) being amendments of pre-existing SHINE designations, but in many cases subject to substantial changes. Over 96% of pre-existing SHINE records in the Low Risk Areas were amended. The added and amended SHINE polygons can be seen in figures 7 and 9, and by Sub-Area in Fig.8.

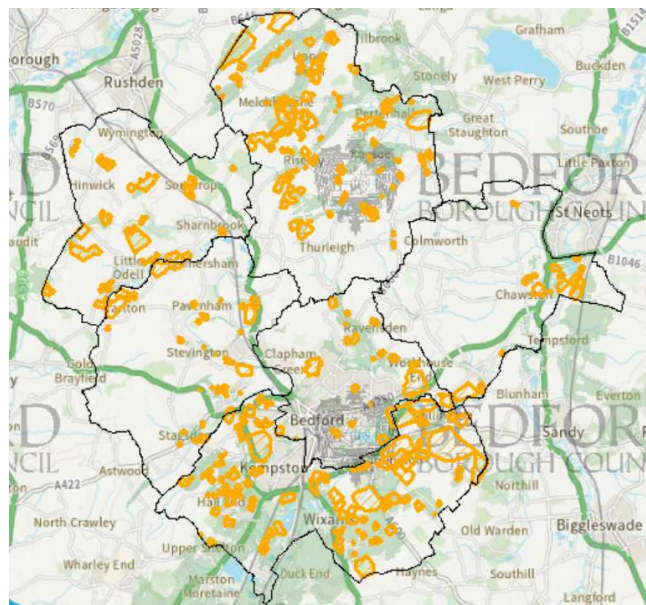


Figure 7: Plan of SHINE records/polygons created or amended overlying the Low Risk Areas
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SUB-AREA	TOTAL
Eastern Wold	99
Marston Vale	88
Western Wold	33
Great Ouse Valley	29
Bedford	26
Eastern Borough	25
TOTAL	300

Figure 8: SHINE features created or amended by Sub-Area

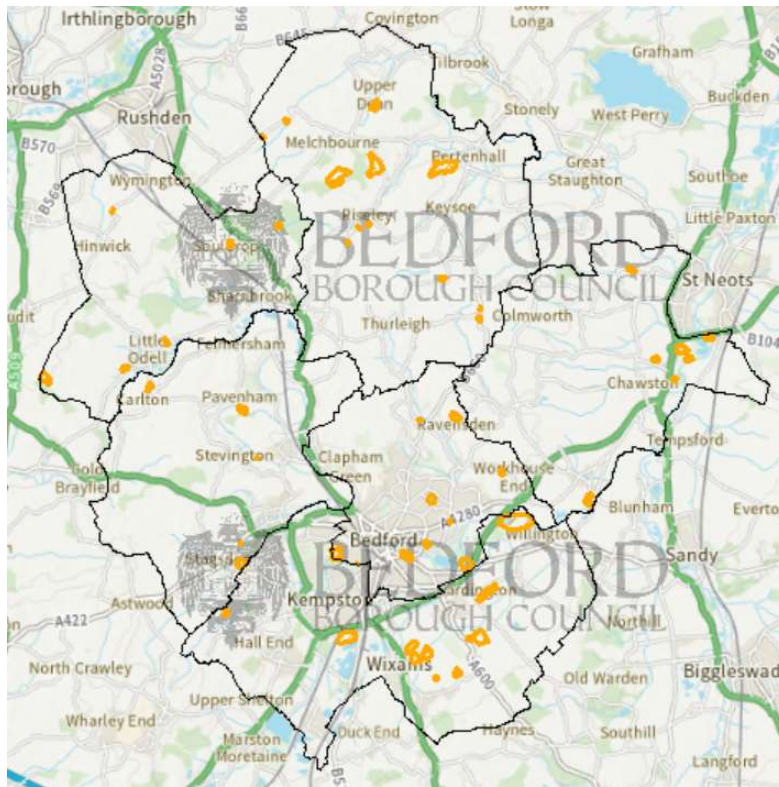


Figure 9: New SHINE features created across the Borough

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The highest number of creations and amendments can be seen in the Sub-Areas of Eastern Wold and Marston Vale as there was the greatest overlap with Low Risk Areas for Woodland Creation in these areas (see figure 1). 99 and 88 new SHINE records were created or amended respectively (see Figure 8). Whilst in the other Sub-Areas, SHINE records and HER monuments are present to a similar density, the Low Risk Areas for Woodland Creation cover a much smaller area and therefore the creation of new or amended SHINE records for many fell outside the scope of work for Key Strands 1 and 2.

Also notable is, that despite the extent of Low Risk Areas for Woodland Creation in the western part of the Marston Vale Sub-Area, there was relatively little scope for new SHINE records to be created. The landscape is largely post-industrial with a number of quarries and therefore contains few new monuments identified by NMP or HIAS which would be suitable for SHINE-ing within the Low Risk Areas. Outside of the Low Risk Areas, within Marston Vale there are 134 HER Monuments, some of which might be suitable for adding to the SHINE record in future enhancement work, whether as part of future national enhancement projects, or as part of the normal annual HEFER process. In the Eastern Wold, the equivalent figure is 111, though despite the slightly lower number, these are on the whole more likely to be added to SHINE in the future as part of agri-environment responses as they predominantly comprise cropmarks and/or earthworks on actively managed farmland.

The methodological issues in applying the established SHINE approach to identifying areas of historic environment interest for the purposes of woodland creation that arose during the undertaking of each key strand of the project are identified and discussed in Sections 5 and 6 below. This is followed in Section 7 by a list of key recommendations as to how the SHINE methodology can be updated so that SHINE could be used to inform woodland creation proposals.

5. RESULTS FROM HISTORIC WOODLAND (SHINE) ENHANCEMENT

Key Strand 3 looked to deliver the addition of new Monument records onto the HER based upon the identification from cartographic sources of all areas of historic woodland across the wider study area, both extant and vanished, recorded within the late Post-Medieval period and where possible to add these also as SHINE records (see section 6 below); note that historic woodland cleared prior to the mapping sources will not be identifiable and ultimately cannot be mapped as a Monument and SHINE-ed through this process. In the longer-term, HERs will likely have access to the Forestry Commission's new ArchAI datasets, most relevantly those relating to woodland on OS mapping, but this section has shown the value of HERs producing their own locally researched and regionally nuanced datasets where possible. In places where these already exist, or that might be created with relatively little difficulty in the near future, there would be great interest in examining the concordance between AI and human derived woodland datasets.

The main historic cartographic source employed for this strand, on the basis of reliability and consistency across the whole study area, is the First Edition Ordnance Survey mapping (1880), with the Second Edition (1900) used where greater detail and quality were required in certain places. This formed the base layer to this part of the project, amended where possible with additional data from Inclosure maps, the 1765 Jefferys Map and the 1815 Hyett Map. The latter two sources have their

limitations, being difficult to truly geo-reference, and so have essentially been used to validate antiquity where possible, and to further explore time-depth to surviving elements of historic landscape character. It is also relevant that many other parts of the country lack mapping with this level of detail, and so the use of the Ordnance Survey mapping as *the* core dataset is the most practicable way to approach this work nationally. As with some other HERs around the country, Bedford Borough has no useable HLC, and so any additional data generated by Key Strand 3 for the purposes of woodland creation is particularly useful.

The historic woodland identified from the maps comprises both named areas of woodland as well as unnamed copses, spinneys, and plantations predating the First Edition OS Mapping, some of which may ultimately be suitable for re-planting or expansion through woodland creation schemes.

Orchards have also had HER Monuments created, as they are of sufficient extent to be seen as historic tree cover and contribute to a wider pattern of historic landscape character, the lack of HLC making the mapping of historic land use in this manner crucial. Shelter belts and avenues of trees have not been included at this stage given their tendency to be smaller in scale/extent, although there is certainly scope to consider their contribution to historic landscape character going forward.

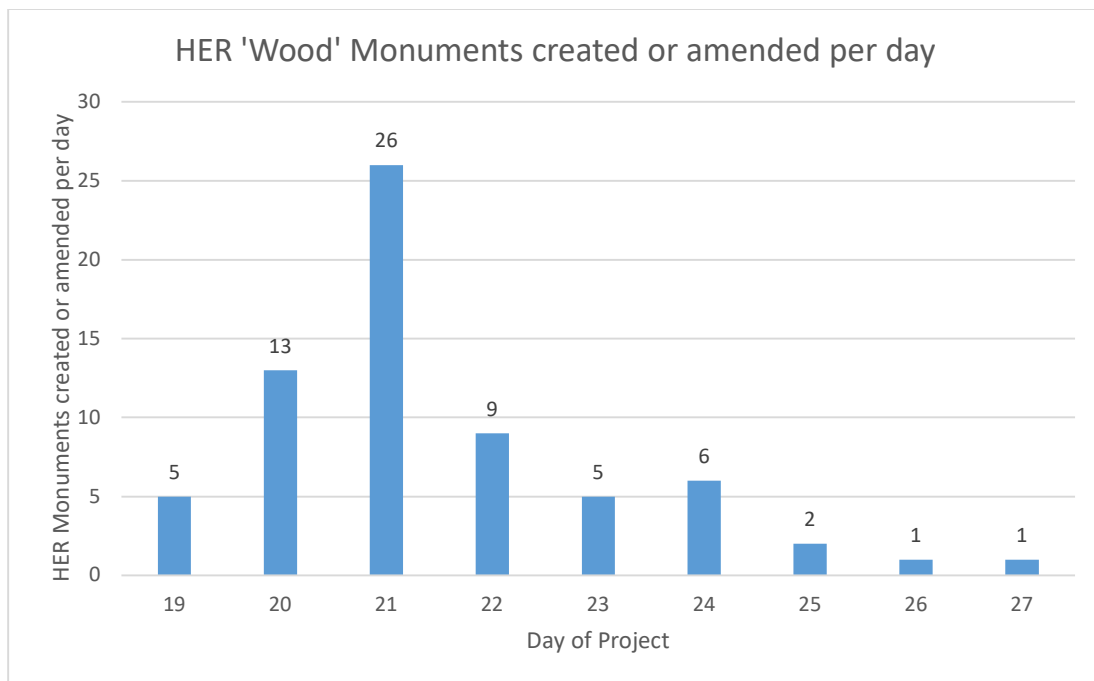


Figure 10: New HER monuments created or amended per day with the type 'WOOD', starting on Day 19 of the project once Key Strands 1 and 2 had been completed

