Natural England Commissioned Report NECR141

New Forest SSSI Ecohydrological Survey Overview

Annex G: Vales Moor and Foulford Bottom

First published 06 March 2014

www.naturalengland.org.uk

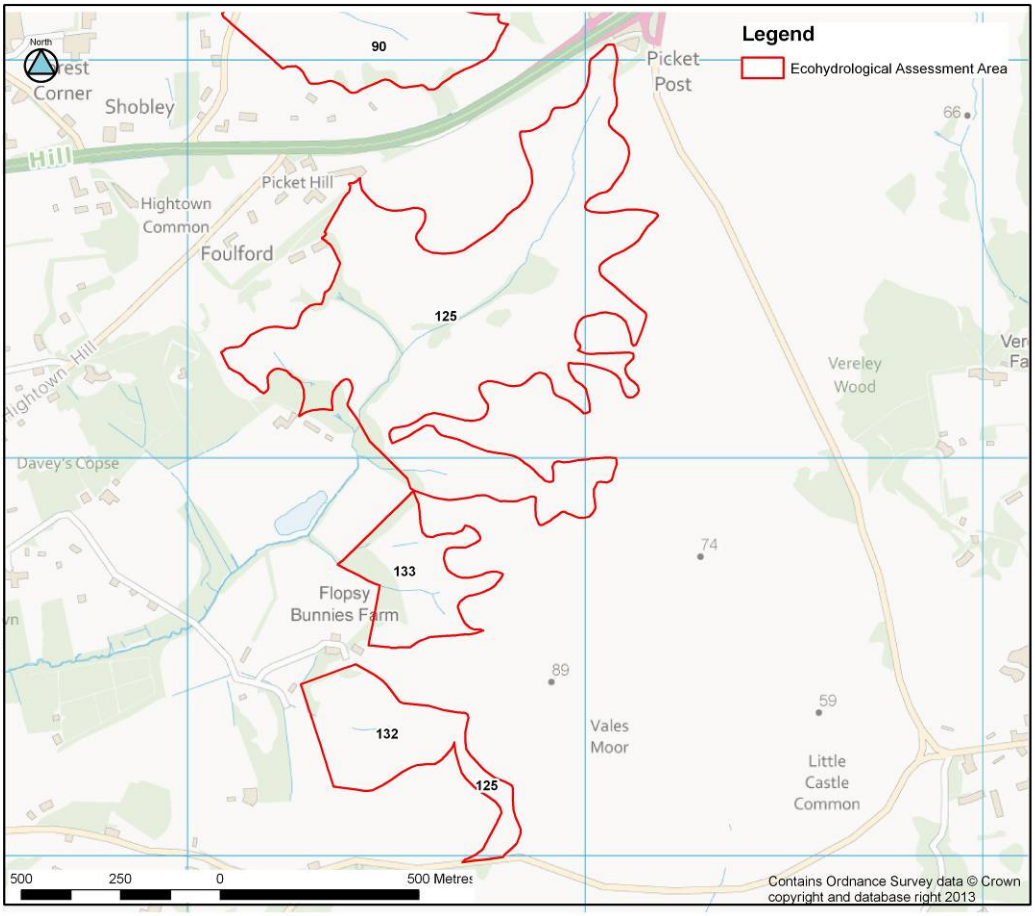
Contents

1 Vales Moor and Foulford Bottom

1.1 Introduction

This Ecohydrological Assessment Area (EcoHAA) covers 68.4 ha and is contained within SSSI Units 125, 132 and 133 with its centre at National Grid Reference (NGR) 418656 105050 (see Figure 1-1).

Figure 1-1: Location Map



The site includes a series of flush-dominated valley mires supplied with water by seepage from the base of the Tertiary Becton Sand Formation and possibly also from the base of the Tertiary Chama Sand Formation. There has been little artificial drainage, although some watercourses may have been straightened slightly. Unit 133 (immediately northeast of Flopsy Bunnies Farm) is drained by streams that are deeply incised where they leave the unit. This over-deepening appears to be artificial and is likely to be causing headward erosion. There is evidence of bank slumping within the SSSI boundary.

Table 1-1: Ecohydrological Assessment Area Summary Table

Eco-hydrological Assessment Area		**G**	
Name		Vales Moor and Foulford Bottom	
Relative Geomorphology Assessment			
Size (ha)		68.4	
SSSI Units		125 and 132	133
Valley Side Wetland	Present	Y	
	Wetland Type	Flush Dominated Wetland	
	Main Source of water	Seepage from (i) junction of Becton Sand Formation and underlying Chama Sand Formation and possibly (ii) junction of Chama Sand Formation and underlying Barton Clay Formation.	Seepage from junction of Becton Sand Formation and underlying Chama Sand Formation.
	Indicative NVC communities	M16a, M16b, M29, M21a, M25a, H2, W4b	M16a, M29, M21a, H2
	Wetland Types	Wet Heath, Valley Mire, Wet Woodland	Wet Heath, Valley Mire
	Drainage Damage	N	N
	Scrub/Tree Encroachment Damage	Y - pine seedlings and some Rhododendron (Moderate)	Y - pine seedlings and occasional Rhododendron (Minor)
	Poaching and Grazing Pressures Damage		N
Valley Basin Wetland	Present	Y	
	Wetland Type	Flush Dominated Wetland	
	Main Source of water	Seepage from (i) junction of Becton Sand Formation and underlying Chama Sand Formation and possibly (ii) junction of Chama Sand Formation and underlying Barton Clay Formation.	Seepage from junction of Becton Sand Formation and underlying Chama Sand Formation.
	Indicative NVC communities	M16a, M29, M21a, H2, M25a	M16a, M29, M21a, H2
	Wetland Types	Wet Heath, Valley Mire	Wet Heath, Valley Mire
	Drainage	Y - likely modification of valley centre stream (Minor)	Y - overdeepening of valley centre stream where it leaves the unit; probable headward erosion (Moderate).
	Scrub/Tree Encroachment Damage	Y - pine seedlings and some Rhododendron (Moderate)	Y - pine seedlings and occasional Rhododendron (Minor)
	Poaching and Grazing Pressures	Y - poaching (Minor)	Y - poaching (Minor)
Additional Comments		Clay prone to poaching. Some valley bottom watercourses have straight sections, suggesting artificial drainage. Use of culverting for watercourse crossing (50 cm diameter culvert pipe at southwestern edge of unit 125). Rhododendron encroachment into unit 132 in particular is an issue, with occasional patches in unit 125.	Clay prone to poaching. The southern stream has a deeply incised/over-deepened section (undercut clay banks c.2 m high) at the western boundary of the unit. Headward erosion is likely to be occurring (evidence of bank slumping within the SSSI boundary). Occasional patches of Rhododendron.

