

Natural England Commissioned Report NECR141

# New Forest SSSI Ecohydrological Survey Overview

Annex D: Dibden Bottom and Noads Mire

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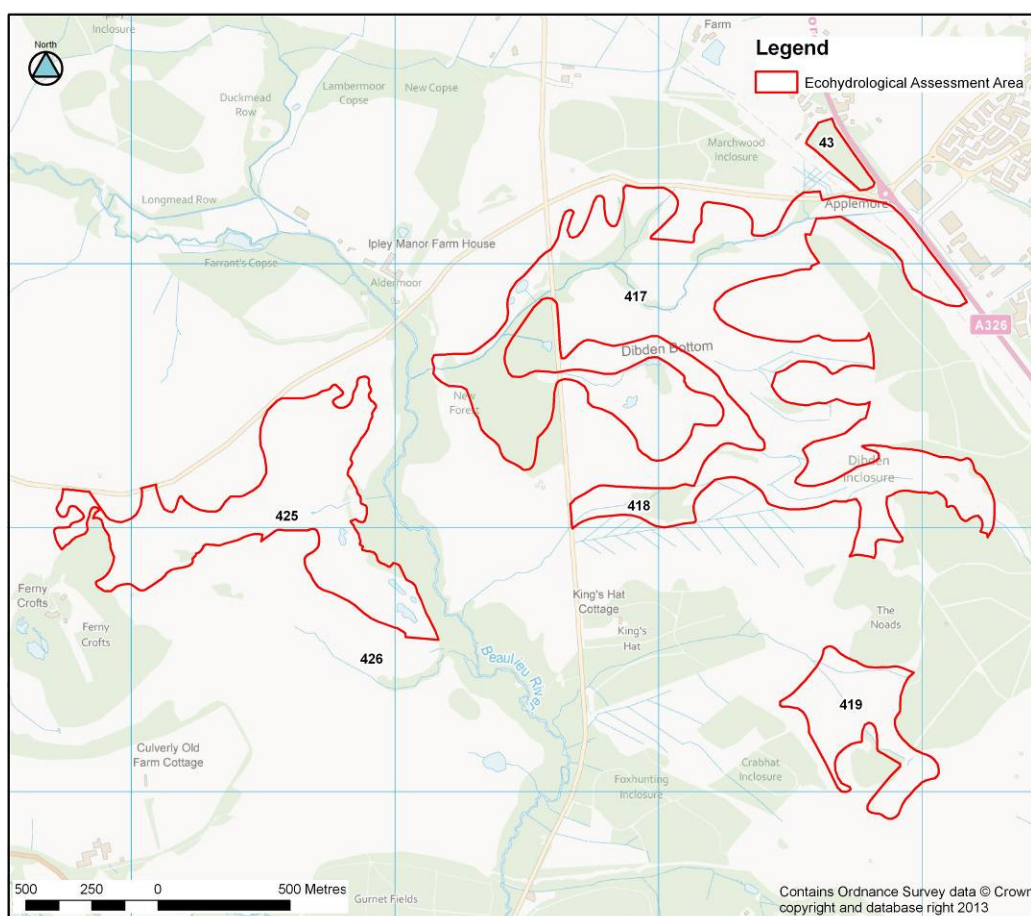
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# 1 Dibden Bottom and Noads Mire

## 1.1 Introduction

This Ecohydrological Assessment Area (EcoHAA) covers 179.0 ha and is contained within SSSI Units 417, 418, 419 and 425 with its centre at National Grid Reference (NGR) 439115 106393 (see Figure 1-1). Units 417, 418 and 425 are mire sites; unit 419 is classified as a mire to stream transition unit.

Figure 1-1: Location Map



The site includes a number of separate areas drained by tributaries of the Beaulieu River. There are a range of wetland types, including flush-dominated valley side mires, seepage-dominated valley bottom/basin mires and seepage-dominated valley bottom marsh or marshy grassland. Artificial drainage is widespread and would need to be addressed as part of the restoration. Footpath erosion is a problem locally.



