Natural England Commissioned Report NECR141

New Forest SSSI Ecohydrological Survey Overview

Annex B: Lodge Heath Mire

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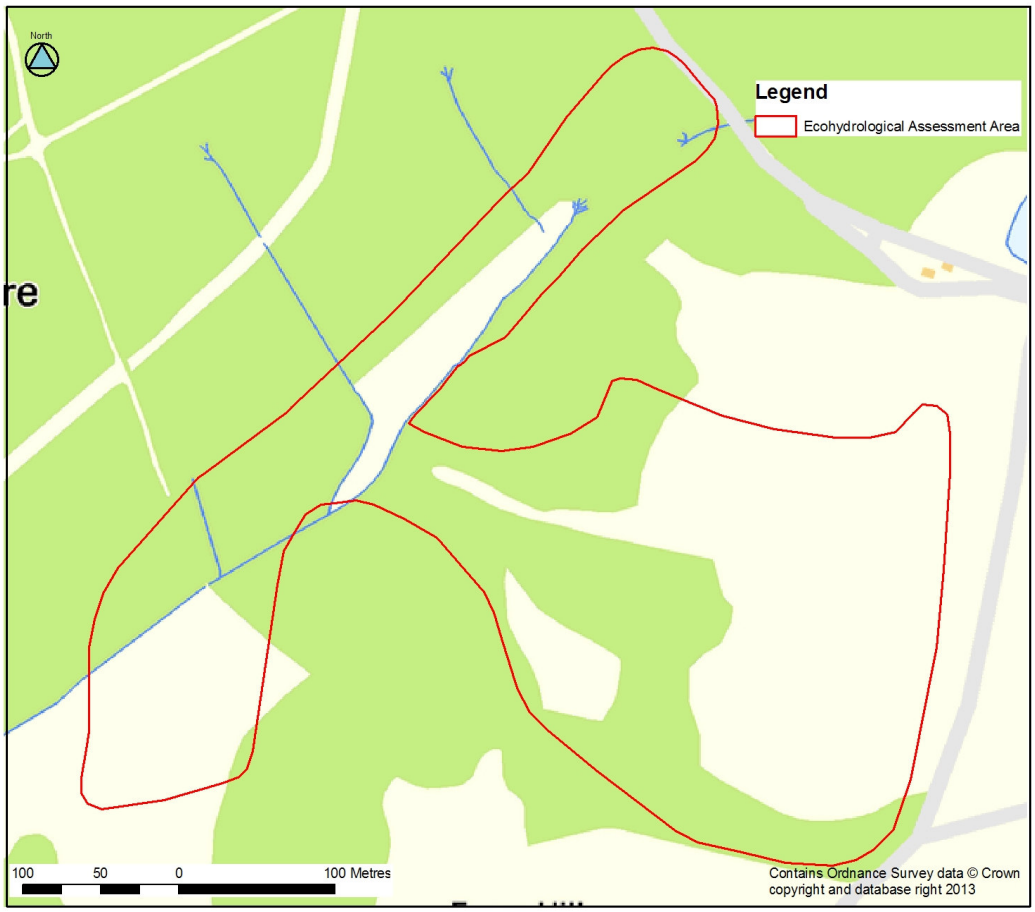
Contents

1 Lodge Heath Mire

1.1 Introduction

This Ecohydrological Assessment Area (EcoHAA) covers 12ha and is contained within SSSI Unit 446 with its centre at National Grid Reference (NGR) 433007, 101860 (see Figure 1-1).

Figure 1-1: Location Map



The unit is formed from two valleys with seepages from river terrace gravels supporting valley side and valley bottom wetlands. Drainage in the main valley is damaged and limited the extent of one of the valley bottom wetlands and this may require restoration.