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

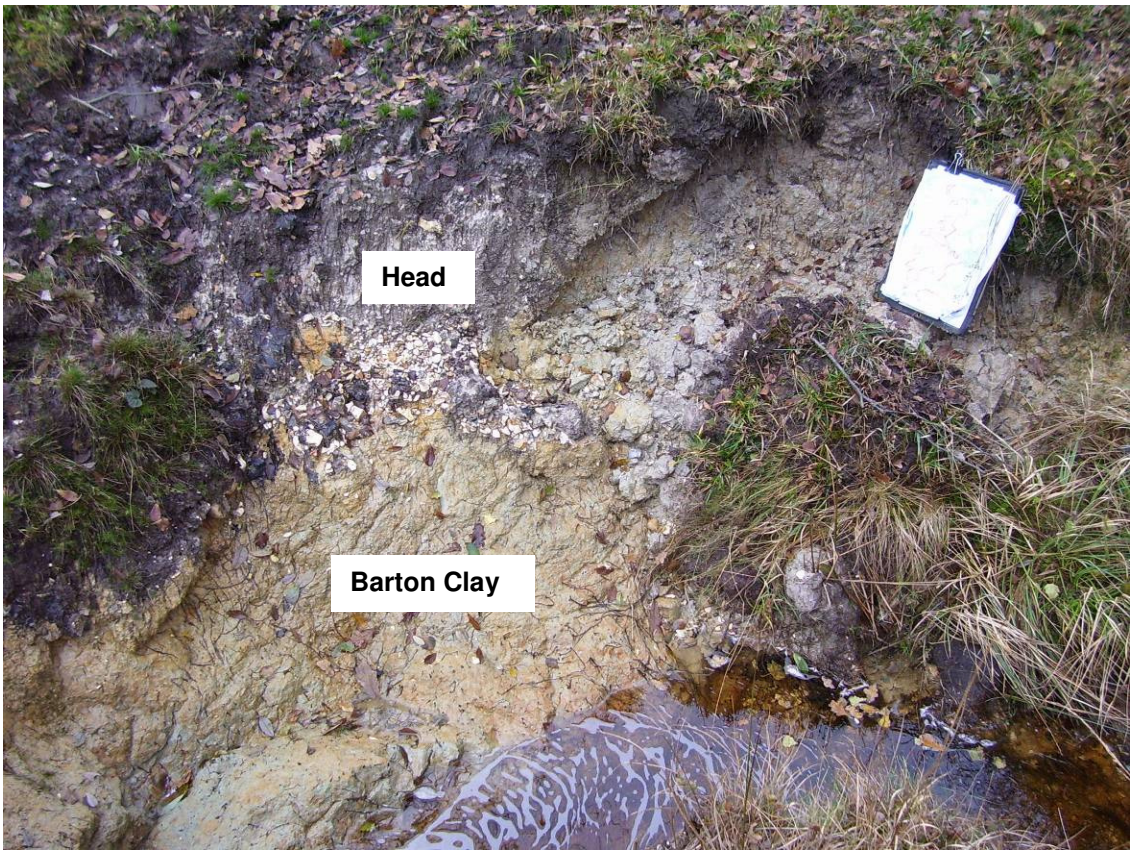
The site consists of a series of valleys that drain mainly westwards and south-westwards towards an unnamed watercourse that flows into Hightown Lake (c.1.6 km west of the site) on the edge of Ringwood. The wetlands take the form of valley mires and are sourced mainly by groundwater seepages concentrated within the valley heads. These seepages occur at breaks-of-slope that represent stratigraphic boundaries within the bedrock: the base of the Becton Sand Formation, and possibly also the base of the Chama Sand Formation.

Figure 1-2: General view of one of the valley mires (Unit 125) showing the break in slope associated with the base of the Becton Sand Formation (NGR 418792 104890)

Figure 1-3: Seepage (interpreted as being from the base of the Becton Sand Formation) at the head of the valley mire in Unit 132 (NGR 418655 104307)

Figure 1-4: Over-deepened channel (c.2 m deep) at outflow from Unit 133 (NGR 418413 104714)

Figure 1-5: Evidence of bank failure in outflow channel from Unit 133 (NGR 418533 104664; the clipboard is 0.3 m long)



1.3 Ecology

The southern-most portion of this Ecohydrological Assessment Area consists of a small linear site which is part of unit 125 and Vales Moor unit 132. The larger part of this area, Vales Moor unit 132, is a classic valley mire, with the central valley bottom very boggy when surveyed, with a range of mire species present, including *Sphagnum* tussocks (*S. denticulatum, S. capillifolium ssp. rubellum, S. papillosum* and *S. capillifolium ssp. capillifolium*), Sharp-flowered Rush *Juncus acutiflorus*, Purple Moor-grass *Molina caerulea*, Bog Pondweed *Potamogeton polygonifolious*, Deergrass *Trichophorum germanicum*, White Beak-sedge *Rhynchospora alba*, Bog Asphodel *Narthecium ossifragum* and New Zealand Willowherb *Epilobium brunnescens* (an introduced species). This community has affinities with the NVC class W21a, although there are a larger number of *Sphagnum* species than one would normally expect. Water within this valley mire eventually concentrates into a soakway and then a channel, before discharging into artificial drains dug along the western boundary, which flow through a small area of Grey Willow *Salix cinerea* dominated (W4b) scrub.

Around the margins of the valley mire, wet heath is present with Cross-leaved Heath *Erica tetralix* and Purple Moor-grass dominant (M16a), with occasional Heather *Calluna vulgaris* and patches of Gorse *Ulex europaeus* and Downy Birch *Betula pendula*. On the higher valley slopes, Heather-dominated acid dry heath (H2) and Bracken *Pteridium aquilinum* (W25) are present, with woodland containing Downy Birch, Scot's Pine *Pinus sylvestris*, Oak *Quercus robur* and Gorse along the western and north-western boundaries.

The adjoining part of the site, part of Foulford Bottom unit 125, is small and linear. Adjacent to the road there is a small, dystrophic open pool, with few aquatic macrophytes and a patch of W4b Grey Willow dominated wet/woodland scrub. This pool is unlikely to be natural; instead, it is likely that the road has acted as a barrier to flow, causing ponding of water on its northern side. This pool is not linked to, or having an impact on, the mire habitats within the EcoHAA.

Surrounding the pool is Cross-leaved Heath and Purple Moor-grass dominated wet heath, with *Sphagnum tenellum* patches that is similar to M16a. Moving upslope this grades into Heather dominated acid dry heath, with lichens present beneath the ericoid layer. Bracken, both scattered amongst the Heather and forming continuous cover, is also present, with patches of Gorse.

Vales Moor unit 133 is also a valley mire system, consisting of three smaller valleys, two of which merge together in the southern portion of the site. These discharge into the artificially straightened drains on the western margins of the unit, which also have low earth banks adjacent to them in places (although the presence of the mature Beech and Oak on these banks indicates that the earth bank may have originated from the digging of the drain, rather than more recent clearing). Headwater erosion also appears to be occurring on one channel and woody debris has accumulated across the deeply incised channel in several places. The valley mire habitats throughout this unit were very similar to those described above, with *Sphagnum* tussocks (*S. denticulatum* and *S. papillosum*), Deergrass, Sharp-flowered Rush, Bog Pondweed, Carnation Sedge *Carex panicea*, Marsh St. John's-wort *Hypericum elodes* and patchy Bog Myrtle *Myrica gale* (M16a & M25*a*). Around the margins of the valley mire is Cross-leaved Heath, Heather and Purple Moor-grass dominated wet heath (M24c), which grades into Heather dominated acid dry heath moving upslope (H2). The western portion of the unit is broadleaved woodland, with Oak and Beech *Fagus sylvatica* in the canopy, and Downy Birch, Holly and Honeysuckle *Lonicera periclymenum* prevalent in the understorey with patchy Bracken in the field layer (W10a).