**Table 1-1: Ecohydrological Assessment Area Summary Table**

Eco-hydrological Assessment Area		D			
Name		Dibden Bottom and Noads Mire			
Relative Geomorphology Assessment					
Size (ha)		179.0			
SSSI Units		417	418	425	419
Valley Side Wetland	Present	N	N	Y	Y
	Wetland Type			Flush Dominated	Flush Dominated
	Main Source of water			Seepage from contact between Becton Sand Formation and underlying Chama Sand Formation.	Seepage from river terrace sand/gravel deposits (upper terrace) where they overlie the lower permeability Headon Formation.
	Indicative NVC communities			M21a, M29, M16a, W23	M29, M21a, M16a, W23
	Wetland Types			Mire, wet heath	Mire, wet heath
	Drainage Damage			N	Y - Drainage ditches and/or straightened stream sections present. Locally enhanced drainage where rutted footpath provides route for runoff (Minor).
	Scrub/Tree Encroachment Damage			Y - occasional Scot's Pine encroachment (Negligible)	Y - some gorse encroachment into wet heath areas (Minor)
	Poaching and Grazing Pressures Damage			Y - localised (Minor)	Y (Minor)
	Valley Basin Wetland	Present	Y	Y	Y
Wetland Type	Seepage Dominated	Seepage Dominated	Flush Dominated / Seepage Dominated		
Main Source of water	Seepage from Chama Sand Formation and river terrace sand/gravel deposits (lower terrace).	Seepage from Chama Sand Formation and river terrace sand/gravel deposits (lower terrace).	Seepage from contact between Becton Sand Formation and underlying Chama Sand Formation. Also diffuse seepage from Chama Sand Formation and river terrace sand/gravel deposits (lower terrace).		
Indicative NVC communities	M21a, M16a, W4b, H2, M29, M25a, M24	M21a, M16a, H2	M21a, M29, M16a, M16b, W4b		

	Wetland Types	Mire, wet heath, wet woodland, dystrophic standing water	Mire, wet heath	Mire, wet heath, wet woodland, dystrophic standing water	
	Drainage	Y - valley centre drains with offshoots (Minor)	Y - valley centre drains (Minor); dense herringbone drainage network immediately to the south of the unit (Moderate)	Y - drains via "collects" to Beaulieu River at eastern edge of site (Minor)	
	Scrub/Tree Encroachment Damage	Y - Extensive invasive of Scot's Pine in places (Moderate)	Y (Negligible)	Y - occasional Scots Pine encroachment (Negligible)	
	Poaching and Grazing Pressures	Y - significant patches of poaching and footpath erosion, particularly near car park (Minor)	N	Y - localised (Minor)	
Additional Comments		Northern part of the site receives water from road drainage. At the northern edge of the site (near an "issues") there is an area of quaking bog with Sphagnum. This area receives road drainage.	Deep peat in valley mire (auger hole proved 1 m). Significant areas of footpath erosion around the footbridge.	Augering showed the Chama Sand Formation to be clay-rich and probably therefore of low permeability. Vehicle pressures/footpath erosion noted in the centre of the unit.	Very good example of seepage from base of (exposed) river terrace sand/gravel at National Grid Reference 439901 105328. Significant footpath erosion (with deep ruts) in central part of site where path descends a steep slope. Ruts in the eroded footpath act as drainage channels, conveying runoff rapidly over sandy clay of the Headon Formation. Gorse dominates significant areas of the unit and is beginning to encroach into wet heath areas.

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 includes a number of separate valleys drained by tributaries of the Beaulieu River. These valleys contain a range of wetland types, including flush-dominated valley side mires, seepage-dominated valley bottom/basin mires and seepage-dominated valley bottom marsh or marshy grassland. Artificial drainage is widespread, especially in the central part of the area, where there is a herringbone arrangement of drainage ditches.