Table 1-1: Lodge Heath Mire Ecohydrological Assessment Area Summary Table

Eco-hydrological Assessment Area		**B**
Name		Lodge Heath Mire
Relative Geomorphology Assessment		
Size (ha)		12.0
SSSI Units		446
Valley Side Wetland	Present	Y
	Wetland Type	Flush Dominated Wetland
	Main Source of water	Seepage from junction of River Terraces (aquifer) and Headon Beds (aquitard)
	Indicative NVC communities	M21a, M29
	Wetland Types	Mire
	Drainage Damage	Moderate
	Scrub/Tree Encroachment Damage	Y

	Poaching and Grazing Pressures Damage	Y
Valley Basin Wetland	Present	Y
	Wetland Type	Flush Dominated Wetland
	Main Source of water	Seepage from river terrace gravels
	Indicative NVC communities	M25a
	Wetland Types	Wet grassland
	Drainage	Y
	Scrub/Tree Encroachment Damage	Y
	Poaching and Grazing Pressures	Y
Additional Comments		Minor Rhododendron encroachment

It should be noted that although this is a standalone report, it is strongly reliant upon the background information provided in section 3 of the JBA (2013) Ecohydrology Survey Overview report, which provides general geology, hydrogeology, ecology, wetland mechanisms and restoration information for the New Forest wetlands surveyed. At the end of the report is a series of maps which support the assessment and indicate the spatial distribution of the features described.

1.2 Topography and Wetland Distribution

The unit consists of a narrow north-east to south-west trending a valley which is joined by a valley from the east 330m downstream of the road to Lodge Heath. The main valley contains a small stream along most of its length. This appears to have been straightened and deepened artificially along some reaches. There are a small number of valley basin wetlands (two significant ones) in the upper parts of the tributary valleys on both sides of the main stream. The extent of the northern valley basin wetland to the north of the main stream appears to have been reduced and damaged by past drainage works.

Figure 1-2: Small Drain at Base of Main Valley (NGR 432750, 101832 looking north-east)

In addition to the valley basin mires there are several areas of valley side wetlands; the distribution of which will be discussed further below.

Within the forestry to the north-west of the unit is forestry drainage which discharges at several points into the main valley.

1.3 Ecology

The unit is a valley side mire combined with a seepage face. The valley mire is situated in the eastern part of the unit within the valley that enters the main valley 330m downstream of the

Lodge Heath road. Within this valley, the areas above the valley side mire, which is below the break of slope are typically drier and are Bracken *Pteridium aquilinum* and Gorse *Ulex europaeus* dominated. The valley side mire itself is cattle poached, but relatively intact with very wet areas containing species such as Bog Pondweed *Potamogeton polygonifolius* in soakways (NVC M29 community) and Cross-leaved Heath *Erica tetralix,* combined with areas of drier heath on the margins.

The valley side mire grades into an area of raised mire at the valley bottom where it is very wet and, as a result, *Sphagnum* rafts are abundant. Characteristic mire species are present in large quantities including Bog Myrtle *Myrica gale*, Deer-grass *Trichophorum germanicum*, Purple Moor-grass *Molinia caerulea* and Bog Pondweed representing an M25a NVC community. Downstream the valley leads into an area of mixed woodland where stands of Rhododendron *Rhododendron ponticum* are present (at NGR 433069101814). The shrub layer is composed of Bracken and a natural opening in the wood contains a small valley mire.

The western side of the unit contains broad-leaved woodland species including Beech *Fagus sylvatica,* Oak *Quercus robur* and Silver Birch *Betula pendula*. This woodland is analagous with W14 Beech woodland but has more Bracken that would be considered typical of the community type. This woodland, however, is notable for the large, ancient, senescent Beech trees present, some of which have been pollarded (Figure 1-3). These are a valuable habitat, especially for saproxilic species, in thier own right and care should be taken to ensure, as they stags-head, that they are not over-topped by taller growing, younger trees. However, there does not appear to be much risk of this at the moment as the current canopy surrounding the veterans is mature and there appears to be very little regeneration going on, limiting the age-class structure of this woodland (Figure 1-3).

Figure 1-3 Ancient Beech *Fagus sylvatica* Trees now Stag-heading. The Trees to the Rear have been Pollarded. Note the Lack of Regeneration.

Wet grassland 'lawn' is also present within the main valley bottom, where a drain has been cut through it and this approximates to M23a typically although there are patches which grade into the Molinia M25a community and even the M21a valley bog plant community. This is instructive as it implies that the valley bottom here has been drying out and the more natural mire habitats that would have been present, mainly *Molinia* dominated but with some patches of *Sphagnum* dominated valley bog, are on the retreat (Figure 1-4). Grazing by large herbivores, which gain increasing access to these areas as they dry, will have exacerbated this process, leading to the loss of these habitats over time. The incised, straightened drain at the valley bottom is likely to be the cause of this long-term habitat change: change that is still continuing to the present day.