The largest, most northern, component of this Ecohydrological Assessment Area is Foulford Bottom unit 125, which is a complex of valley mires, draining towards Foulford Bottom. The central stream originates as a spring, in a mire area near Picket Post Cottage and flows down the valley, through very wet valley mire habitats with Bog Asphodel, Deergrass, *Sphagnum* tussocks, Purple Moor-grass, Bog Myrtle, Carnation Sedge, Cross-leaved Heath, Sharp-flowered Rush and Bog Pondweed. These are common valley mire communities in the New Forest and are frequently accompanied by an anastomosed network of soakways (M29) with the latter species, as they are here. These valley mire areas were relatively tussocky, with some standing water pools when surveyed. Grey Willow dominated scrub (W4b) also follows the alignment of the watercourse at its upstream end.

Moving further downstream along Foulford Bottom, to where the track crosses, there is a large thicket of Grey Willow and Downy Birch wet woodland (W2a) which lines both banks of the stream and extends out into the floodplain, particularly on the left bank. Beyond this species-poor wet heath dominates, with large Purple Moor-grass tussocks interspersed with Bog Myrtle shrubs (M24c). Where the tussocks were smaller the wet heath is slightly more species rich, with some Cross-leaved Heath and occasional Heather and Bracken. Burning of Heather stands had also occurred relatively recently within this unit. In the south-west, downstream part of the unit, woodland and scrub is the dominant habitat, with areas of Bracken. Along the unit boundaries the woodland is open, with Beech and Oak the dominant species (W14). Grey Willow and Downy Birch are more abundant in the wetter areas, particularly along a number of channels which carry water down the slope towards Foulford Bottom. Foulford Bottom, at the downstream end, is a relatively large stream, although no aquatic macrophytes were recorded during the survey. This is most likely due to the heavy shading of the channel created by the surrounding woodland.

Within Vales Moor, Unit 132, Rhododendron *Rhododendon ponticum* is a particular problem, with several small stands recorded throughout, particularly in the western portion of the site. Patchy Rhododendron was also recorded in Vales Moor, Unit 133, and the northern part of Foulford Bottom 125. Occasional Scot's Pine seedlings were also recorded from within the wet heath areas of Vales Moor, Unit 132, and the southern part of Foulford Bottom 125.

1.4 Geology and Hydrogeology

Table 1-2 shows the geology at Vales Moor and Foulford Bottom. Note that thin superficial head deposits (clay, silt, sand and gravel) cover most of the Tertiary Formations in the New Forest area and that only the thicker deposits are indicated on published 1:50,000 geology maps. No head is mapped within the Vales Moor and Foulford Bottom area, but thin head deposits are exposed within stream cuttings (Figure 1-5).

Table 1-2: Geology and Hydrogeology

Age	Group	Formation - member	Description	Thickness	Hydro-geological Role	Water Resources
Quat-ernary		River terrace deposits	SAND and GRAVEL.		Aquifer - Spring lines may be present at the base of high level river terraces.	
Tertiary (Eocene)	Barton Group	Becton Sand Formation	Yellow/buff fine- to very fine-grained well sorted SAND.	6 – 70 m	Aquifer - The most permeable and reliable aquifer within the Barton Group.	Yields up to 600 m^3/d in the south; in the north they rarely exceed 200 m^3/d.
		Chama Sand Formation	Greenish grey fine- to very fine-grained and rather clayey/silty SAND; slightly glauconitic. Also sandy CLAY.	6 – 15	Aquifer	May yield small supplies
		Barton Clay Formation	Greenish grey to olive grey, glauconitic CLAY; may contain fine-grained sand and shells (mainly bivalves and gastropods).	26 – 80 m	Aquitard	Little useable groundwater

Local BGS borehole logs (available at http://www.bgs.ac.uk/GeoIndex/) describe the Barton Sand Formation as consisting of fine-grained very clayey sand, and the Barton Clay Formation as clay, sandy at the top.

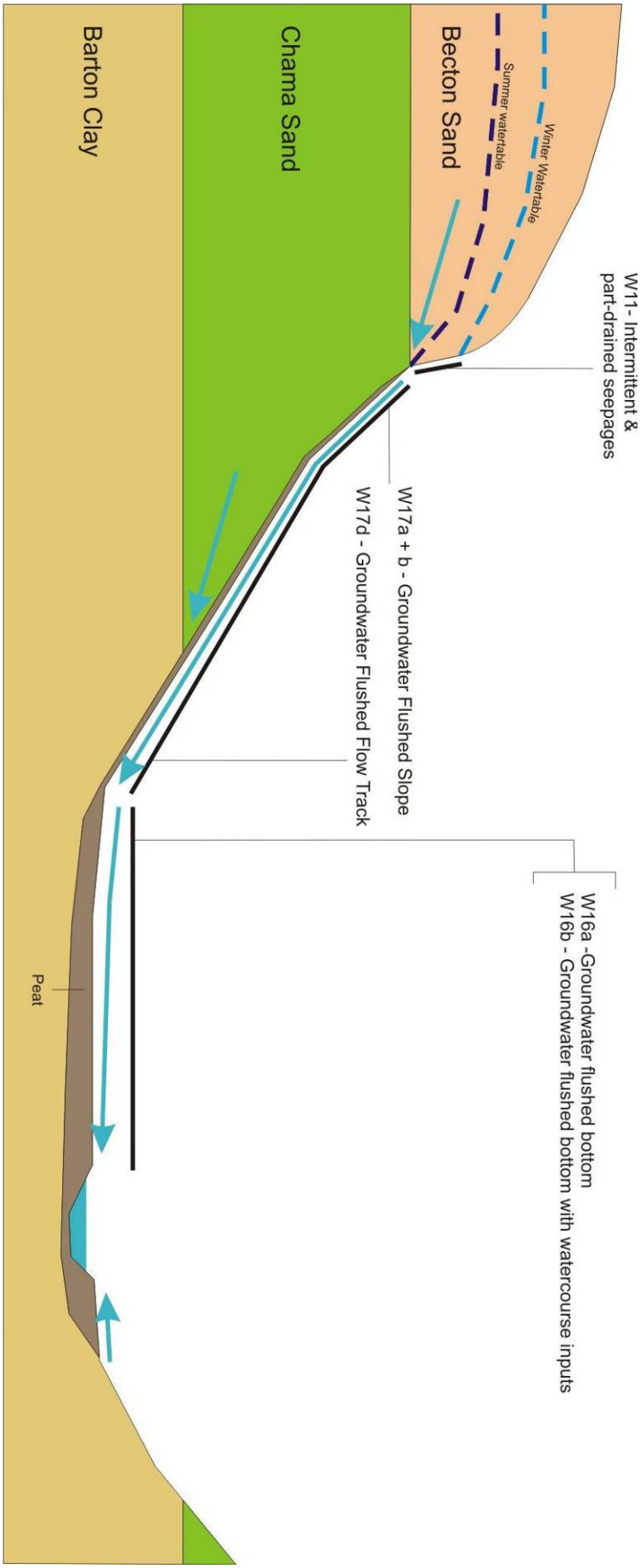
Hand augering undertaken during the site walkover survey found the Barton Sand Formation to consist of grey to grey/brown, very fine- to fine-grained, locally clayey sand with scattered flint pebbles. The Chama Sand Formation was found to consist of grey/brown sandy clay. The Barton Clay Formation, exposed in stream cuttings, was seen to consist of grey/buff/orange clay (Figure 1-5).