**Figure 1-2: Marshy grassland in the north-eastern part of the site (Unit 417, NGR 439599 107170)**



**Figure 1-3: View towards small quaking bog fed by "issues" in the northern part of the site - water from a drainage ditch is piped under a road, where it flows onto the bog (adjacent to Unit 417, NGR 438847 107318)**





**Figure 1-4: Area of herringbone drainage adjacent to the central part of the site (adjacent to Unit 418, NGR 438679 105942, looking east-northeast)**



**Figure 1-5: Aerial photograph showing herringbone drainage adjacent to Unit 418 in the central part of the site (Google Earth)**





**Figure 1-6: View of valley mire in the central part of the site, showing slight doming of the peat within the valley bottom (Unit 418, NGR 439729 106139, looking east-northeast)**



**Figure 1-7: Eroded footpath in the southern part of the site. Orange/buff/grey sandy clay of the Headon Formation is exposed in the deeper ruts (Unit 419, NGR 439723 105227, looking north).**





**Figure 1-8: Seepage step feeding valley side mire in the southern part of the site - the step represents the edge of a river terrace (Unit 419, NGR 439901 105328, looking east)**



**Figure 1-9: River terrace sand and gravel deposits exposed at seepage step (Unit 419, NGR 439901 105328) - the Trimble computer is about 0.15 m long**





**Figure 1-10: View of valley mire near Ferny Crofts, in the western part of the site (Unit 425, NGR 437271 105802)**



In the eastern part of the site are well-developed valley mires containing significant thicknesses of peat (see Section 1.5). The peat locally displays very slight doming of its upper surface (Figure 1-6).

### 1.3 Ecology

#### *Unit 417 and 418 Dibden Bottom*

Units 417 and 418 form the Dibden Bottom complex, which contains several valley mire systems. The northern portion of Unit 417 contains a relatively large watercourse along the valley bottom. This watercourse is tree-lined with a thick fringe of bog woodland on both banks. As a consequence, aquatic macrophyte diversity in the main watercourse and connecting tributaries is very limited. The woodland contains Oak *Quercus sp.*, Downy Birch *Betula pubescens*, Grey Willow *Salix cinerea*, Holly *Ilex aquifolium* and some Scot's Pine *Pinus sylvestris*. In places it appears that the stream may have been deepened, with low earth banks present; these were evident as flood waters were pooled on both sides of the bank. Where the canopy was open, these low banks were, in general, heavily grazed. There were also areas where Scot's Pine seedlings were beginning to encroach into wet heath areas.

Adjacent to the tree-lined streams are areas of wet heath, with Bog Myrtle *Myrica gale*, Purple Moor-grass *Molinia caerulea*, Cross-leaved Heath *Erica tetralix* and Heather *Calluna vulgaris*. In the northern part of unit 417 significant areas of this wet heath had been burned. Extensive patches of Bracken *Pteridium aquilinum* were also present and this species dominated some areas. To the south of the stream a number of drains appeared to have been cut across the wet heath area.

Around the footbridge in the north-east of unit 417, the area consisted of heavily grazed, wet grassland/lawn, which was grazed by both cattle and ponies. Around the footbridge the water

was ponded in places, potentially as a result of the crossing point itself impeding water flows. There is no tree cover and there is a good diversity of aquatic macrophytes present; Bog Pondweed *Potamogeton polygonifolius*, Floating Sweet-grass *Glyceria fluitans*, Ivy-leaved Water-crowfoot *Ranunculus hederacea*, Marsh St. John's-wort *Hypericum elodes* and Floating Club-rush *Isolepis lacustris* were recorded, along with the non-native, invasive New Zealand Stonecrop *Crassula helmsii*.