Figure 1-4 Mire, with affinities to M21a, gradually turning to lawn under the twin influences of drainage and grazing pressure

Towards the north-eastern 'arm' of the unit mixed woodland dominates interspersed with areas of seepage mire. The seepage mire runs into a cut drain which is Willow *Salix* spp. lined.

There are several areas of mire present within the unit, however, these are not connected and are separated by both the mixed woodland and the presence of artificially cut drains throughout the unit.

1.4 Geology and Hydrogeology

Table 1-2 shows the geology at Lodge Heath Mire. The river terrace gravels surround the unit to the east and north.

Table 1-2: Geology and Hydrogeology

Age	Group	Formation - member	Description	Thickness	Hydrogeological Role	Water Resources
Quaternary		River terrace deposits	CLAY, SILT, SAND and GRAVEL.		Aquifer / Aquitard - Spring lines may be present at the base of high level river terraces.	
Tertiary (Eocene)	Solent Group	Headon Formation and Headon Hill Formation	Greenish grey shelly CLAY with laminated SAND, SILT and CLAY.	Up to 49 m	Aquifer / Aquitard	Sandy strata may provide yields sufficient for domestic or small agricultural use.
BGS digital 1:50,000 geology mapping, Melville and Freshney (1982), Edwards and Freshney (1987), Bristow *et al.* (1991), Jones *et al.* (2000), Barton *et al.* (2003), and Neumann *et al.* (2004).						

Local BGS borehole logs (available at http://www.bgs.ac.uk/GeoIndex/) describe the river terrace deposits as sandy gravel (likely to be relatively permeable and to act as an aquifer) and the Headon Formation as a greyish yellow green clay (likely to act as an aquitard).

Within the valley basin wetland in the east, the centre is raised suggesting a significant depth of peat.

1.5 Water Supply Mechanisms

The wetlands on unit are flush dominated (see Figure 1-5). They receive water from a seepage face at the junction between river terrace deposits (aquifer) and the underlying Headon Formation (aquitard). The major seepage faces at this junction have been mapped by the survey. It appears that the seepage faces and the valley side wetlands are limited to the areas where thicker river terrace gravels intersect with the valley sides. The water runs over the surface of the low permeability Headon Formation, forming flushed slopes before reaching the valley bottoms. The length of the valley side wetlands is controlled by the difference in elevation between the seepage face and the bottom of the valley.

The valley basin wetlands are flush dominated and their extent is controlled by the topography of the valley and, in the case of the main valley, where the drainage has had limited impact upon them.

1.5.1 WETMECS identified

WETMECs are ecohydrological classifications of how water can be supplied to a wetland to create distinguishable habitats WETMECS were developed in partnership between the Wetland Research Group at the University of Sheffield, the Environment Agency, English Nature (now Natural England) and Countryside Council for Wales (now Natural Resources Wales). For each Ecohydrological Assessment Area WETMECS have been identified.