1.5 Water Supply Mechanisms

The wetlands on site are flush dominated (see Figure 1-6). They receive water from a seepage face (i) at the junction between the Becton Sand Formation (aquifer) and the underlying Chama Sand Formation (aquifer/aquitard) and possibly also (ii), at the junction between the Chama Sand Formation (aquifer/aquitard) and the underlying Barton Clay Formation (aquitard)*. The water runs over the surfaces of the lower permeability Chama Sand and Barton Clay Formations, forming flushed slopes before reaching the valley bottoms.

[*Uncertainty in the accuracy of the 1:50,000 geological mapping means that in places it is not clear whether the seepage face is located at the base of the Becton Sand Formation or at the base of the Chama Sand Formation.]

Figure 1-6: Conceptual Model Diagram (applicable to the whole EcoHAA)



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 (locally also W17d) with small areas of W11 above.

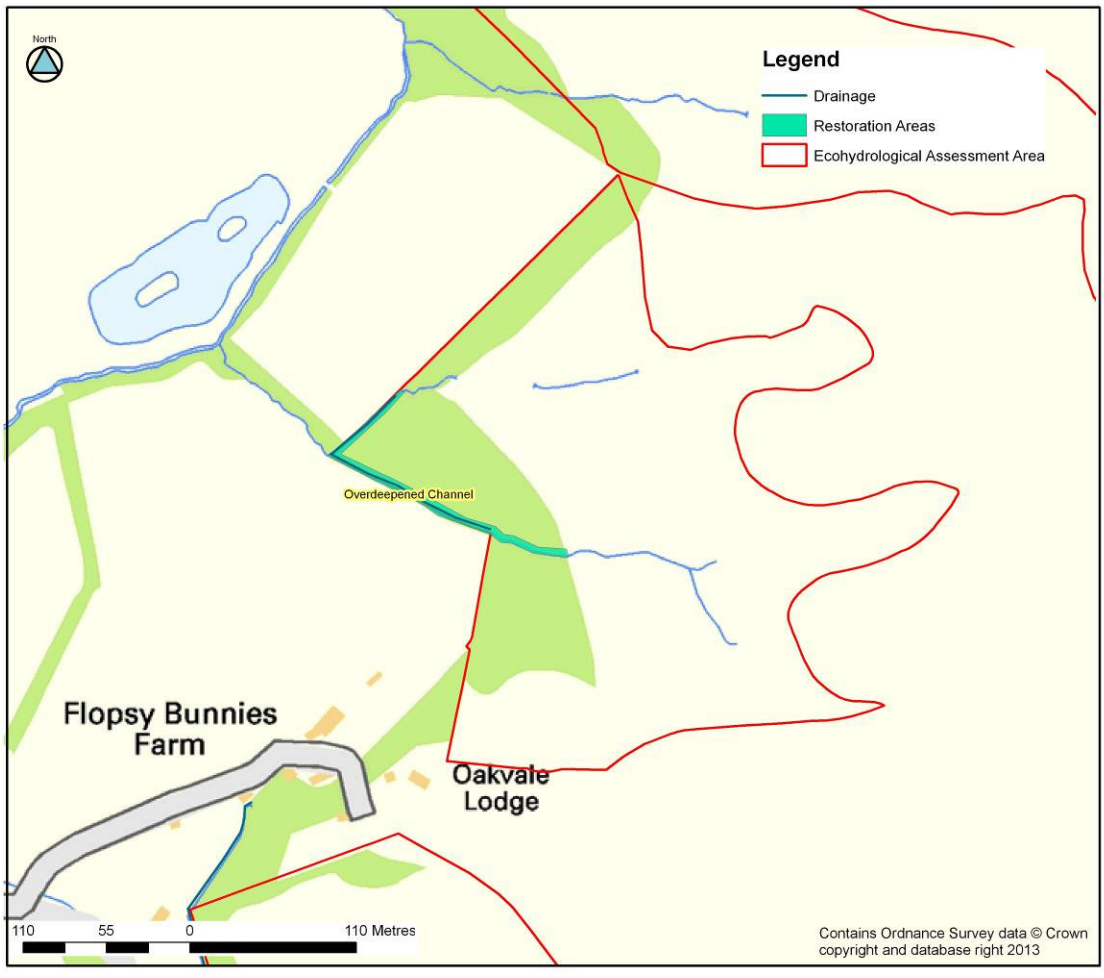
Valley bottom wetlands - W16a+b.

1.6 Damage and Restoration

1.6.1 Damage

There are no areas of significant hydrological damage within the mire areas themselves. However, it would be prudent to monitor the outflow channels from Unit 133 for headward erosion (see Figure 1-7).

Figure 1-7: Restoration Areas Map (Unit 133)



Parts of the area are suffering from encroachment by Scot's Pine (in particular Vales Moor, Unit 132 and the southern part of Foulford Bottom, Unit 125) and Rhododendron (most notably Vales Moor, Unit 132, but also some parts of Vales Moor, Unit 133 and the northern part of Foulford Bottom, Unit 125).

1.6.2 Restoration

No ecohydrological restoration proposals are made for this site, but it is recommended that the outflow channels from Unit 133 be monitored to detect any further significant headward erosion. If a problem is identified then it may be necessary to take preventative measures by installing some kind of slope control. This could involve the use of staked heather bales (where flows are not too energetic), the installation of wooden weirs and/or the infilling or re-profiling of the channel. The engineering design of suitable measures would need to be based on a detailed study beyond the scope of this report.

Restoration proposals are made in relation to the scrub encroachment issues (see Table 1-3).

Table 1-3: Restoration Area Summary Table

Restoration Area	Damage Type	Restoration Proposals	Improvement	Constraints and Issues
Overdeepened channel	Potential for headward erosion	Monitoring possibly followed by installation of slope control measures.		The design of suitable control measures will require more detailed studies beyond the scope of this report. Heather bales may be washed away by high energy flows, and weirs may be bypassed.
Areas of Rhododendron and Scot's Pine encroachment within all units of Ecohydrological Assessment Area	Scrub encroachment, which can lead to drying of mire habitats. Presence of invasive non-native species outcompeting native flora.	Eradicate Rhododendron. Monitor Scot's Pine encroachment and eradicate if it continues to spread.	Removal of non-native invasive species from habitat. Removes risk of drying of mire habitats associated with scrub encroachment.	Potentially ongoing management requirements.

1.7 Monitoring requirements

1.7.1 Water Monitoring

The site contains flush-dominated wetlands with thin peat or peaty soil. Groundwater monitoring is unlikely to be appropriate for such a site. The surface water features are small and appear stable, limiting the need for monitoring.

1.7.2 Vegetation

Pine and Rhododendron encroachment have been identified as an issue at this site. As a result, it may be necessary to monitor the extent of encroachment annually post restoration works.