At the very north of the unit, approaching the road, there were extremely species-rich valley mire areas, which then develop into the woodland. These are extremely boggy and spongy with extensive *Sphagnum* (*S. palustre*, *S. cuspidatum*, *S. magellanicum* and *S. tenellum*), White-beaked Sedge *Rynchospora alba*, Carnation Sedge *Carex panicea*, Common Yellow-sedge *Carex viridula* ssp. *oedeocarpa*, Deergrass *Trichosporum germanicum*, Bog Asphodel *Narthecium ossifragum*, Marsh St. John's-wort, Bog Pondweed and occasional tussocks of Purple Moor-grass and some Heather and Cross-leaved Heath. These habitats have been mapped outside of the unit because they are considered an integral part of the mire system. The road immediately to the north of this area is on a raised bank, which is dominated by short-grazed, amenity grassland. This slopes quite steeply down into the seepage areas. It appears that a drain discharges into the seepage areas from north of the road, and also soak drains run alongside the road on its southern side.

The southern portion of unit 417 contains a number of valley mire areas with Deergrass, White-beaked Sedge, Sharp-flowered Rush *Juncus acutiflorus*, Bog Asphodel and Purple Moor-grass. Patches of Grey Willow dominated scrub are also present locally along the valley bottoms. A number of drains appear to have been cut through the valley mires in places. To the south-west of unit 417 there are several bog pools, with standing dystrophic water, surrounded by boggy habitats similar to the valley mires discussed above and also some wet heath. Around the pools there was less Heather and Deergrass and *Sphagnum* tussocks became much more frequent. Several of these pools appeared to interconnect; however, this may have been because of the heavy rain experienced prior to the survey which had flooded the marginal areas. Vegetation in the bog pools is sparse; however, some Marsh St. John's-wort, Sharp-flowered Rush, *Sphagnum cuspidatum* and Floating Club-rush are present.

In unit 418 a stream also runs east to west across this narrow valley. At the upstream end a valley mire is present, with an extensive bed of Common Sedge *Carex nigra* with White-beaked Sedge, Deergrass, Sharp-flowered Rush, Purple Moor-grass, *Sphagnum* spp. and Bog Asphodel. Some surface water was present within this area and peat was relatively deep (1 m confirmed by augering). Moving downstream the stream passes through areas of wet heath and a number of drains (several outside of the unit boundaries) have been dug in a herringbone pattern. There is also an area of Scot's-Pine dominated woodland, with some Oak *Quercus robur*, Birch *Betula pubescens* and Holly *Ilex aquifolium*.

Towards the road at the west of the site there appears to be a low bank adjacent to the watercourse which has Heather dominant along it, possibly indicating that the channel has been over-deepened in the past. There are also thickets of Gorse *Ulex europaeus* along the watercourse.

#### ***Unit 419 The Noads Mire***

Unit 419, The Noads Mire, is a small unit, with significant areas dominated by Gorse shrubs, interspersed with scattered Bracken and Heather. Two watercourses are shown on OS maps, which converge just outside the unit boundary to the northeast. At their downstream ends these watercourses are contained within distinct channels and are relatively wide (1 – 1.5m) channels. The southern watercourse originates in a boggy area of valley mire habitat, with *Sphagnum* species (*Sphagnum cuspidatum*, *S. squarrosum* and *S. inundatum*), Bog Asphodel, Purple Moor-grass, Deergrass, White Beak-Sedge, Sharp-flowered Rush and scattered Cross-leaved Heath. Around the margins this valley mire habitat grades into wet heath, with increasing Cross-leaved Heath and Heather, as the ground rises. This southern stream also passes through a small area of woodland, with a varied range of species, including Scots Pine, Grey Willow, Birch and Gorse.

At its upstream end, the northernmost stream does not have a distinct channel and is represented on the ground by an open, lush green soakway habitat, which channels water downslope from the plantation woodland at the top of the slope, just outside of the unit boundary. A number of ditches drain water from this plantation and converge at the top of this



soakway. The soakway is very boggy, with a number of *Sphagnum* tussocks (*Sphagnum cuspidatum*, *S. squarrosum* and *S. inundatum*), which dominate the flora.