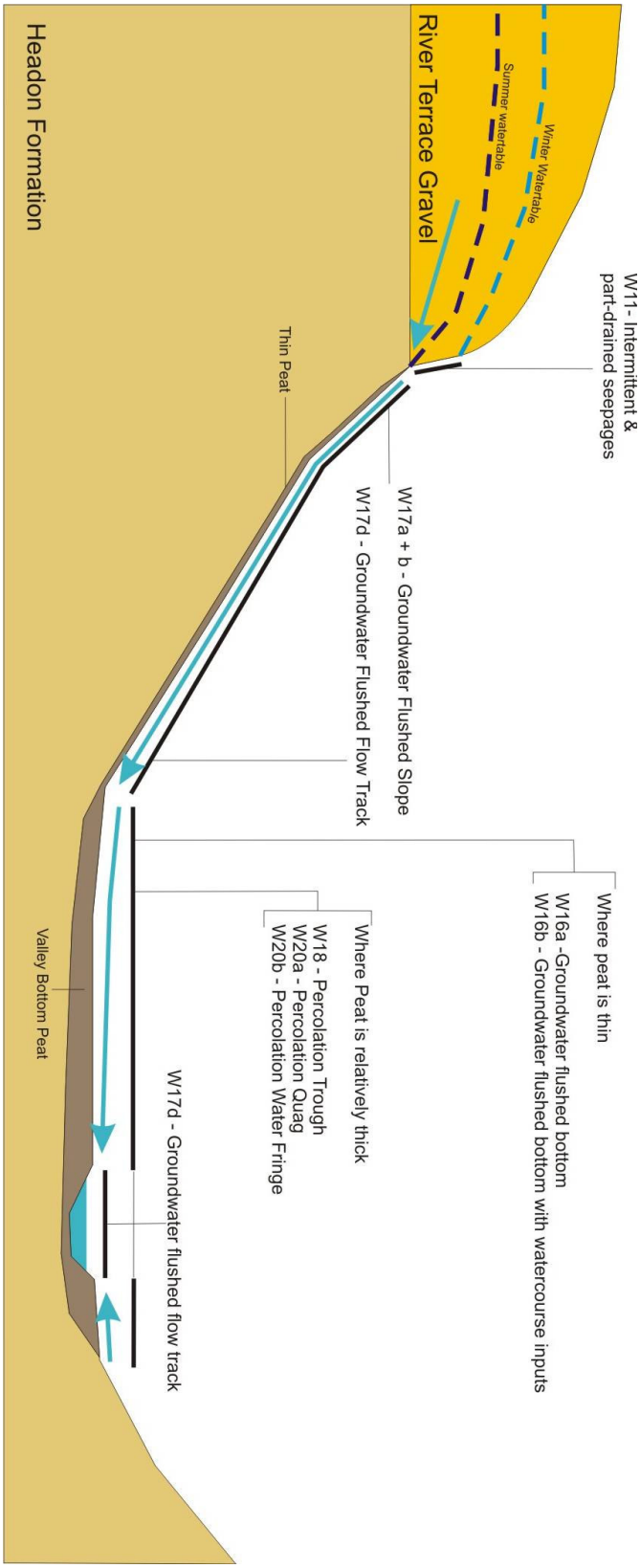
The WETMECS identified include:

Valley side wetlands - W17a+b and W17b with small areas of W11 above.

Eastern valley peat area- valley bottom basin - W18, W20a, 20b and W19.

Main valley bottom basins - W16a, W17d and W17b.