Figure 10 shows the rate of data creation for Key Strand 3, being quite heavily front-loaded as work took place initially in areas where woodland was considerably more apparent in scanning the OS mapping, before addressing finer details and more isolated examples in the final five days. Day 21 was the most productive day when 26 new HER 'WOOD' monuments were created; by this time the format of the work with standardised entries for monuments had been firmly established, and the entries for the named woods of Turvey in particular produced a much higher figure than for prior or subsequent days. After this point, individually more complex areas of woodland, mainly whole parish plans of dispersed smaller areas of unnamed woodland, made the process less rapid. In total, 68 areas of historic tree planting identified from the First Edition mapping (and earlier sources) were added to the HER as new Monuments or were used to substantially alter existing records (see figure 11).

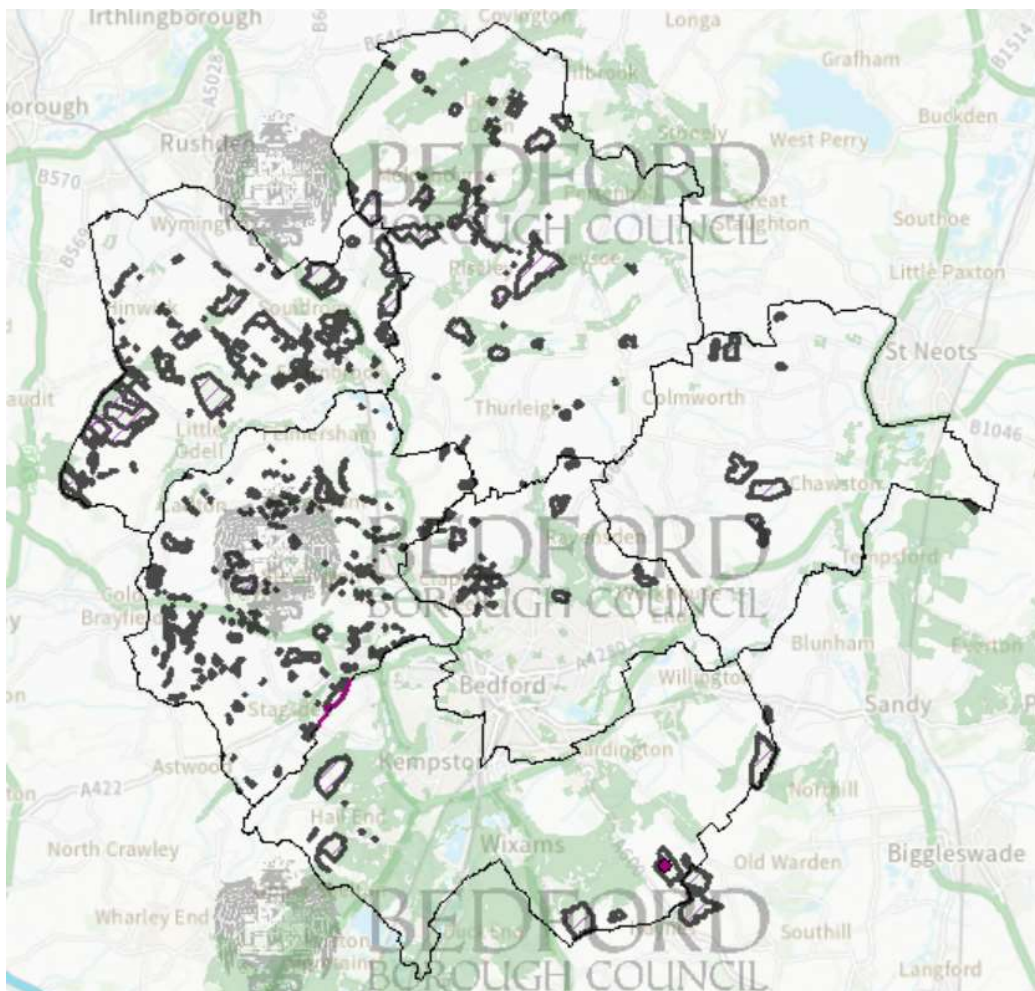


Figure 11: Woodland Monuments created or substantially amended on the HER as part of Key Strand 3, demonstrating a specific concentration in the north and west of the Borough.

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This strand of work has been able to demonstrate that in the 18th and 19th centuries, surviving woodland and new planting within the Study Area was concentrated in the north, west and southwest, mainly coinciding with regions of upland (see figure 2). This was particularly the case on the Bromswold, and on the upland ridge that historically separated Bedfordshire and Buckinghamshire, as well as on the Greensand Ridge to the south. Key Strand 3 established three key areas of historic woodland character or 'regions', 'Bromswold', 'Western Parkland' and 'Greensand'; not necessarily being areas which were fully or even heavily wooded, but in which woodland did form a key part of their historic character (see figure 13).

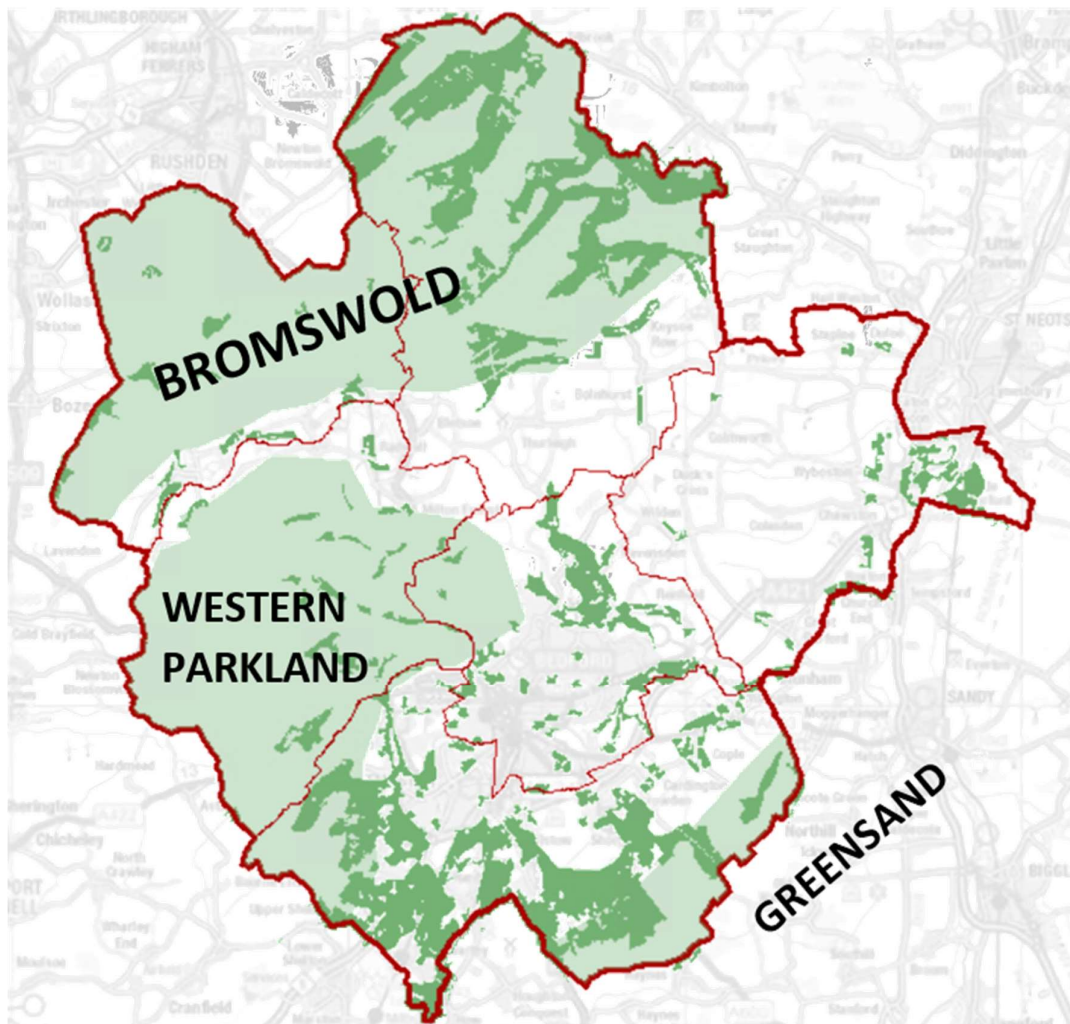
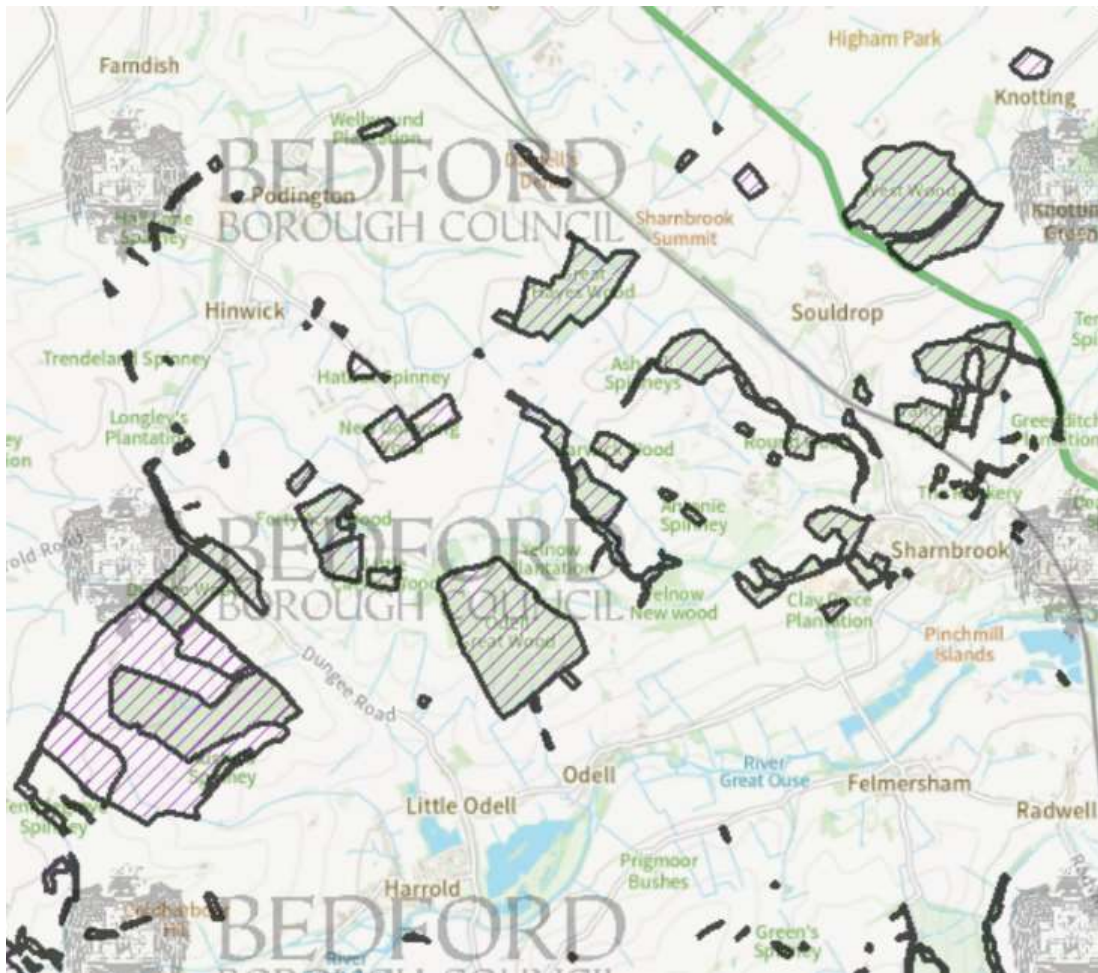