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)
G	125, 132 and 133	Vales Moor and Foulford Bottom	Fixed point camera and transect surveys (specifically focussing on extent of pine and Rhododendron scrub encroachment)	Flush dominated wetland – little peat – no monitoring recommended

2 Maps

Map 1: Location

Map 2: Aerial Photography

Map 3: Topography, Hydrology and Wetland Distribution

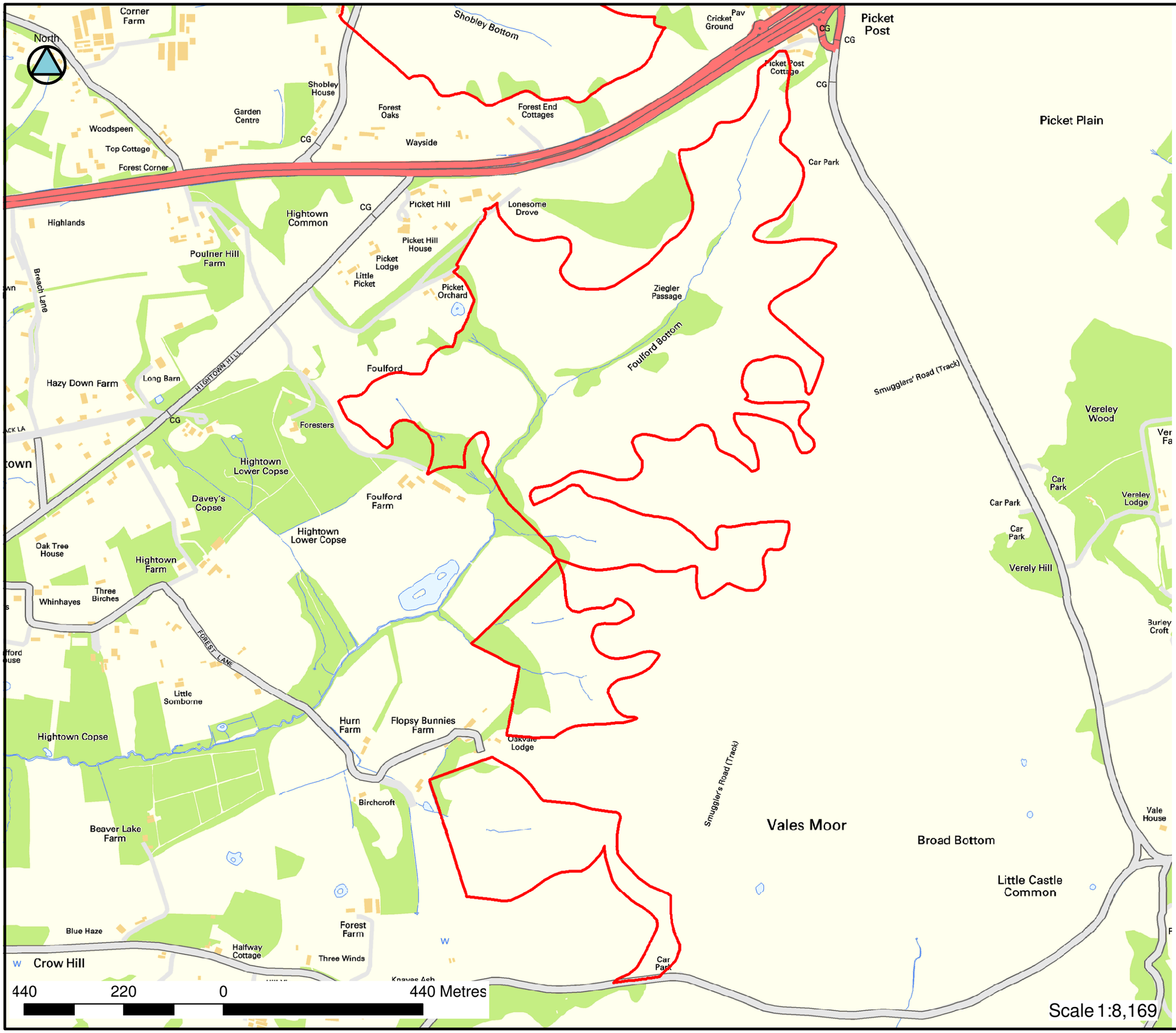
Map 4: Phase One Habitat

Map 5: Drift Geology

Map 6: Bedrock Geology

Map 7: Eco-Hydrology Map

Map 8: Restoration Plan



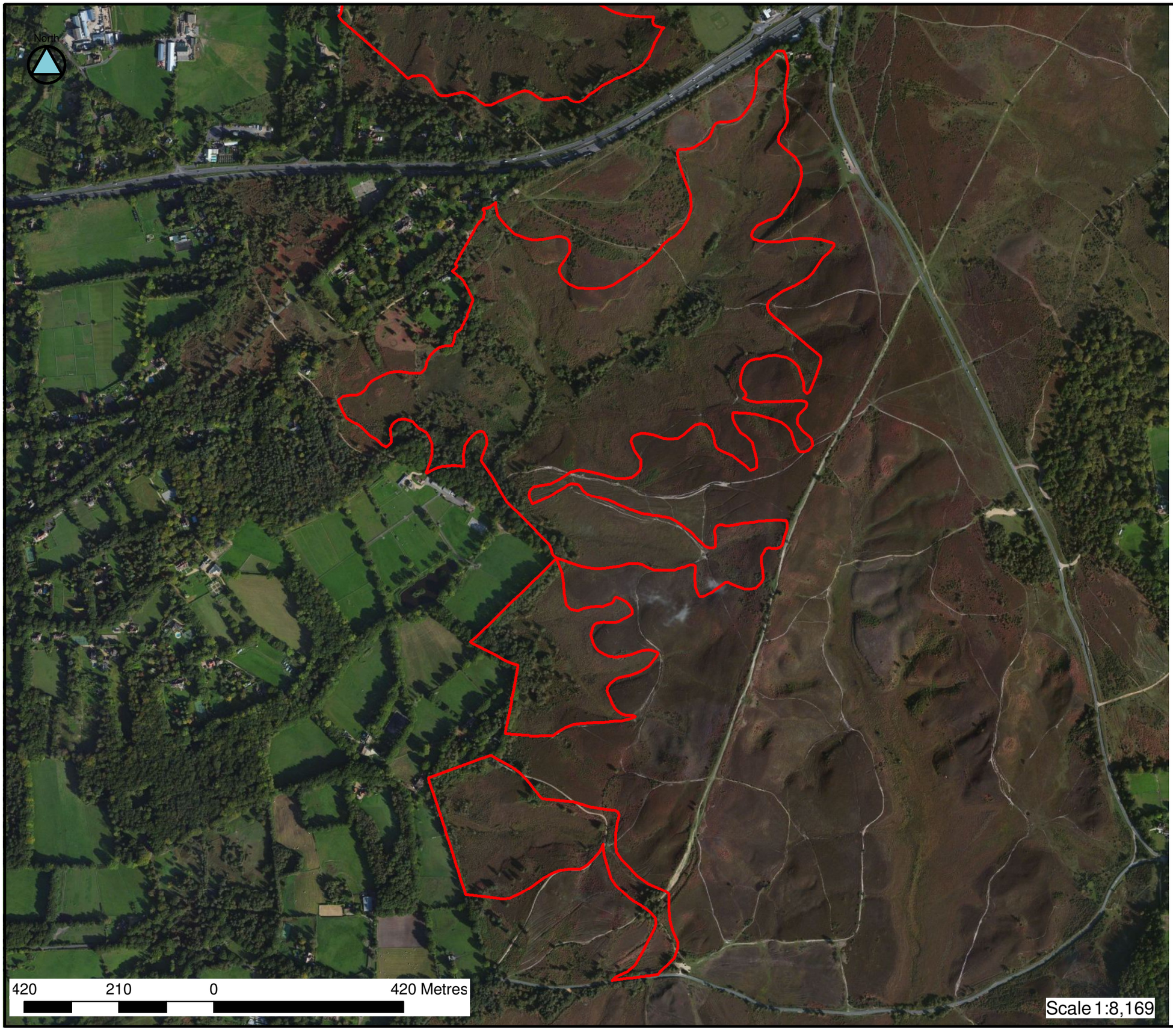
LEGEND

Ecohydrological Assessment Area

JBA consulting

MAP 1

Site Location