Figure 1-5: Conceptual Model Diagram

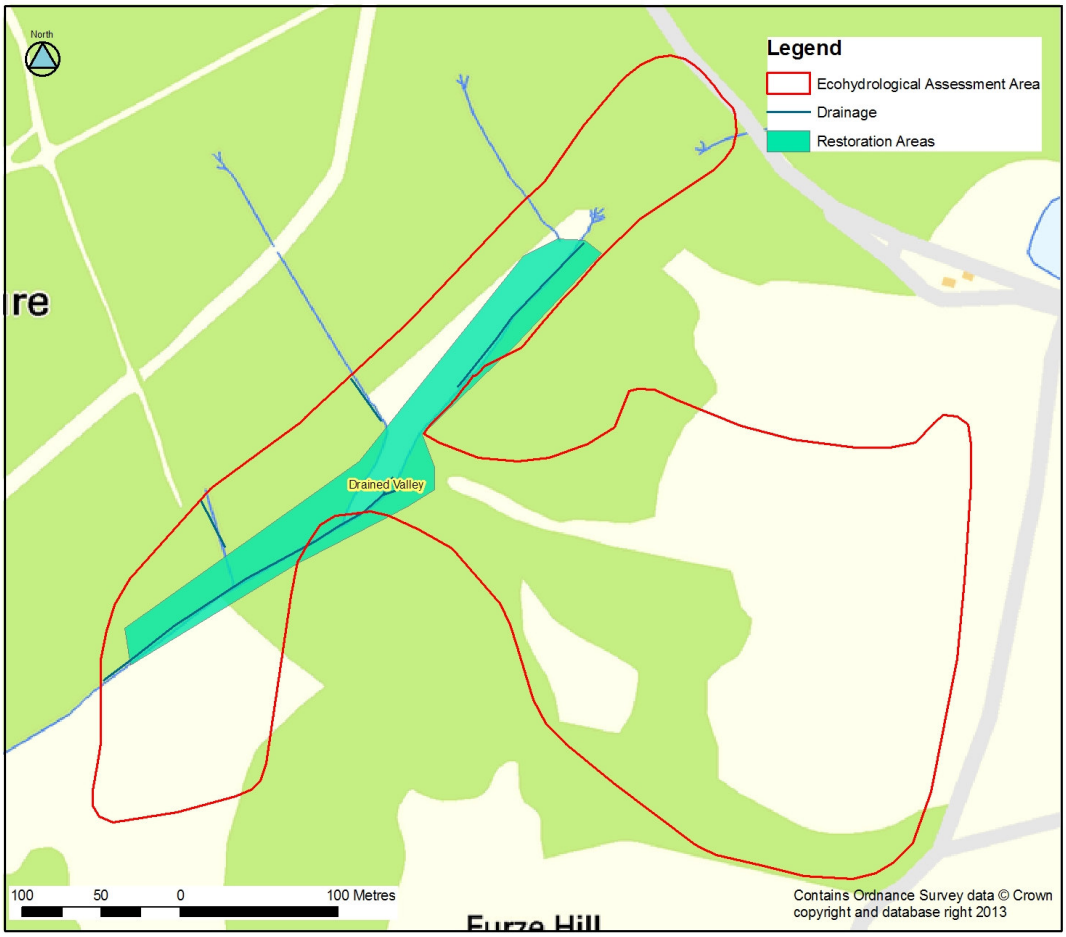


1.6 Damage and Restoration

1.6.1 Damage

There is one area of significant damage (see Figure 1-6). This is in the main basin where a drain has limited the area of the valley basin mire. In this area the peat soils have degraded over time and the mire replaced with an area of marshy grassland.

Figure 1-6: Restoration Areas Map



The unit is becoming increasingly unfavourable as Bracken encroachment and scrub are beginning to dominate in some areas, especially in the valley bottom where the previous mire basin habitat has become drier. The drain at the bottom of the valley is compromising the mire habitat (which runs directly alongside it) and some areas are becoming drier, resulting in wet grassland habitats forming, which are likely to become increasingly drier and scrubbed over without intervention. The invasive species, Rhododendron, was also found in the unit in a small area. It is highly likely that this species will colonise the unit further if preventative action is not taken to remove it.

The unit is heavily poached by animals in places and as a consequence the small areas of fragile mire habitat present within the unit are becoming increasingly damaged.

1.6.2 Restoration

Given that the area of drainage has almost completely removed the wetland habitat that existed in the past, robust restoration objectives should be developed for the unit. For this area, to restore it back to its former state, does not just require drainage controls but also the

build up of peaty soils over a long period of time. If the objectives developed for the unit are the restoration of the mire habitat then it is recommended that the drain at the base of the main valley be infilled or regularly blocked with earth bunds. If the aim is to ensure that the mire in the upper reaches of the main valley is maintained then the upper part of the drain in this arm of the stream could be blocked.

Table 1-3: Restoration Area Summary Table

Restoration Area	Damage Type	Restoration Proposals	Improvement	Constraints and Issues
Drained Valley	Drainage	Infilling drain or earth bunds along the upper reach	Ensures that the current extent of mire habitat does not degrade further as a result of drainage	
		Infilling drain or earth bunds along all the drain	Will retain existing mire habitats and allow them to extend into areas where it was formerly present	It would replace some areas of marshy grassland with mire habitats over time, which may constrain current grazing activities
		Scrub / Bracken Clearance	Prevents further encroachment and ensures that the current extent of wetland habitats does not dry out further	
Upper Mire Area	Invasive Species	Rhododendron clearance	Ensures invasive species do not spread across unit	Constraints are variable and dependent on type of control technique used. Also, follow-up control treatments may be necessary
Upper Mire Area	Poached Ground	Grazing management	Prevents sensitive mire habitat becoming trampled and damaged continuously	May be constrained by current grazing rights

1.7 Monitoring requirements

1.7.1 Water Monitoring

Groundwater monitoring of the two valley basin mires and a stilling well within the drain in the upper part of the main valley would help to improve knowledge of baseline water conditions, quantify the impact of drainage and monitor the success of any restoration work (see Table 1-4).