Figure 12: Historic woodland character areas overlaid within Low Risk Areas

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*Figure 13: The Bromswold between Harrold and Knotting, showing a landscape of ancient woodlands
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Much of the **Bromswold** wood-cover in the north of the Study Area is/was part of current or former estates or parkland, and therefore was protected from exploitation/clearance and falls within both the Western Wold Sub-Area and much of the Eastern Wold Sub-Area. In the Eastern Wold it is heavily coincident with the Low Risk Areas for Woodland Creation, offering opportunities for woodland creation that would potentially fit with the wider historic landscape character of the area. The Western Wold remains intensely wooded, with the post-1765 Colworth Park (including parkland trees) at its centre. The ancient woodlands of Harrold are the legacy of a Medieval deer park (see figure 13), and there is potential scope for restoring native woodland to this area between Dungee Wood and Nun Wood, along the boundary between Bedfordshire, Northamptonshire and Buckinghamshire.



Figure 14: The Western Parkland post project enhancement, an area of historic parks and ancient woodland

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The **Western Parkland**, an area in the west of the Study Area roughly coincides with the Great Ouse Valley Sub-Area and is defined by the presence of mixed ancient and more recent woodland as part of planned/ designed parkland landscapes. This character was present to some degree by the 18th century, with certain elements (mainly specific park copses and spinneys) being added over the 19th century, as evidenced on historic mapping. The extant ancient woodlands present within the area such as Freers Wood and Great Oaks Wood are predominantly on the upland, along with other former woodlands such as Goblin Hole Wood in the north-east of Turvey parish. The distribution of these suggest something of a wooded corridor up the boundary between Bedfordshire-Buckinghamshire, on an upland which separates the watershed of the River Ousel from that covering the watercourses of the Marston Vale and Great Ouse proper. This region is separated from the Bromswold by the Great Ouse, although is arguably part of a continuity of surviving mixed parkland and older woodland within that region. There is potential for woodland creation opportunities in a parkland style, perhaps restoring and enhancing existing tree cover as an expansion of ornamental style tree stands, or enhancing the existing areas of ancient woodland with the planting of native British trees and the creation of wildlife corridors. This would have to fulfil the UK Forestry Standard (with woodland creation meeting the definition set out in the UKFS (Chapter 2 overview, p3)), which permits regeneration of parkland in certain circumstances, but which make the creation of new stands the preferred option, and which at present contain strict stipulations that 20% of the given area of woodland creation must contain woodland canopy. Therefore, any new parkland, or expansion of that which exists already, would have to take this into account, though should be manageable with a considered planting plan. Given the variation in ‘ornamental’ stand types within the Western Parkland alone, this leaves plenty of scope for new woodland creation within these parameters.

Whilst Low Risk Areas for Woodland Creation are relatively sparse in the Great Ouse Valley (**'Western Parkland'**), there is certainly scope for woodland creation in areas which were either historically wooded, and/which might connect surviving areas of ancient woodland on the upland, and have the dual purpose of creating green corridors as well as reinforcing historic landscape character.

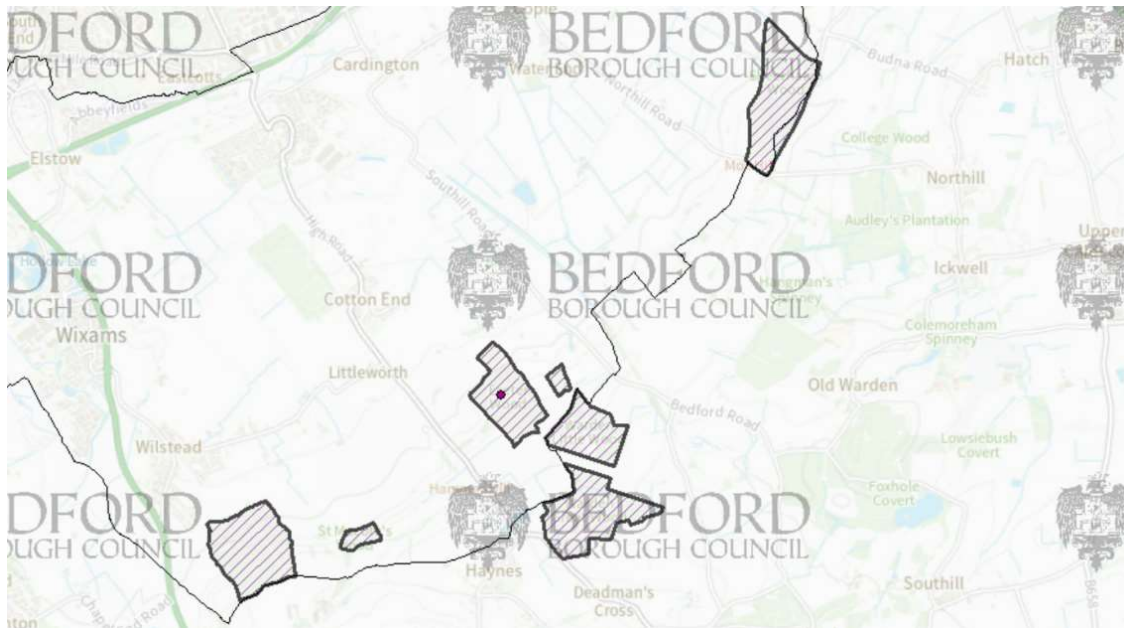


Figure 15: The woodland of the Greensand Ridge post project enhancement, and its place in the Marston Vale

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The smallest region with notable historic woodland character identified from historic mapping is on the southern boundary of the Study Area, along the south-eastern edge of the Marston Vale Sub-Area. This region contains the northern fringe of the **Greensand Ridge**, an area of upland which crosses into Central Bedfordshire. Within this region are prominent extant ancient woodlands such as Sheerhatch Wood, Exeter Wood and Wilstead Wood. Set as it is in the area of Marston Vale which contains the Forest of Marston Vale, there is scope within the Sub-Area for woodland creation that reflects the dominant historic landscape character (in woodland terms) with a time-depth of at least as far back as the late Post-Medieval if not Medieval periods. The woodland on the Greensand Ridge is an example of one which has significance beyond resource and landscape alone, as the Hundred of Wixamtree (the namesake for the new settlement of Wixams, which despite its name sits outside the historic Hundred) had its moot, or meeting place, at a site on the upland. Residents of the Medieval Hundred would have come together at a locality now called Deadman's Cross, where four parishes meet, including Cople and Willington. A tree on the corner of Sheerhatch Wood would have marked

the agreed meeting place, and would have drawn large numbers of people onto the ridge to discuss local matters.