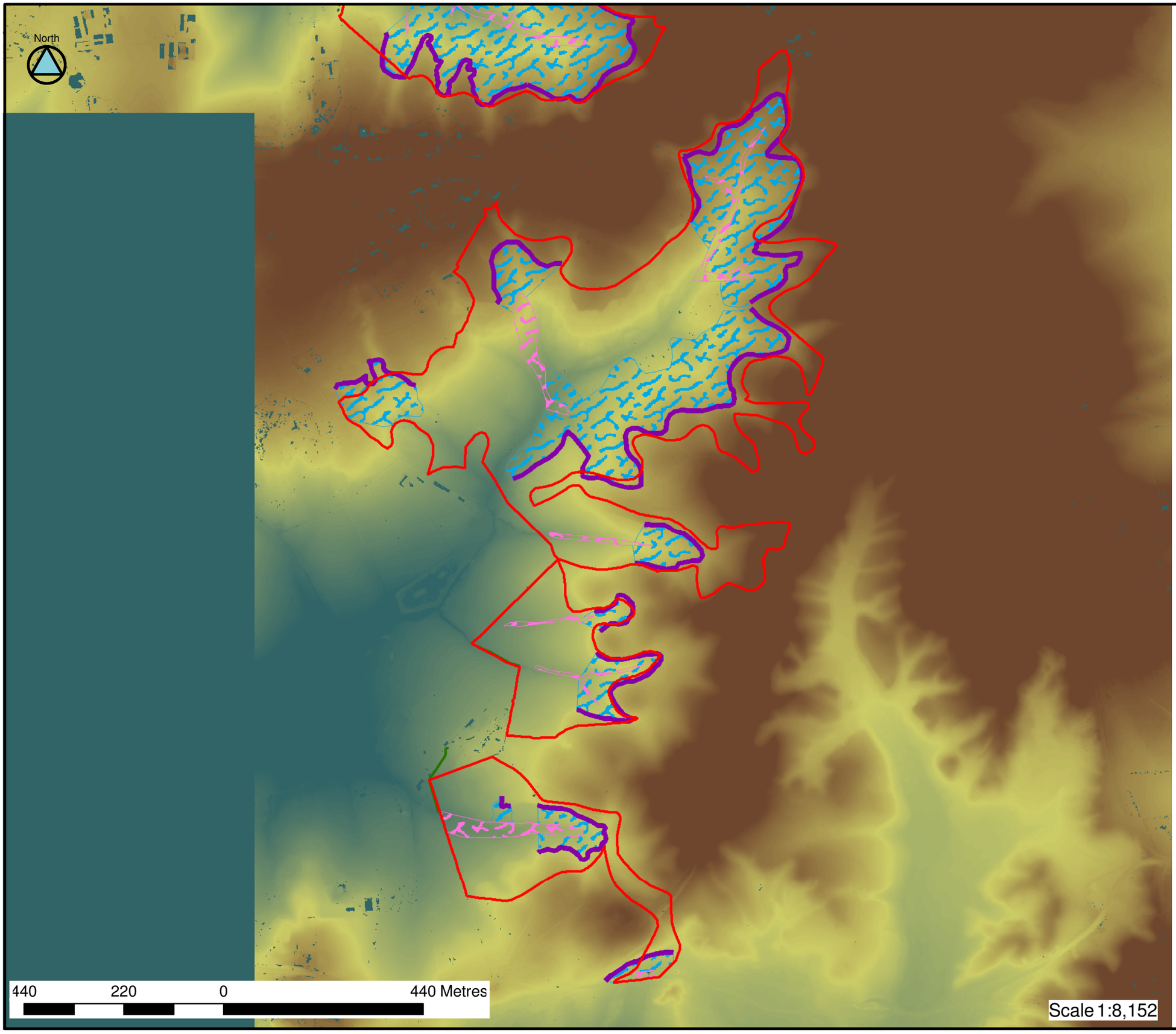
LEGEND

Ecohydrological Assessment Area

JBA consulting

MAP 2

Aerial Photography



LEGEND

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

LIDAR

mAOD

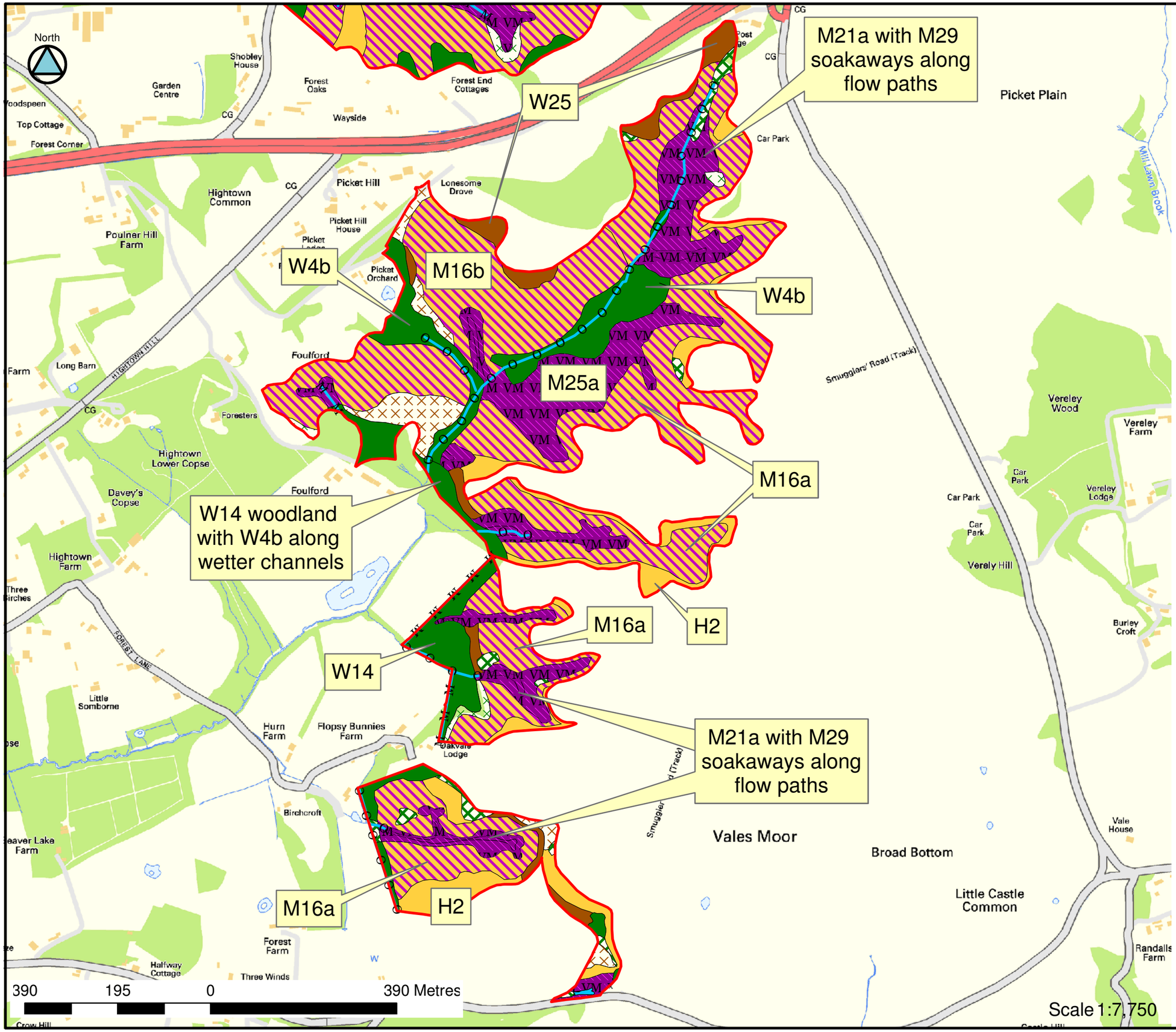
High : 80

Low : 40

JBA consulting

MAP 3

Topography, Hydrology and Wetland Distribution



LEGEND

Ecohydrological Assessment Area

Habitat

- A1.1.1
- A2.1
- A2.2
- C1.1
- C1.2
- D1.1
- D2
- E3.1
- G1.4

Boundary

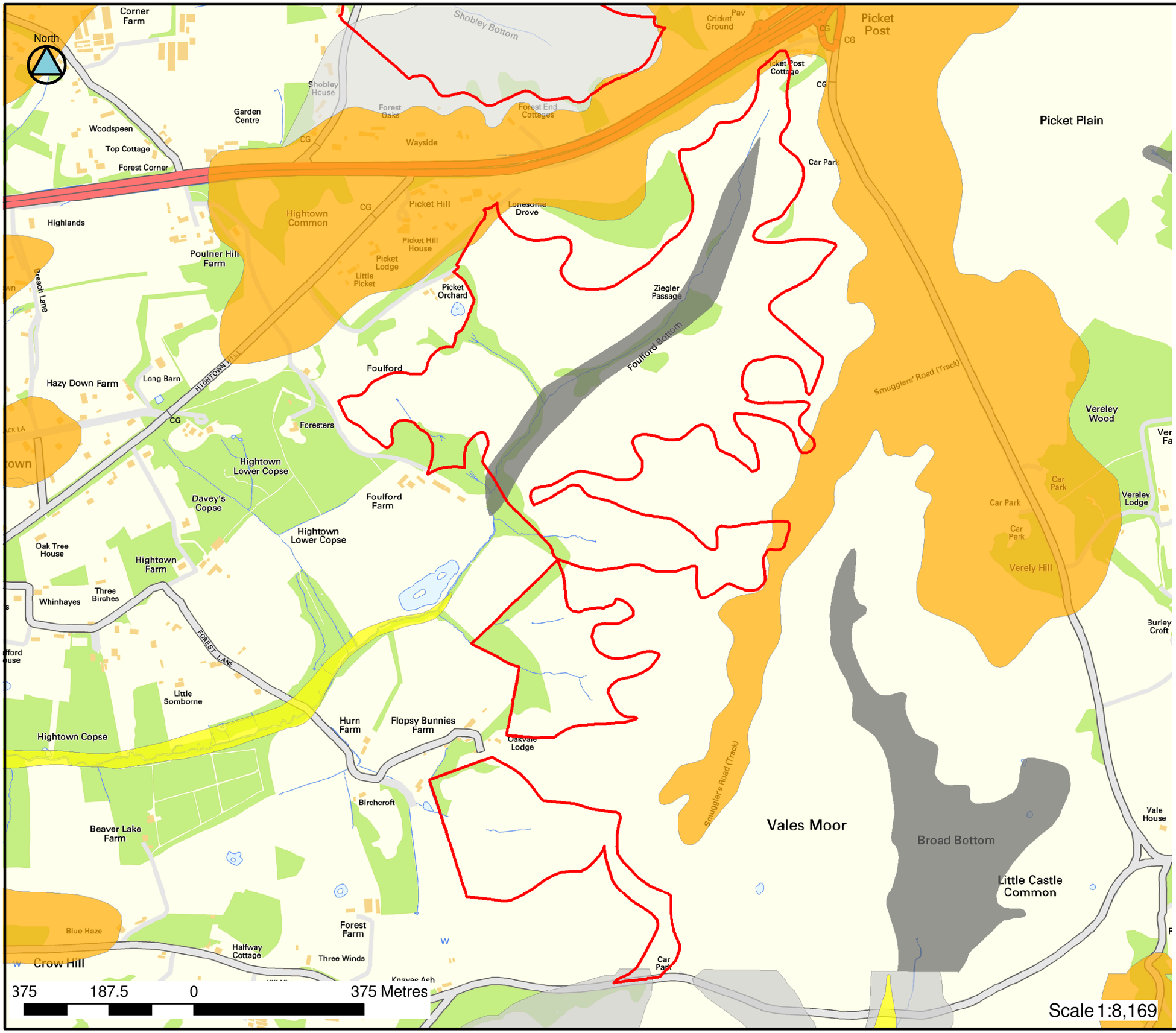
Linear_Feature

- G2.2
- G2.3

JBA consulting

MAP 4

Phase One Habitat



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

JBA consulting

MAP 5

Drift Geology