1.7.2 Vegetation

Rhododendron monitoring is necessary to ensure that the species does not spread further across the unit, compromising the restoration of the unit as a whole. Monitoring would consist of fixed point camera surveys and transect studies to assess the spread of the species across the unit; this could be used to monitor continued encroachment without restoration and also the success of any eradication programme implemented.

Poaching of the soil across the unit can also be monitored by taking fixed point camera surveys of specific areas within the unit on a bi-annual basis. Quadrat surveys may also be used to monitor vegetation recovery within the managed grazing areas.

Table 1-4: Monitoring Requirements

Eco-hydrological Assessment Area	SSSI Units	Site Names	Requirements for monitoring: ecology	Requirements for monitoring: hydrology (number of installations estimated)
B	446	Lodge Heath Mire	Fixed point camera survey (specifically focussing on extent of Rhododendron encroachment and areas of poaching) Fixed point quadrat survey (focussing on recovery of poached areas)	6 boreholes and 1 stilling well (7 installations in total) within the valley mires Plus associated monitoring and processing

2 Maps

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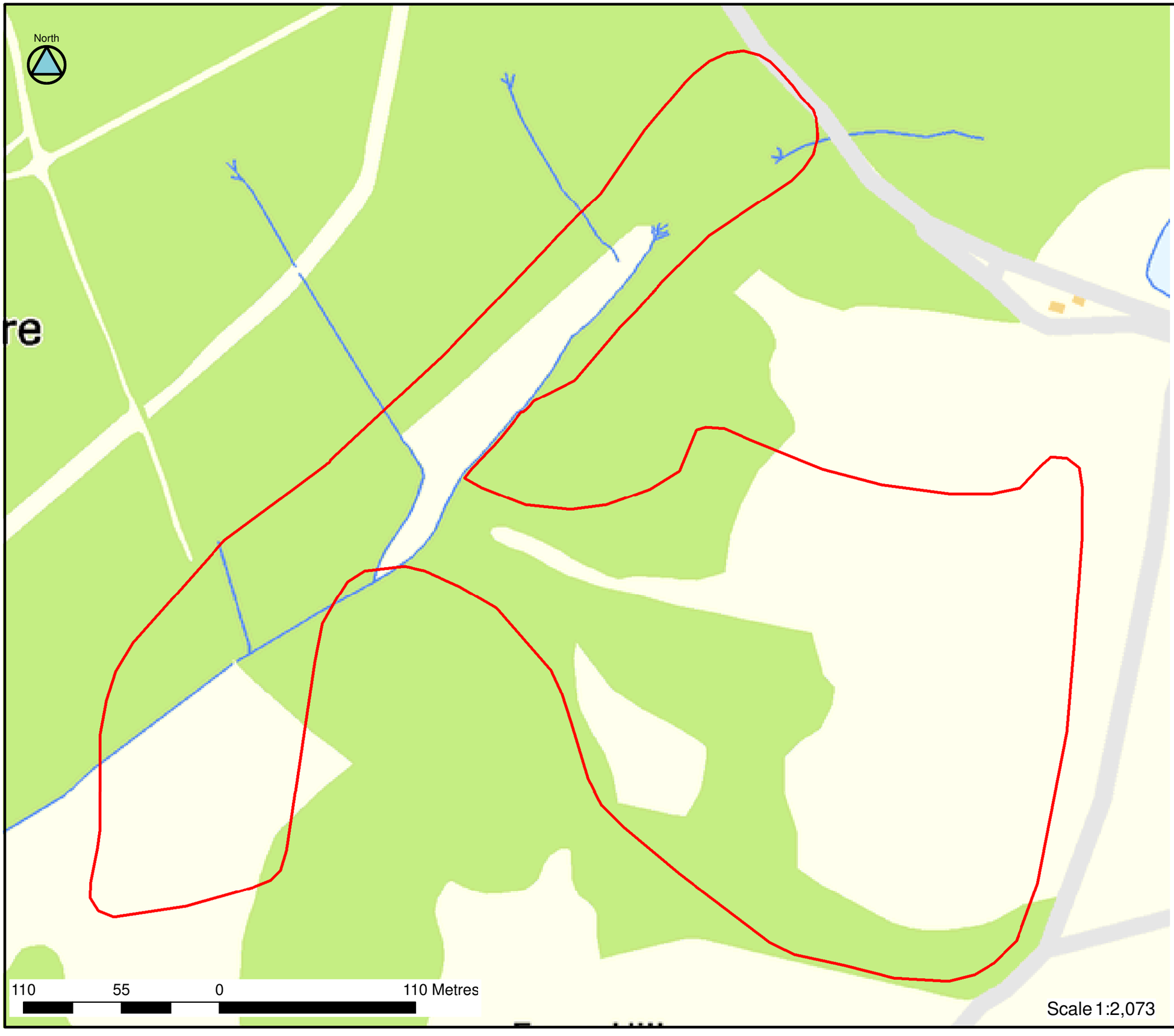
Map 8: Restoration Plan