Of course, outside of these areas there remains plenty of scope for non-historic woodland creation on marginal or brownfield sites, as part of new developments and wider landscaping efforts in both the town and the countryside.



Figure 16: Joan Blaeu's 1646 map of Bedfordshire shows extensive woodland on the Thurleigh Plateau

The area in which place-name evidence most strongly suggests historic woodland (on the Thurleigh plateau, in particular within Thurleigh and Bolnhurst parishes) is essentially devoid of tree cover by the dates of the historic mapping consulted; woodland on the Thurleigh Plateau had been extensively exploited and cleared for agricultural use by the time of Enclosure in the mid-18th to mid-19th centuries, if not much earlier.

Brown and Taylor's work suggested that Thurleigh's open field may once have been woodland, cleared to make way for arable farming at some point in the Medieval period (Brown and Taylor, 1989). Joan Blaeu, a Dutch cartographer, by contrast shows an apparently well-wooded plateau in his 1646 map of Bedfordshire (Blaeu, 1646). Whilst stylised, it is a notable feature on the map, which similarly shows the various wooded parks of the county with reasonable accuracy (within the

standards of cartography at the time). However, whilst this woodland would have once existed, potentially at least up to the mid-17th century, it cannot be mapped and SHINE-ed from any more detailed historic mapping and so little can be said with any confidence regarding its character. In the absence of the appearance of such woodland on more reliable later mapping, woodland creation schemes can only really be informed by those historic woods still surviving into the 18th and 19th centuries and appearing on the First Edition Ordnance Survey mapping. It is also worth considering, given the presence of assarted woodland as a common feature of the local landscape, that it might be worth assigning assart landscapes their own place as a feature, especially in areas such as Thurleigh where the 'new', cleared landscape has been a feature for many centuries.

Furthermore, it is important to consider how such woodland character 'regions' and individual areas of tree planting within can be represented within SHINE in accordance with the current guidelines, standards and methodologies, if at all, or whether further detailed work on 'regions' could be used to inform standalone opportunity and sensitivity mapping guiding the restoration, creation or expansion of woodland that fits within an area's historic landscape character. The Forestry Commission is currently working on the creation of new sensitivity mapping, which this information could be integrated into, or used alongside. Whatever the final system and database, it must ensure that it simultaneously ensures that other sites of historic environment interest, such as areas of cropmarks, can be protected through SHINE or other complementary mechanisms from the impacts of tree planting.

To aid this process, two case studies are presented below. The first case study examines the historic wooded **Bromswold** landscape:

Case Study 1: Odell Great Wood

The Western Wold/Bromswold is a good example of a historically wooded Sub-Area with woodland coverage evidenced as far back to at least the eleventh century. The records for the vills in the Domesday Book show the presence in Harrold of '200 pigs, woodland' and in Odell 'woodland, 50 pigs'. Everitt (1977) postulated that the villages along the river valley might have specifically used upland woodland pasture for the grazing of pigs and other livestock. Prior to the creation of the Medieval deer park, the villagers of Harrold were likely managing extensive woodland for this purpose. This woodland 'visible' in eleventh century historical records presumably forms part of the extensive tracts shown surviving on Thomas Jefferys Map of 1765 (see figure 18) which highlights how the woodland wraps around the streams and brooks running off the upland.



Figure 17: Drone photograph of the Bromswold at Odell, with Odell Great Wood and former RAF Podington in the background



Figure 18: The 1765 Jefferys Map of Bedfordshire shows extensive woodland

All of this has led to a very particular landscape quite distinct from the rest of the Borough. Woodland creation in this area could take the opportunity to reinforce the localised historic landscape pattern, potentially including wood pasture environments which would restore some part of the Medieval landscape on the wold, and provide ecological benefits.

Issues arising from Case Study 1 under Key Strand 3

The process of trying to address historic woodland landscape character, e.g. that outlined in Case Study 1 (above), using the current SHINE guidelines, standards and methodologies, presents real and perhaps ultimately, insurmountable difficulties. This is why during this test phase, ultimately existing and former areas of woodland were only mapped as HER Monuments rather than having new SHINE records created, allowing in the absence of HLC a greater understanding of wooded landscape characters in the Borough, without having to deal with the specific problems associated with SHINE at present.

Fundamentally, SHINE as is, aims to protect, conserve and optimally manage *existing individual* historic environment features, with the data structure for classification of type, identifying significance and priority for action all geared towards this rather than dealing with a scenario of creating records of landscape-scale historic environment features *of multiple components* (extant or former historic woodland) that have either disappeared, or if existing, will not be the subject of direct action. On this basis, employing SHINE selection criteria would be irrelevant for the purpose of informing the enhancement of existing, or to recreate former historic landscape character, as would be the classification of lost or not directly affected woodland as an above or below ground feature. Similarly, identifying significance and priority for action. SHINE as is, may work for the small number/extents of surviving woodlands identified for restoration through woodland creation schemes, but as is says on the tin, woodland creation schemes are aimed at new areas of planting, not conserving or optimally managing existing, and put simply, SHINE is not suitable for work under Key Strand 3. SHINE would require revised selection criteria, a new data structure and categories of metadata to record the typical character of existing and formerly extant areas of historic woodland to inform woodland creation e.g. topography/location (e.g. upland, river valley, valley slope), origin/nature (ancient, designed, parkland, field copse/shelter belt etc.), size (hectares), likely date (Medieval, Post-Medieval, 20th century etc.), associations with other historic environment features (e.g. parkland/country house, quarry restoration etc.). However, it is possible that a category for priority areas for Woodland Creation within the context of a given Study Area could be employed, similar to that in use within the current SHINE data structure for land holdings.

In addition, the existing SHINE workflow does not best suit the purposes of woodland creation, in that the historic environment suitability of areas for tree planting should be considered at the earliest possible stage by promoters rather than waiting until a response is received from the local historic environment service at application stage when a detailed scheme may have already been drawn up

which may or may not be suitable. To help inform the optimum outcome for the historic environment from tree planting proposals, to best aid applicants and the Forestry Commission, and to speed up the process and make it most efficient for all, as much information on 'opportunity' areas for tree planting as well as 'constraints' should be available from the outset. The Forestry Commission plans to create colour-coded opportunity and targeting maps, a process which would align with the outcomes of this report.

Finally, as common to many cases of SHINE polygonisation and data export, the inability to have SHINE polygons close together, prohibits the discrete mapping of what tends to be smaller individual blocks or belts of woodland which lie close together, yet which may have a quite different character to their neighbours but have to be unhelpfully 'lumped together' under existing SHINE rules and practice.

Potential Solutions to the issues raised under Case Study 1 - Key Strand 3

Consequently, consideration has been given to producing a standalone GIS layer (underpinned by metadata) to complement SHINE and which would acknowledge the dominant historic woodland character of an area and could be used to inform opportunities for woodland creation whilst also ensuring that other historic environment features which may be impacted by tree planting are recognised and such issues are addressed.

The potential solution is based upon the identification of surviving and lost woodland from historic mapping (as presented above). This would involve mapping the woodland in the HER as individual Monuments with the accompanying attribute data on its character. This will be buffered by a set distance using standard GIS buffer tools, thus identifying potential locations where woodland could be created which is in keeping with the local historic character. Where groupings of woodland exist, the buffer would be used to generate a zone where woodland infill could take place. In places where smaller patches of woodland exist, it could inform the creation of new woodland by extending those woods without allowing for massive expansions which would be out of character.

In this concept work, a 250 metre buffer was employed as a sample distance, which created a substantial area of woodland potential without overextending into areas where woodland would not be historically appropriate, but greater consideration needs to be given to the pros and cons of different buffer extents. Indeed, it is very likely that the concept of a set buffer would be counter-productive in many areas, and therefore a more flexible model, perhaps one where the buffer is proportionate to the extent of existing woodland would better match the objectives of this project. Once these zones have been established, the next step is to use the GIS clip tool to select areas where the buffers overlap with known archaeological sites, in this case using the Borough's NMP/AIM

polygons for cropmarks and earthworks. These allow for the exclusion of archaeological sites and features which are most likely to be adversely affected by tree planting, and provide an initial guide to ‘constraints’ for those considering the location and design of woodland creation schemes. Upon consultation, further advice from local historic environment services could address the potential for previously unrecorded archaeological sites to be affected by tree planting proposals in accordance with the United Kingdom Forestry Standard (Forestry Commission England, 2021).