There is a third 'channel' in the centre of the site, which carries water from a seepage area on the valley side, down to the southernmost stream within the unit. The seepage area is very boggy and similar in character to the valley mire habitat described above. Where water collects downslope, the habitat becomes lush and greener, and similar to the soakway habitat described above.

There are also significant areas of wet heath habitat on the site, dominated by Purple Moor-grass and Cross-leaved Heath, with frequent Heather. There are also small areas where the sward is closely cropped, giving rise to a more marshy grassland type habitat.

Footpath erosion was noted to be particularly severe in the centre of the site, where the main footpath crosses the southernmost watercourse.

#### *Unit 425 Ferny Croft*

Within Unit 425, the dominant habitat is wet heath, with Cross-leaved Heath dominant and abundant Purple Moor-grass and frequent Heather. In places the habitat is relatively tussocky, with a number of other species growing beneath the tussocks (e.g. Carnation Sedge, Common Yellow-sedge). The wet heath habitat across the site is therefore considered to be a mosaic of M16a and M16b communities. Towards the west of the unit, and to the south of the stream, this more tussocky wet heath habitat is more dominant.

Along the valley bottom, running west to east, there is a channel which is a tributary of the Beaulieu River just outside of the unit. At the upstream (western) end of the unit there is no distinct channel carrying water, and the water originates in a series of seepage areas which channel water down into the valley bottom. These seepage areas are very boggy and contain a good mix of species, including White Beak-sedge, Purple Moor-grass, *Sphagnum* tussocks and some Cross-leaved Heath. Moving towards the lowest part of the valley, the valley mire habitat changes and the amount of Cross-leaved Heath and Purple Moor-grass declines significantly. Species such as Bog Pondweed and Marsh St. John's-wort become much more abundant and pools and channels of water are present on the ground surface. There are also two Grey Willow dominated patches of dense scrub along this soakway habitat. A similar complex of habitats, valley mire moving into soakway habitat where water is channelled is also present in the northeast of the site.

Within the wet heath areas there are also a number of dystrophic bog pools. These appear relatively species-poor. Here there are a number of Purple Moor-grass tussocks, *Sphagnum cuspidatum* and Marsh St. John's-wort. Due to the heavy rain prior to the survey, the extent of the standing water area was most likely larger than in typical conditions, with shallow standing water now present around the pool margins.

Heavy poaching was evident in a few locations at this unit, particularly at the very western end of the unit, immediately south of the track running towards Ferny Croft Scout Centre. There is also a vehicle track that runs north-south across the unit, towards the centre. This appears well used, with vehicle ruts which were water-filled at the time of survey. A further track runs into the woodland across the eastern part of the site, and then crosses the Beaulieu River; this also appears to be suffering from erosion in places.

## **1.4 Geomorphology**

Unit 419 is classified as a mire to stream transition unit. The mires are drained by two watercourses that join together immediately outside the north-western boundary of the unit. The northern watercourse has straight sections and appears to be a drainage ditch, probably representing an enhancement of what would have been a natural flow track for water emerging from the groundwater seepage line along the north-eastern edge of the site. The southern watercourse has a more natural planform, with meanders present, but also some apparently straightened sections. This is likely to be a modified natural stream.

Straightening and deepening of natural drainage channels/pathways from the mires will have improved the efficiency of drainage, potentially lowering groundwater levels in and adjacent to the mires. Footpath erosion is severe at the fording point where the main footpath crosses the southernmost watercourse.

## 1.5 Geology and Hydrogeology

Table 1-2 shows the geology in the area.