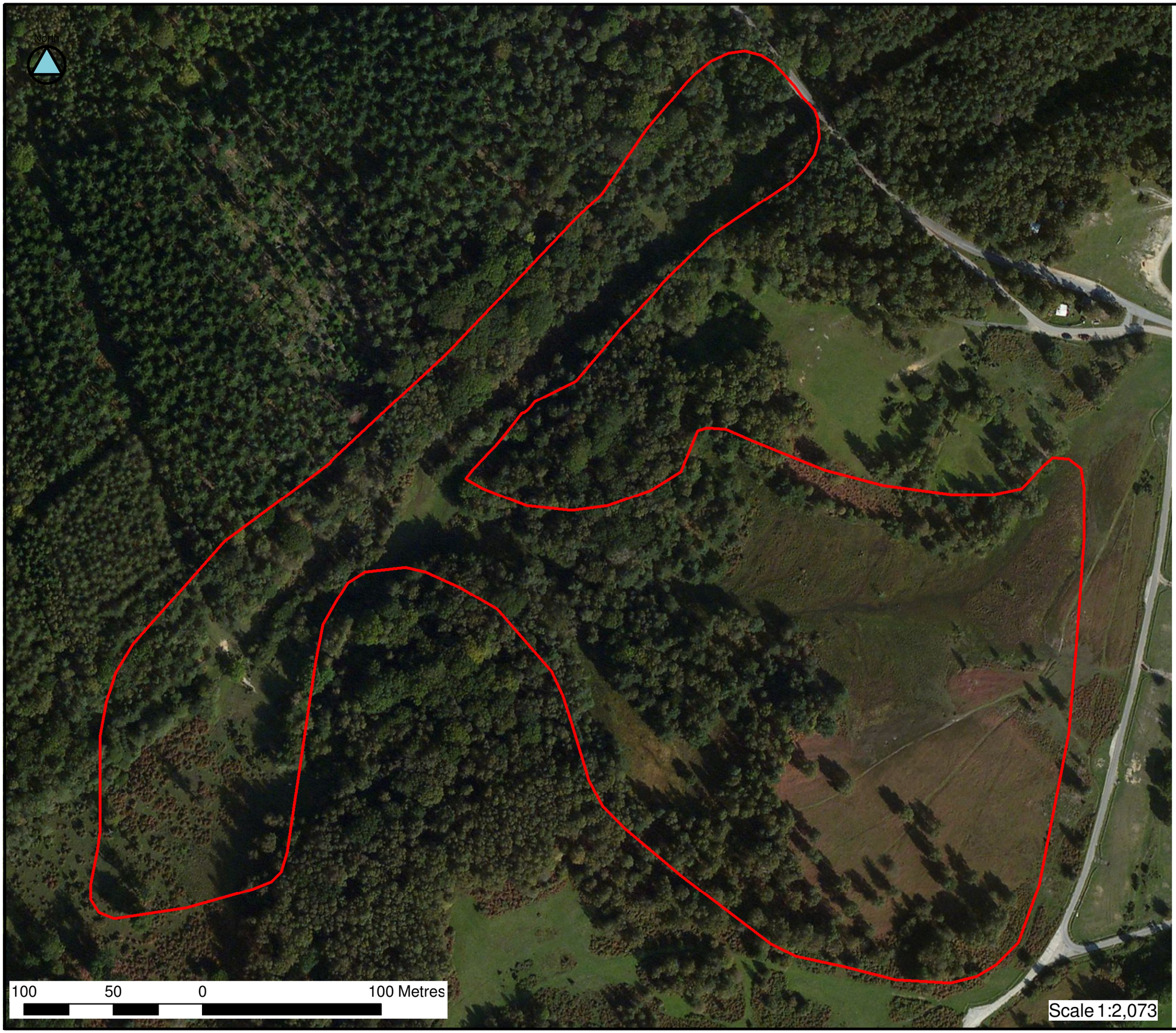
LEGEND

Ecohydrological Assessment Area

JBA consulting

MAP 1

Site Location



LEGEND

Ecohydrological Assessment Area

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MAP 2

Aerial Photography

North

LEGEND

Ecohydrological Assessment Area

Seepage face

Drainage

Valley Bottom Wetland

Valley Side Wetland

LIDAR

mAOD

High : 40

Low : 20

110 55 0 110 Metres

Scale 1:2,073

JBA consulting

MAP 3

Topography, Hydrology and Wetland Distribution

North

M24

M24

U4-H2 Mosaic

M21a

M24

W14

M21a

U4-H2 Mosaic

100 50 0 100 Metres

Scale 1:2,000

LEGEND

- Ecohydrological Assessment Area
- Invasives
- G2.1
- G2.2
- A1.1.1
- A1.3.1
- A1.3.2
- A2.1
- A2.2
- B5
- C1.1
- C1.2
- D6
- E3.1
- E3.2

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MAP 4

Phase One Habitat

North

re

90 45 0 90 Metres

Scale 1:2,073

LEGEND

- Ecohydrological Assessment Area
- No Drift
- Other Deposits
- Alluvium - Clay, Silt, Sand and Grave
- Head - Clay, Silt, Sand and Gravel
- Head - Gravel, Sand, Silt and Clay
- Head - Silty Clay
- Head - Gravelly Sand
- Peat
- River Terrace Deposits - Clay and Silt
- River Terrace Deposits - Sand and Gravel
- River Terrace Deposits - Sand, Silt and Clay

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MAP 5

Drift Geology

North