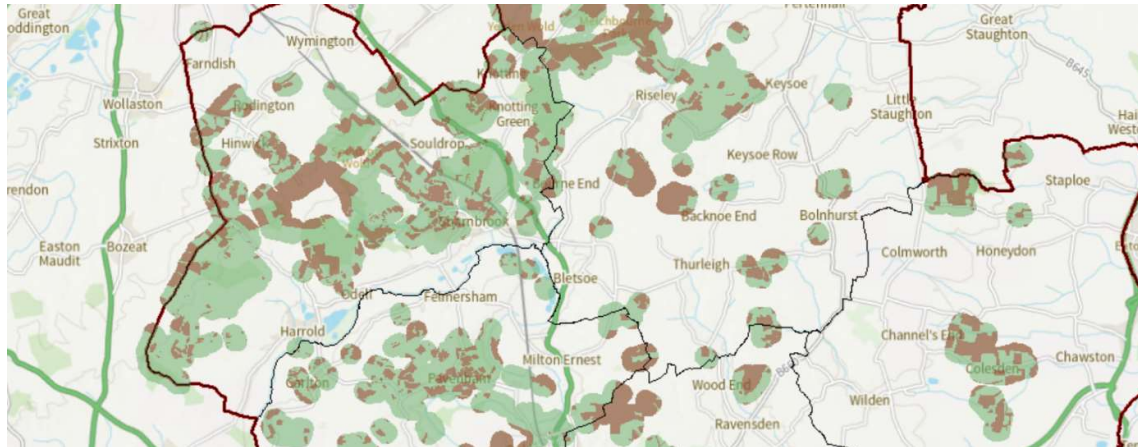


Figure 19: 250 metre buffers around historic woodland HER features (green) with NMP based exclusion zones (brown)

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In figure 19 above, the zones in green encompass areas of historic woodland likely wooded during the Medieval and Post-Medieval periods and a surrounding 250m buffer where woodland creation may be possible, but exclude areas of known cropmarks and earthworks in brown. These are not necessarily absolutely unable to contain tree planting, carefully agreed placement of wood pasture or tree stands would be possible so long as the woodland creation proposed meets the definition set out in the UKFS (Chapter 2 overview, p3), with 20% of the project area under wooded canopy. Creation of such zones for a given Study Area would enable areas within to be potentially identified for the purposes of woodland creation which would be in keeping with the localised historic woodland character, whilst also simultaneously allowing for management advice and conditions in areas of known archaeology. The possibility exists to provide such a GIS layer and underpinning attribute table to the Forestry Commission and/or to integrate this data into an eventual application/advice portal for woodland creation (similar to that for environmental stewardship schemes), should one be created, along with SHINE data. Consideration might also be given to the value in providing such a layer as part of upfront high-level ‘opportunity mapping’ for landowners/woodland creation promoters to actively consult at the very beginning of a woodland creation project so that they can best identify sites for and types and scales of woodland which would be in keeping with the localised

vanished ancient woodland are set amongst ornamental plantations, screening belts of trees and wooded boundaries across the area around the village.

Three significant ancient woodlands, the extant Great Oaks Wood, the now vanished Goblin Hole Wood and the area of Northey Wood (which is largely vanished, albeit with a small area surviving as a patch at Carlton Hall), form something of an arc around the upland of Turvey parish. The village itself is set on a brook in a wide 'bowl' in the landscape, the ridges of upland separating it from Carlton, Stevington and Stagsden. The ancient woodlands are on those ridges, and suggest that the open-field farmland closer to the village was ringed by liminal wooded wastes, potentially shared as a resource with neighbouring communities. This is a common trend across the borough, with wooded uplands as a resource for communities as well as land owners, apparently a key element of the local economy in the Medieval period.

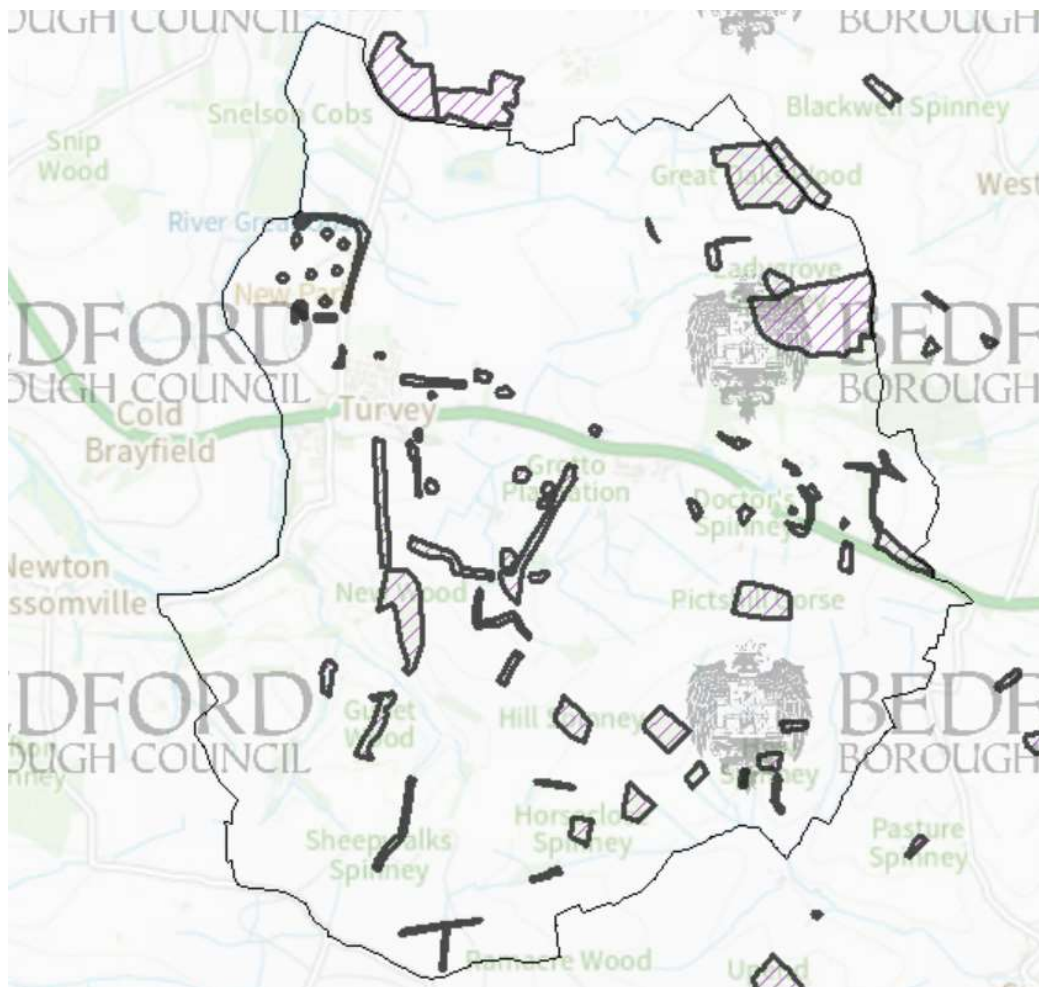


Figure 21: Woodland Monuments in Turvey parish, including parkland at New Park and Abbey Park, and historic ancient woodland at Great Oaks Wood, Goblin Hole Wood and Northey Wood
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Figure 22: Aerial photograph of Turvey with Abbey Park in the foreground and New Park in the background (© Historic England, 2014)

The Mordaunt estate (the predecessor to the extant high-status houses at New Park and Pict's Hill) was based in the south of the parish at Turvey Hall, and so it is possible that some of the large amount of woodland in this area is linked to this site, although the Jefferys Map suggests that it at least post-dates 1765. It is therefore most likely that the majority of this woodland is late 18th to early 19th century in origin. New Park lies at the north-west corner of the village of Turvey, bounded to the west by the River Great Ouse and similarly contains woodland screens and ornamental stands in expanses of pasture.



Figure 23: The New Park at Turvey, a good example of the form taken by woodland in the Western Parkland (© Historic England, 2014)

Issues arising from Case Study 2 under Key Strand 3

The Western Parkland area has a historic wooded landscape which is clearly distinct from the rest of the Borough, including the Bromswold to the north, but its component parts such as former or extant narrow screening belts of woodland and small and scattered copses (see figures 23 & 24), are impossible to correctly transcribe in SHINE due to polygon constraints of minimal size, shape and proximity to other SHINE polygons. Several small blocks of woodland can be framed by a SHINE polygon representing historic parkland within which they fall but they are not always located within parkland, and if they are, this approach could confusion as to the extent, shape and size of the woodlands rather than the parkland. This is arguably an even greater limitation than was seen in the Western Wold/Bromswold in Case Study 1, in so much as the individually larger elements there could at least be added as SHINE polygons under the current methodology, even if the supporting metadata would have been nonsensical.



Figure 24: The area to the south of Turvey parish is difficult to properly reflect within SHINE
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In Figure 24 above, the problem is clearly demonstrated. Whilst the main body of Abbey Park is covered by an existing SHINE polygon, the majority of the smaller ornamental woodland areas to the south and east cannot satisfactorily be created as their own SHINE polygons, being too small or angular. A larger polygon would be misleading and would clash with an area of cropmark monuments already SHINE-ed (see below for further detail on this particular issue), and some form of status in which nuanced advice on woodland planting be provided within and around SHINE-ed parklands is necessary whatever the circumstances. Within the Western Parkland and indeed in other areas of the

Borough, parkland is often surrounded by a wider corona of dispersed ornamental woodlands. A softening of the polygon standards would go some way towards enabling an area like this to be SHINE-mapped correctly but any solution to this issue still needs to be able to address the great preponderance of small areas of ‘ornamental’ style stands of trees and their contribution to historic woodland character and the opportunities this may offer for informed woodland creation.

Furthermore, many of the new woodland Monuments created within the Western Parkland lay within existing SHINE monuments, either as wider entries for parkland (such as at Turvey and Colworth), or as entries for underlying features such as Medieval ridge and furrow earthworks, as opposed to for the Post-Medieval woodland itself. Had it been critical to SHINE the woodland, it would not have been possible, given its overlapping with existing SHINE polygons for other historic environment features.

Case Study 3: A Palimpsest in Riseley and Melchbourne – Key Strands 1 and 2

This case study could have been include in either section 4 or 5 but its inclusion here serves to further highlight an issue already demonstrated under Key Strand 3 but also affects work under Key Strands 1 and 2. The area between the villages of Riseley and Melchbourne is also a good example of the complexities faced in creating SHINE designation records in areas with a high density, rich range and time-depth of archaeological sites. This palimpsest includes Iron Age cropmarks, a Post-Medieval landscape park and an extremely complex set of wartime features including munitions storage in the woodland.