**Table 1-2: Geology and Hydrogeology**

Age	Group	Formation - member	Description	Thickness	Hydro-geological Role	Water Resources
Quaternary		Alluvium		Up to 10 m	Aquifer / Aquitard	Yields from alluvium and terrace gravels are often obtained from the adjacent rivers.
		River terrace deposits	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.
	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 <sup>3</sup> /d in the south; in the north they rarely exceed 200 m <sup>3</sup> /d.
	Barton Group	Chama Sand Formation	Greenish grey fine- to very fine-grained and rather clayey/silty SAND; slightly glauconitic. Also sandy CLAY.	6 – 15 m	Aquifer	May yield small supplies

Local BGS borehole logs (available at <http://www.bgs.ac.uk/GeoIndex/>) describe the river terrace deposits as fine- to coarse-grained sand with fine and coarse gravel (flint and quartz); the Headon Formation is described as dark reddish brown clay.

In the eastern part of the site are well-developed valley mires with a significant thickness of peat: augering proved 1 m of peat overlying very soft, very organic-rich, mineral soil.

## **1.6 Water Supply Mechanisms**

The wetlands on site include both flush-dominated and seepage-dominated types (see Figure 1-11 to Figure 1-14).

In the western part of the site (near Ferny Crofts) are flush-dominated valley side mires that receive water from a groundwater seepage line at the contact between the Becton Sand Formation and underlying Chama Sand Formation. Down-slope the valley side mires merge with valley bottom mires that receive diffuse groundwater seepage from the underlying Chama Sand Formation. At the lowest part of the system are ponds and mires that receive diffuse groundwater input from (lower) river terrace sand/gravel deposits.

In the northern, eastern and central parts of the site (Dibden Bottom and Beaulieu Heath) are valley bottom mires and marshes (or marshy grassland areas) that receive diffuse groundwater seepage from the Chama Sand Formation and from (lower) river terrace sand/gravel deposits.

In the south-eastern part of the site (near Crabhat Inclosure) are flush-dominated valley mires that receive water from a groundwater seepage line at the contact between river terrace sand/gravel deposits and the underlying, less permeable, Headon Formation.

Figure 1-11: Conceptual Model Diagram: Western part of site near Ferny Crofts - upper part of valley system