HEADON BEDS AND OSBORNE BEDS (UNDIFFERENTIATED) - CLAY, SILT AND SAND

90 45 0 90 Metres

Scale 1:2,073

LEGEND

- Ecohydrological Assessment Area
- Other Rock Types
- Headon and Osbourne Beds - Clay, Silt and Sand
- Headon Formation - Clay, Silt and Sand
- Lyndhurst Member - Sand, Silt and Clay
- Becton Sand Formation - Sand
- Becton and Chama Sand Formation - Sand, Silt and Clay
- Becton Bunny Member - Clay
- Chama Sand Formation - Sand
- Chama Sand Formation - Sand, Silt and Clay
- Chama Sand Formation - Silty Clay
- Barton Clay Formation - Clay
- Barton Clay Formation - Sand
- Selsey Sand Formation - Sand, Silt and Clay
- Marsh Farm Formation - Clay, Silt and Sand
- Poole Formation - Sand, Silt and Clay
- London Clay Formation - Clay, Silt and Sand

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MAP 6

Bedrock Geology

North

LEGEND

- Ecohydrological Assessment Area
- Seepage face
- Drainage
- Valley Bottom Wetland
- Valley Side Wetland

Drift Hydrogeology

- Aquifer
- Aquifer/Aquitard
- Aquitard

Bedrock Hydrogeology

- Aquifer
- Aquifer/Aquitard
- Aquitard

90 45 0 90 Metres

Scale 1:2,073

JBA consulting

MAP 7

Eco-hydrology

North

re

Drained Valley

120 60 0 120 Metres

Scale 1:2,073

LEGEND

- Ecohydrological Assessment Area
- Drainage
- Restoration Areas

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MAP 8

Restoration Plan