Figure 25: The complex palimpsest of monuments and SHINE on the Riseley-Melchbourne border
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Issues arising from Case Study 3 under Key Strands 1, 2 and 3

It has become even clearer during the course of this project, with larger areas of SHINE under consideration during this project than is the norm during the HEFER process, that the current methodology is insufficient in areas of such complex archaeology. A 20m gap has had to be left between the individual SHINE polygons (in accordance with the current polygon data standards) which cover (sometimes overlapping) individual archaeological sites or Monuments falling within a wider palimpsest. The alternative would have been to create one huge SHINE polygon covering the palimpsest as a whole and multiple heritage assets/sites within – however, this would not best serve the varying significance of individual assets/sites and their sensitivity to change from woodland creation proposals and so the SHINE mapping shown in figure 25 represents the best effort to balance SHINE coverage of the cores of (sometimes overlapping) Monument records with minimising known archaeological features falling outside/between SHINE areas.

Potential Solutions to the issues raised under Case Studies 2 and 3 - Key Strands 1, 2 and 3

Case Study 3 under Key Strands 1 and 2 further builds upon an issue established as part of case studies 1 and 2 during Key Strand 3 work and underscores that a change in polygon data standards to allow directly bordering SHINE and overlapping polygons, as well as polygons of all sizes and shapes, is urgently needed for both woodland creation proposals (if taken forward as a tool), as well as for use in environmental stewardship schemes to be able to properly map the extents (as known at that point in time) of archaeological sites or woodland.

Case Study 4: Key Aspects of Historic Landscapes – Key Strand 3 and Beyond...

There is no useable HLC for Bedford Borough and so recently a key aspect of the borough's historic landscape has been digitised as landscape (record) components of the HER Monuments data (see figure 27). Expanses of ancient enclosures - enclosures pre-dating the Parliamentary Inclosure Acts in the mid-18th to mid-19th centuries - have been digitised for each parish from Inclosure mapping. Where extant, these can include not only vestiges of historic woodland, but also ancient hedgerows as components of historic landscapes, and which also have biodiversity value.

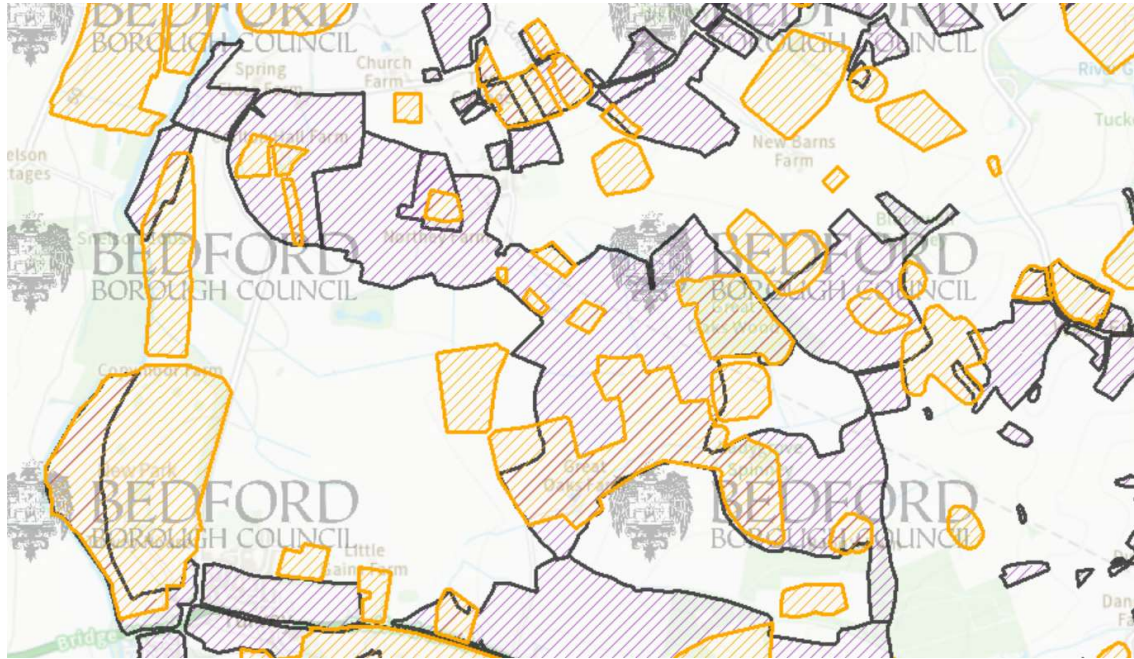


Figure 26: Bedford Borough HER's ancient enclosure extent polygons (purple) and relationship with existing SHINE polygons (hatched orange)

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Issues arising from Case Study 4 under Key Strands 1, 2 and 3

Depending upon the parish and its historic landscape evolution, these expanses of surviving ancient enclosures can potentially be very extensive areas with complex underpinning metadata, and can contain a number of heritage assets/archaeological sites within, and so are not suitable for conversion into SHINE for the many reasons already covered above in the other case studies, despite the value of this information to land management and woodland creation schemes. The same could be said for any types of surviving historic field systems e.g. Parliamentary Enclosure. Any new SHINE criteria arrived at by evolution of the dataset would have to bring with them some level of training to provide renewed understanding of expectation and methodology.

Potential Solutions to the issues raised from Case Study 4

It seems unlikely that any future amendments to the current SHINE guidelines and standards will be able to deal with such aspects of surviving historic landscape character given their wide geographical coverage and overlap with other historic environment features.

Consequently, consideration has to be given to supplying the Forestry Commission with a standalone GIS layer of surviving historic field systems (underpinned by metadata) to perhaps complement SHINE (if the latter is taken forward for use in woodland creation). For HERs with HLC, this may be an extraction of the existing data although most HLCs employed varying methodologies, metadata structures and terminologies so an issue with consistency and the data frameworks will no doubt arise. For HERs without HLCs, an issue with resourcing the mapping and creation of metadata for surviving historic field systems is likely to be an obstacle. For both, the data is unlikely to include any sensitivity to change analysis/scoring for such landscapes to incorporate different types of woodland creation. Instead, it may be better to create larger 'Historic Field System Sensitivity Areas' in which blanket policies for woodland creation in such historic landscapes can be set e.g. - retention of existing ancient/enclosure hedgerows, maintenance of ancient woodlands in their current state etc.). This could perhaps be accompanied by a 'Red', 'Amber' and 'Green' rating for sensitivity to woodland creation in the metadata with further refinement of advice to follow based upon outline proposals submitted to the local historic environment service by the woodland creation proposer. During this process the key element would have to be simplicity, insomuch as the enquirer is given a basic understanding of the situation on the ground (whilst avoiding the implication that a green rating will come with no conditions), with the details of the situation discussed properly during the subsequent consultation.

Similarly, broad-brush sensitivity areas could also be created for other types of historic landscape such as 'prehistoric cropmark complexes', 'Post-Medieval parklands', former military airfields, quarries, areas of former woodland pasture etc., each with broad-brush woodland creation policies and perhaps again a 'Red', 'Amber' and 'Green' rating for sensitivity to woodland creation in the metadata, with the potential for tailored advice to be provided at a later stage.

A prehistoric ritual cropmark complex such as that recognised at Cople/Willington/Cardington might be given a red rating given the likely damage to it and lack of evidence for historical woodland in that area. On the other hand, woodland on the wood pastures in Odell might be given a green rating (subject of course to further examination by the local historic environment service), whilst the upland ancient enclosures in Turvey, an amber rating for an area in which woodland creation or restoration could be desirable in the right locations.

This suggested approach and that generated by Case Study 3 would benefit from further exploration and consideration, especially as there is some overlap between the two ideas.

6. RECAP: ISSUES ARISING

Project E within Bedford Borough has demonstrated a number of issues arising with the current SHINE approach (HEFER Service Standard, 2021) when attempting to apply it to woodland creation schemes, including resourcing the updating of SHINE, the established workflow, existing selection criteria, data structure and metadata, data standards and polygons and dealing with areas of historic landscape character including woodland character. For further detail see Case Studies 1-4 above, and the summary of these issues recorded below.

Resourcing -

Aside from the issues below, a possible hurdle to overcome in employing the current SHINE approach to woodland creation is simply the time and resourcing required by individual HERs to bring all their SHINE records up-to-date ahead of contributing to a national SHINE dataset for use by the Forestry Commission. However, the latter body has stated that HERs would not have to get their SHINE datasets in order before participating in any SHINE evolution, and that funding would probably have to factor in some review of the legacy SHINE records. Whilst Key Strands 1 and 2 were completed relatively rapidly within the Borough Study Area as part of Project E, the authority area is small compared to that of many of other HERs and contains fewer Monument records, and so the potential for excess resource needing to be committed to getting datasets up to standard must remain front of mind.

Longer term, many HERs are not in a position to commit to regularly updating their SHINE records outside of DEFRA- funded HEFER responses to Countryside Stewardship schemes. Therefore, excepting HERs which have undertaken specific enhancement schemes such as through Project E, it is unlikely that individual SHINE datasets will be updated within a significant number of cases without additional funding and/or resources being made available. Even those HERs that have participated in Project E, including Bedford Borough, will have only updated limited geographical areas, i.e. suggested Low Risk Areas for Woodland Creation, and these areas may be subject to change, amendments and additions going forward.

Whichever approach is taken forward for the provision of historic environment advice on woodland creation schemes e.g. SHINE, revised SHINE, identification of woodland and historic landscape character areas etc., consideration will need to be given to not only the initial resources required but for regular maintenance and updating to keep data current.