North

CHAMA SAND FORMATION - SAND, SILT AND CLAY

BECTON SAND FORMATION - SAND

BARTON CLAY FORMATION - CLAY

HEADON FORMATION - CLAY, SILT AND SAND

CHAMA SAND FORMATION - SAND, SILT AND CLAY

BECTON SAND FORMATION - SAND

CHAMA SAND FORMATION - SAND, SILT AND CLAY

CHAMA SAND FORMATION - SAND

CHAMA SAND FORMATION - SAND, SILT AND CLAY

CHAMA SAND FORMATION - SAND, SILT AND CLAY

BECTON SAND FORMATION - SAND

CHAMA SAND FORMATION - SAND, SILT AND CLAY

BECTON SAND FORMATION - SAND

CHAMA SAND FORMATION - SAND, SILT AND CLAY

CHAMA SAND FORMATION - SAND, SILT AND CLAY

HEADON FORMATION - CLAY, SILT AND SAND

CHAMA SAND FORMATION - SAND, SILT AND CLAY

HEADON FORMATION - CLAY, SILT AND SAND

CHAMA SAND FORMATION - SAND, SILT AND CLAY

CHAMA SAND FORMATION - SAND, SILT AND CLAY

375 187.5 0 375 Metres

Scale 1:8,169

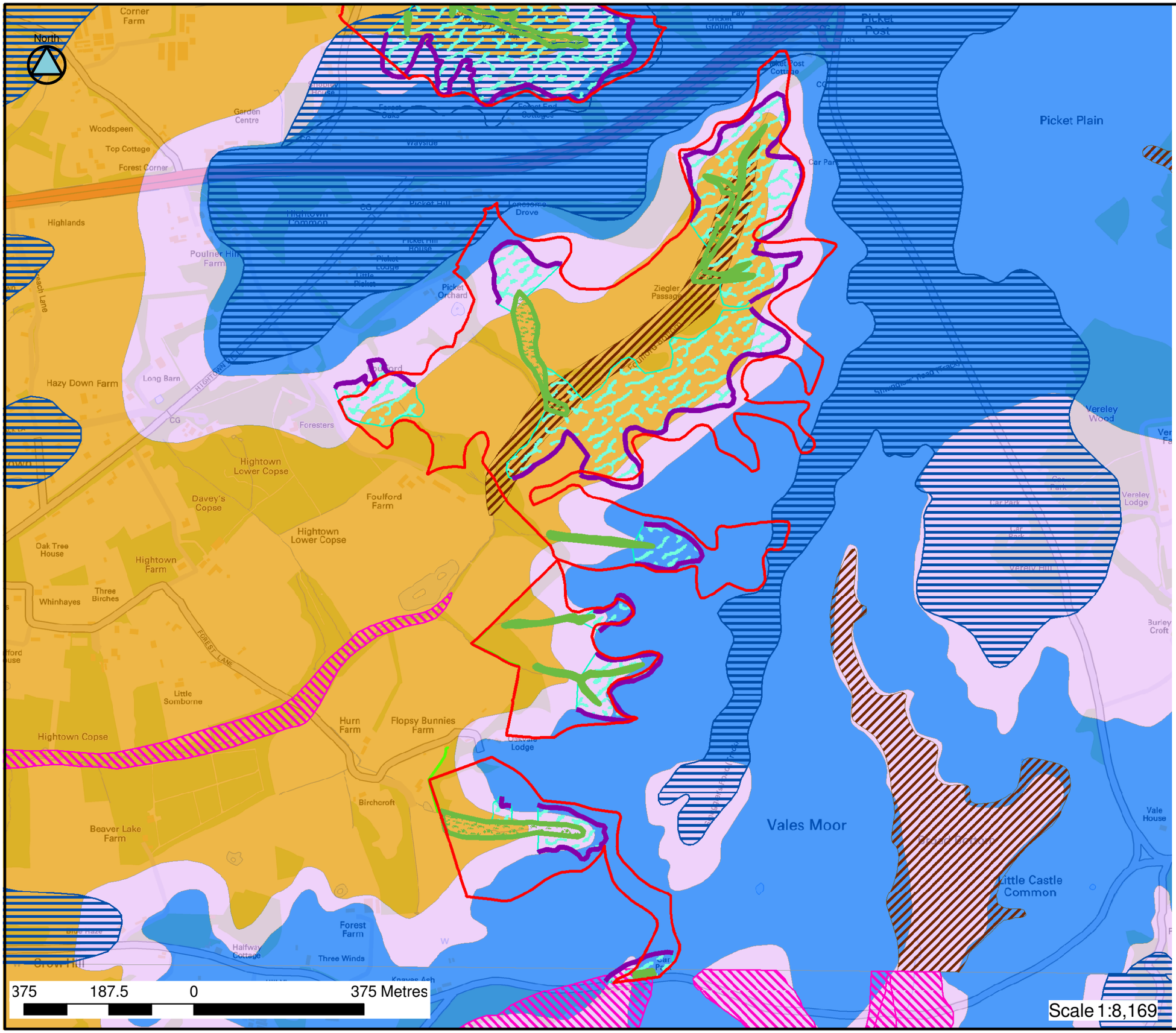
LEGEND

- 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

JBA consulting

MAP 6

Bedrock Geology



LEGEND

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

Drift Hydrogeology

- Aquifer
- Aquifer/Aquitard
- Aquitard

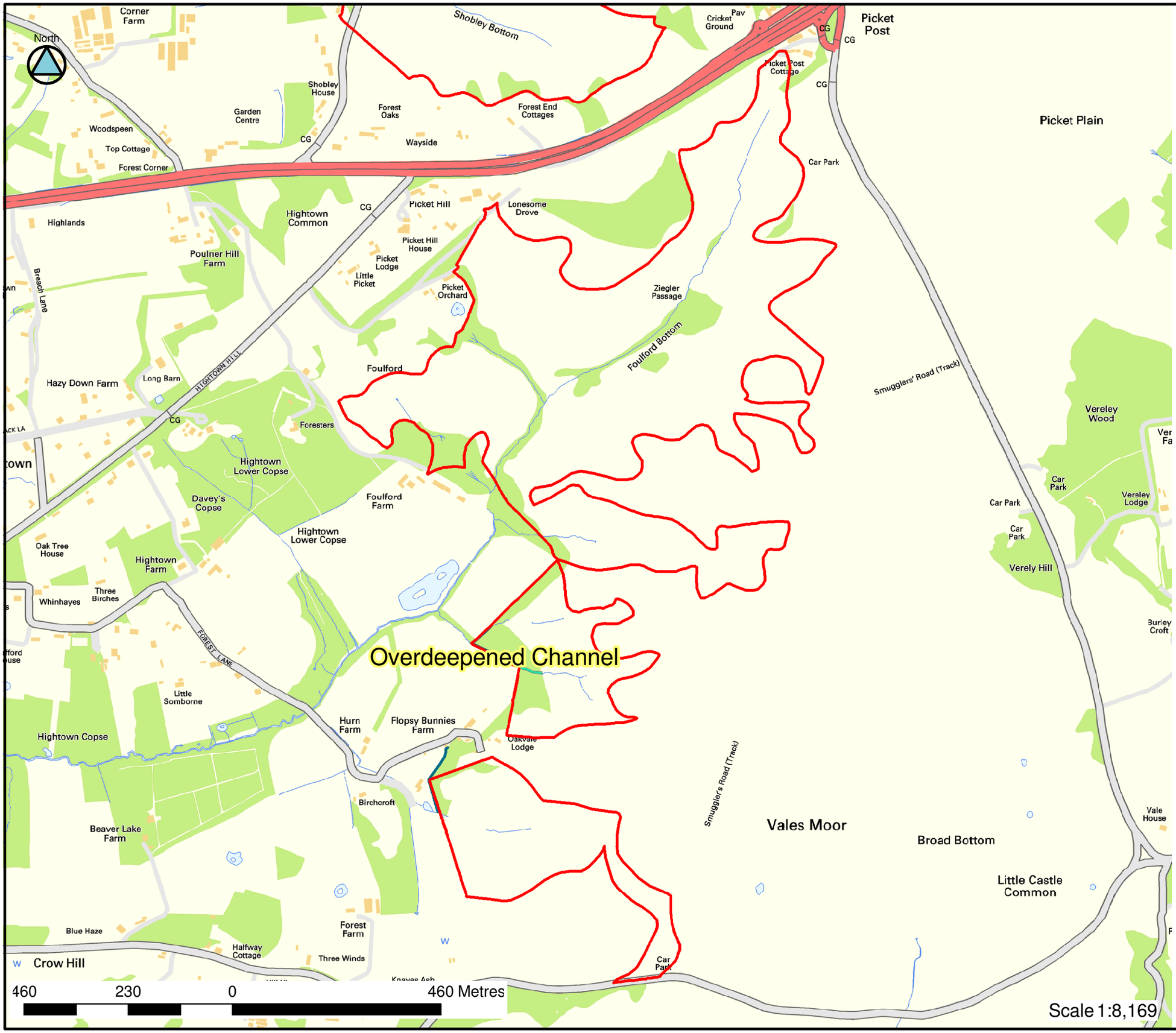
Bedrock Hydrogeology

- Aquifer
- Aquifer/Aquitard
- Aquitard

JBA consulting

MAP 7

Eco-hydrology



LEGEND

- Ecohydrological Assessment Area
- Drainage
- Restoration Areas

JBA consulting

MAP 8

Restoration Plan