Established workflow -

The existing SHINE workflow does not best suit the purposes of woodland creation, in that the historic environment suitability of areas for tree planting should be considered at the earliest possible stage by promoters rather than waiting until a response is received from the local historic environment

service at application stage when a detailed scheme may have already been drawn up which may or may not be suitable. To help inform the optimum outcome for the historic environment from tree planting proposals, to best aid applicants and the Forestry Commission, and to speed up the process and make it most efficient for all, as much information on 'opportunity' areas for tree planting as well as 'constraints' should be available from the outset.

Existing selection criteria, data structure and metadata -

At present SHINE allows for a relatively limited amount of heritage data to be created within the designations record outside of the description, curator notes, form and significance. Whilst it is possible to essentially outline the key elements of a SHINE-ed Monument within these sections, it would be advantageous to integrate the FISH thesaurus (Historic England, 2022) and chronological periods from the HBSMR software to allow for clearer key data to be provided to end users. Whilst the current system allows the inclusion of name, date, type and location within the entry, the implementation of a thesaurus-driven structure for categorisation would help to make transfer of information from the HER more intuitive and consistent. Similarly, tools to assign confidence ratings for historic environment information would be useful.

However, as identified under Key Strand 3, SHINE would require revised selection criteria, a new data structure and categories of metadata to record the typical character of existing and formerly extant areas of historic woodland e.g. topography/location (e.g. upland, river valley, valley slope), origin/nature (ancient, designed, parkland, field copse/shelter belt etc.), size (hectares), likely date (Medieval, Post-Medieval, 20th century etc.), associations with other historic environment features (e.g. parkland/country house, quarry restoration etc.). It is also possible that a category for priority areas for Woodland Creation within the context of a given Study Area could be employed, similar to that in use within the current SHINE data structure for land holdings, although even a revised SHINE is perhaps not the best method of dealing with historic landscape character.

Polygon and Data Standards -

There is often a need to create more accurately targeted SHINE polygons than is currently possible, to best refine historic environment advice. The limitations imposed by the current polygon data standards which prevent too small, oddly shaped and/or overlapping polygons being employed, whilst preventing over-complex SHINE datasets (arguably of benefit of the end user), work to the detriment of the quality of woodland creation advice provided. Often large polygons have to be created which do not best represent the historic environment features under consideration (sometimes 'lumping' too many together), or smaller (but not too small!) polygons are used with odd/nonsensical 20m gaps

left between which still contain archaeological features. Neither of these approaches is ideal and demonstrate the pitfalls of using the existing SHINE system in isolation, within, and beyond its original countryside stewardship purpose.

Data Creation and SHINE at a Landscape Level

Given the identification of differing wooded historic landscape characters during Key Strand 3, it would be desirable to be able to provide historic environment information to the Forestry Commission and woodland creation promoters which enables them to develop proposals at an early stage which are sympathetic to historic character. It is difficult to see how this could be achieved within the current SHINE system, but a revised SHINE approach with supplementary landscape scale layers and targeted areas of woodland creation opportunity would go a long way to resolving this issue.

For example, whilst funding and the general direction of travel to woodland creation has tended towards planting larger blocks of woodland, it is clear from Key Strand 3 that this would not be desirable in some areas of the Study Area from a historic environment perspective – there is potential to correlate this goal with new Forestry legal targets to create ‘trees outside woodlands’, perhaps allowing for any new woodlands to be guided towards historically relevant sites where possible. Even on the Bromswold, more thickly wooded than most of the Borough, there is a case to be made for woodland creation that fits with its wood pasture historic character (see Case Study 1). Being able to bring about parkland-style planting, compliant with the definition for woodland creation set out in the UKFS (Chapter 2 overview, p3), would be desirable in the lowland parts of the west of the Borough, as long as woodland canopy cover makes up greater than 20% of the area concerned.

Low Risk Areas for Woodland Creation -

Further consideration also needs to be given to the Forestry Commission’s Low Risk Areas for Woodland Creation mapping and how historic environment data can be integrated into or inform the mapping. For example, within the Study Area, the Low Risk Area covers much of Little Barford Shrunken Medieval Village and its extensive earthwork survival, and in many other places, the opportunity areas overlap with extant Medieval settlement historic cores especially within the Eastern Wold where the narrow valleys contain dense areas of extant earthworks. If used alongside/or integrating a combination of historic environment data, whichever eventual form that may take, e.g. historic woodland characterisation, historic landscape characterisation, areas of archaeological sensitivity, SHINE, HER data etc., then informed ‘Low Risk’ mapping could be used as an initial guide for woodland creation promoters and the Forestry Commission, to be followed up by more detailed local historic environment service advice. The Forestry Commission plan to potentially

phase out the Low Risk Area layer going forward, but it would be valuable to take into account the lessons learned here in creating future advice layers.

7. KEY RECOMMENDATIONS

The key recommendations established as part of project E are as follows:

- **Resources:** Collaboration between the Forestry Commission, Historic England, ALGAO (and perhaps DEFRA) on future large-scale data generation projects involving HERs, such as NMP/AIM or NRHE-to-HER, to enable new or amended up-to-date SHINE records to be created alongside other data as part of a single efficient process.
- **Resources:** Consideration given to funding SHINE enhancement projects for HERs where NMP/AIM and NRHE-to-HER funded projects have already taken place, including areas outside the 'current' Low Risk Areas for Woodland Creation, perhaps as part of the follow up to Forestry Commission projects on ridge-and-furrow and historic woodland.
- **Resources:** Consideration given to not only the initial resources required to update SHINE but for regular maintenance and updating to keep data current as part of a national dataset. Consideration of the resources required to create and maintain other historic environment datasets which would complement a revised SHINE.
- **Polygon and Data Standards:** Remove the limitations imposed by the current polygon data standards which do not enable the best representation of the historic environment features under consideration.
- **Revision of existing SHINE selection criteria, data structure and metadata** - integration of the FISH thesaurus and HBSMR chronological periods to allow for clearer key data to be provided to end users. Similarly, tools to assign confidence ratings for historic environment information. Furthermore, perhaps a revised selection criteria, new data structure and categories of metadata to record the typical character of existing and formerly extant areas of historic woodland but this would perhaps be better dealt with by supplementary datasets (see bullet point below).
- **Historic Landscape and Historic Woodland Characterisation:** Alongside a revised SHINE, the use of high-level opportunity mapping for woodland creation informed by historic woodland and landscape characterisation coupled with sensitivity analysis and exclusion 'constraint' zones of cropmarks and earthworks.
- **Data Integration:** The possible use of the outputs of AI-driven modelling to create buffers around extant and former areas of historic woodland creating 'opportunity areas' for tree-

planting' but which also exclude 'constraint' areas of cropmarks and earthworks (as mainly identified by NMP/AIM data).

- **Workflow:** The Forestry Commission and woodland creation applicants to be guided by 'opportunity' and 'constraints' mapping based on historic landscape character in drawing up outline proposals for detailed discussion with local historic environment services, rather than as under the current SHINE system, dealing with historic environment issues at application stage.
- **Low-Risk Areas for Tree-Planting mapping** - Further consideration to be given to the Forestry Commission's Low Risk Areas for Woodland Creation mapping and how historic environment data can be integrated into or inform the mapping.

8. CONCLUSIONS

Overall, the issues raised by Project E (as undertaken by Bedford Borough Historic Environment Team) as to employing the current SHINE approach for woodland creation are significant, but not insurmountable, if the recommendations listed in section 7 are considered alongside other suggestions generated by the wider portfolio of Forestry Commission projects on this topic. With an improved approach, there is much potential in employing SHINE as a starting dataset for woodland creation, but it is crucial that it is supported by additional sources of landscape-level historic environment data available at an early stage of proposals, and with local historic environment services being given an opportunity to provide detailed input to woodland creation applications at later stages. Collectively, this will allow for a streamlined, well-informed approach to woodland creation which is sympathetic to historic landscape character and to archaeological features in/on the ground.

In particular, Key Strand 3 has highlighted that SHINE is currently unable nor is likely to be the most suitable model going forward for building the consideration of historic landscapes (including historic woodland character) into woodland creation schemes. Alternative approaches should be considered that could operate alongside SHINE.

9. BIBLIOGRAPHY

Blaeu, J. (1646). *Map of Bedfordshire and Buckinghamshire*.

Brown, Anthony E., and Christopher C. Taylor. (1989) "*The origins of dispersed settlement; some results from fieldwork in Bedfordshire.*" *Landscape History* 11.1: 61-81.

Clarke, V. (2022) *Bedford Borough Council Response to Invitation to Quote for: Researching SHINE evolution: how can the SHINE methodology be updated so SHINE can be used to inform woodland creation proposals? Project E: Insights from local historic environment services creating SHINE records*

Everitt, Alan. (1977) *River and wold: Reflections on the historical origin of regions and pays*. *Journal of Historical Geography*; London Vol. 3, Issue. 1

Forestry Commission. (2022) *Researching SHINE evolution: how can the SHINE methodology be updated so SHINE can be used to inform woodland creation proposals? Project E: Insights from local historic environment services creating SHINE records Invitation to quote (30 September 2022)*

Forestry Commission England. (2017, updated 2021) *The UK Forestry Standard: The government's approach to sustainable forestry*.

Historic England. (2022) *Fish Thesauri, Version 25*.

Jefferys, Thomas. (1765). *Map of Bedfordshire*

Land Use Consultants Ltd. (2014) *Bedford Borough Landscape Character Assessment*.

Natural England. (2014) *National Character Area profile; 88. Bedfordshire and Cambridgeshire Claylands*

Place Services. (2022) *Assessing the use of GIS to produce woodland creation historic environment opportunity /targeting maps*

Rural Payments Agency, Natural England, Forestry Commission, Association of Local Government Archaeological Officers, Historic England. (2021) *Countryside Stewardship: Historic Environment FER (HEFER) Consultation Service Standard v1.13*

10. APPENDICES

No.	SHINE No.	Parish	Work done
1	DBB4895	Wilden	Checked
2	DBB5826	Wilden	Checked
3	DBB5333	Colmworth	Checked
4	DBB6542	Staploe	Created
5	DBB6046	Staploe	Checked
6	DBB6532	Staploe	Checked
7	DBB6047	Staploe	Checked
8	DBB6543	Great Barford	Created
9	DBB4579	Great Barford	Amended
10	DBB5393	Great Barford	Checked
11	DBB4588	Great Barford	Amended
12	DBB5393	Great Barford	Checked
13	DBB5659	Roxton	Checked
14	DBB4561	Wyboston	Amended
15	DBB5732	Wyboston	Amended
16	DBB6048	Wyboston	Amended
17	DBB6544	Wyboston	Created
18	DBB6545	Wyboston	Created
19	DBB6546	Wyboston	Created
20	DBB6547	Wyboston	Created
21	DBB6548	Wyboston	Created
22	DBB5227	Little Barford	Amended
23	DBB5669	Little Barford	Amended
24	DBB5839	Little Barford	Amended
25	DBB5838	Little Barford	Amended
26	DBB6549	Bedford	Created
27	DBB6550	Bedford	Created
28	DBB6551	Bedford	Created
29	DBB6552	Bedford	Created
30	DBB5864	Bedford	Checked
31	DBB4585	Bedford	Amended
32	DBB6553	Bedford	Created
33	DBB6554	Bedford	Created
34	DBB6555	Bedford	Created
35	DBB5125	Renhold	Amended
36	DBB5631	Renhold	Amended
37	DBB6177	Renhold	Checked
38	DBB5172	Renhold	Amended
39	DBB5225	Renhold	Amended
40	DBB5880	Renhold	Amended
41	DBB6556	Renhold	Created
42	DBB6178	Renhold	Checked
43	DBB5726	Renhold	Amended

44	DBB5454	Renhold	Amended
45	DBB6268	Renhold	Amended
46	DBB5898	Ravensden	Amended
47	DBB5132	Ravensden	Amended
48	DBB4990	Ravensden	Amended
49	DBB6557	Ravensden	Created
50	DBB6558	Ravensden	Created
51	DBB5313	Clapham	Amended
52	DBB5183	Carlton and Chellington	Amended
53	DBB5707	Carlton and Chellington	Amended
54	DBB6559	Carlton and Chellington	Created
55	DBB6525	Carlton and Chellington	Checked
56	DBB4540	Felmersham and Radwell	Amended
57	DBB5941	Milton Ernest	Amended
58	DBB6149	Pavenham	Amended
59	DBB5269	Pavenham	Amended
60	DBB6525	Carlton and Chellington	Amended
61	DBB6148	Pavenham	Amended
62	DBB4827	Pavenham	Amended
63	DBB6560	Pavenham	Created
64	DBB5986	Oakley	Amended
65	DBB5891	Stevington	Amended
66	DBB5787	Stevington	Amended
67	DBB6561	Stevington	Amended
68	DBB5902	Bromham	Amended
69	DBB5700	Bromham	Amended
70	DBB5982	Bromham	Amended
71	DBB5544	Bromham	Amended
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73	DBB5981	Bromham	Amended
74	DBB4688	Bromham	Amended
75	DBB6562	Stagsden	Created
76	DBB6567	Stagsden	Amended
77	DBB6563	Stagsden	Created
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79	DBB5432	Stagsden	Amended
80	DBB6154	Harrold	Amended
81	DBB5688	Harrold	Amended
82	DBB6564	Harrold	Created
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84	DBB5182	Harrold	Amended
85	DBB5421	Harrold	Amended
86	DBB6565	Harrold	Created
87	DBB5559	Harrold	Amended
88	DBB5758	Harrold	Amended
89	DBB5423	Harrold	Amended

90	DBB5420	Odell	Amended
91	DBB5419	Podington	Amended
92	DBB5654	Odell	Amended
93	DBB6398	Odell	Amended
94	DBB6397	Odell	Amended
95	DBB6566	Odell	Created
96	DBB6116	Odell	Amended
97	DBB5231	Odell	Amended
98	DBB6426	Odell	Amended
99	DBB5795	Sharnbrook	Amended
100	DBB5968	Sharnbrook	Amended
101	DBB6567	Knotting and Souldrop	Created
102	DBB6167	Knotting and Souldrop	Amended
103	DBB6166	Knotting and Souldrop	Amended
104	DBB6069	Knotting and Souldrop	Amended
105	DBB6568	Knotting and Souldrop	Amended
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109	DBB6076	Podington	Amended
110	DBB6569	Podington	Created
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112	DBB6017	Podington	Amended
113	DBB5648	Bletsoe	Amended
114	DBB6410	Bletsoe	Amended
115	DBB5853	Bletsoe	Amended
116	DBB5074	Riseley	Amended
117	DBB5075	Riseley	Amended
118	DBB5886	Thurleigh	Amended
119	DBB5825	Thurleigh	Amended
120	DBB5203	Bolnhurst and Keysoe	Amended
121	DBB6526	Bolnhurst and Keysoe	Amended
122	DBB6570	Bolnhurst and Keysoe	Created
123	DBB5405	Bolnhurst and Keysoe	Amended
124	DBB4616	Bolnhurst and Keysoe	Amended
125	DBB6571	Bolnhurst and Keysoe	Created
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130	DBB6100	Bolnhurst and Keysoe	Amended
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133	DBB6092	Bolnhurst and Keysoe	Amended
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137	DBB6097	Riseley	Amended
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139	DBB6574	Riseley	Created
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141	DBB6575	Riseley	Created
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266	DBB5782	Kempston Rural	Amended
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269	DBB5515	Kempston Rural	Amended
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277	DBB4860	Wootton	Amended
278	DBB6062	Wootton	Amended
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282	DBB6059	Wootton	Amended
283	DBB6058	Wootton	Amended
284	DBB6064	Wootton	Amended
285	DBB6063	Wootton	Amended
286	DBB6057	Wootton	Amended
287	DBB4854	Wootton	Amended
288	DBB4754	Wootton	Amended
289	DBB5781	Kempston Rural	Amended
290	DBB4575	Kempston Rural	Amended
291	DBB5776	Kempston Rural	Amended
292	DBB6186	Stagsden	Amended
293	DBB5665	Great Denham	Amended
294	DBB5668	Great Denham	Amended
295	DBB5668	Biddenham	Amended
296	DBB4617	Biddenham	Amended
297	DBB5541	Biddenham	Amended
298	DBB5112	Biddenham	Amended
299	DBB5743	Great Denham	Amended
300	DBB5579	Biddenham	Amended
301	N/A	Odell	Created
302	N/A	Podington	Created
303	N/A	Podington	Created
304	N/A	Podington	Created
305	N/A	Odell	Created
306	N/A	Wymington	Created
307	N/A	Sharnbrook	Created
308	N/A	Sharnbrook	Created
309	N/A	Sharnbrook	Created
310	N/A	Harrold	Created
311	N/A	Harrold	Created
312	N/A	Harrold	Created
313	N/A	Harrold	Created
314	N/A	Harrold	Created
315	N/A	Harrold	Created
316	N/A	Sharnbrook	Created
317	N/A	Sharnbrook	Created
318	N/A	Dean and Shelton	Created

319	N/A	Odell	Created
320	N/A	Sharnbrook	Created
321	N/A	Thurleigh	Created
322	N/A	Bolnhurst and Keysoe	Created
323	N/A	Carlton and Chellington	Created
324	N/A	Carlton and Chellington	Created
325	N/A	Turvey	Created
326	N/A	Turvey	Created
327	N/A	Turvey	Created
328	N/A	Turvey	Created
329	N/A	Turvey	Created
330	N/A	Turvey	Created
331	N/A	Turvey	Created
332	N/A	Turvey	Created
333	N/A	Turvey	Created
334	N/A	Turvey	Created
335	N/A	Stagsden	Created
336	N/A	Stagsden	Created
337	N/A	Bromham	Created
338	N/A	Clapham	Created
339	N/A	Clapham	Created
340	N/A	Carlton and Chellington	Created
341	N/A	Dean and Shelton	Created
342	N/A	Dean and Shelton	Created
343	N/A	Podington	Created
344	N/A	Podington	Created
345	N/A	Pavenham	Created
346	N/A	Pavenham	Created
347	N/A	Pavenham	Created
348	N/A	Pavenham	Created
349	N/A	Pavenham	Created
350	N/A	Felmersham and Radwell	Created
351	N/A	Stevington	Created
352	N/A	Melchbourne and Yelden	Created
353	N/A	Melchbourne and Yelden	Created
354	N/A	Oakley	Created
355	N/A	Thurleigh	Created
356	N/A	Bletsoe	Created
357	N/A	Melchbourne and Yelden	Created
358	N/A	Carlton and Chellington	Created
359	N/A	Bromham	Created
360	N/A	Swineshead	Created
361	N/A	Swineshead	Created
362	N/A	Melchbourne and Yelden	Created
363	N/A	Riseley	Created

364	N/A	Bolnhurst and Keysoe	Created
365	N/A	Wyboston	Created
366	N/A	Staploe	Created
367	N/A	Clapham	Created
368	N/A	Wootton	Created