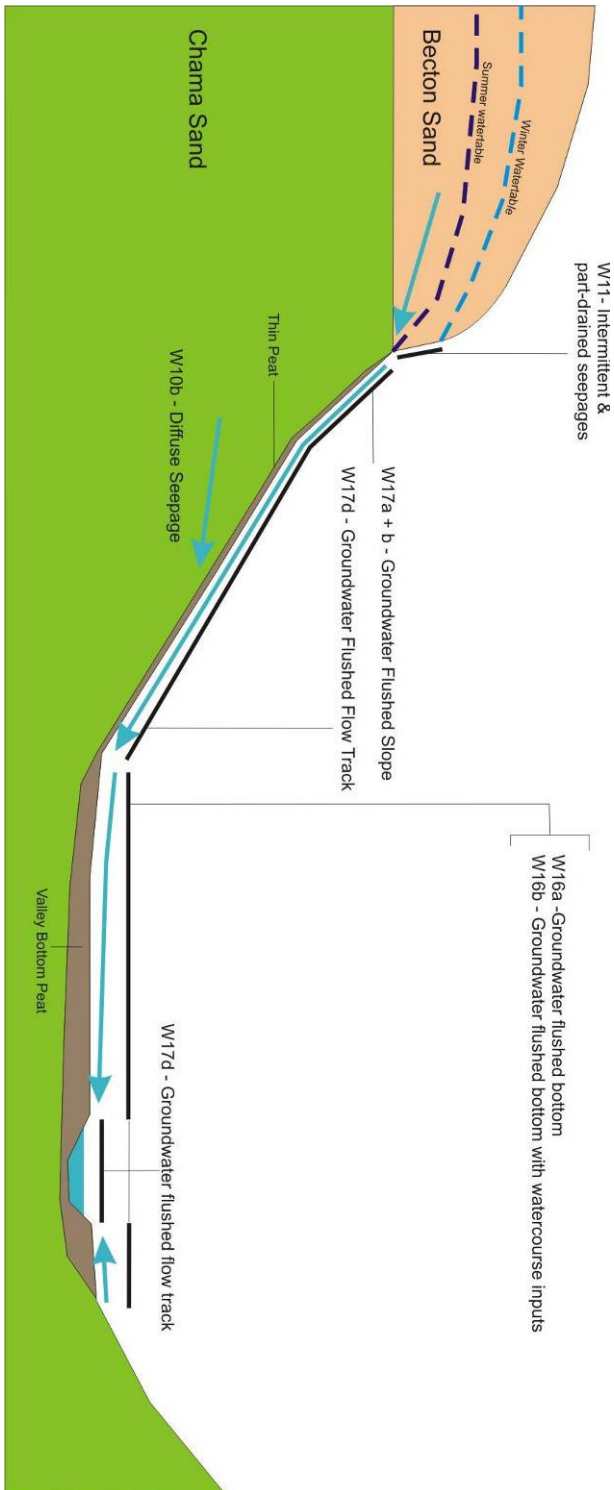


Figure 1-12: Conceptual Model Diagram: Western part of site near Ferny Crofts - lower part of valley system

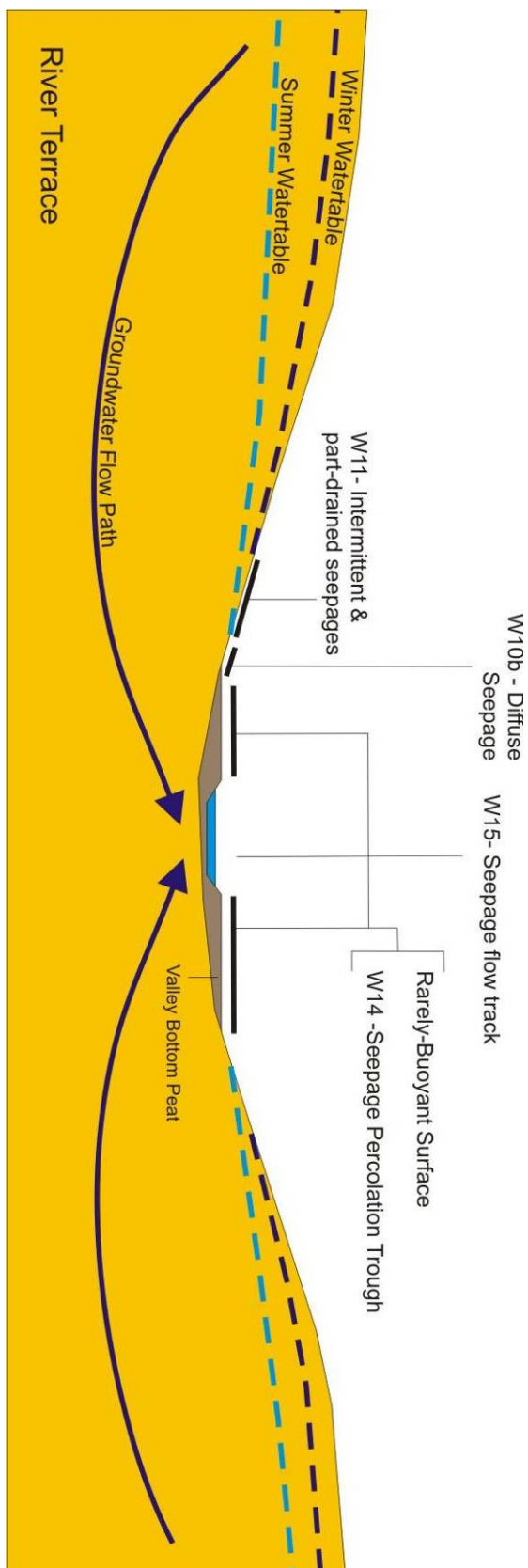


Figure 1-13: Conceptual Model Diagram: Eastern part of site

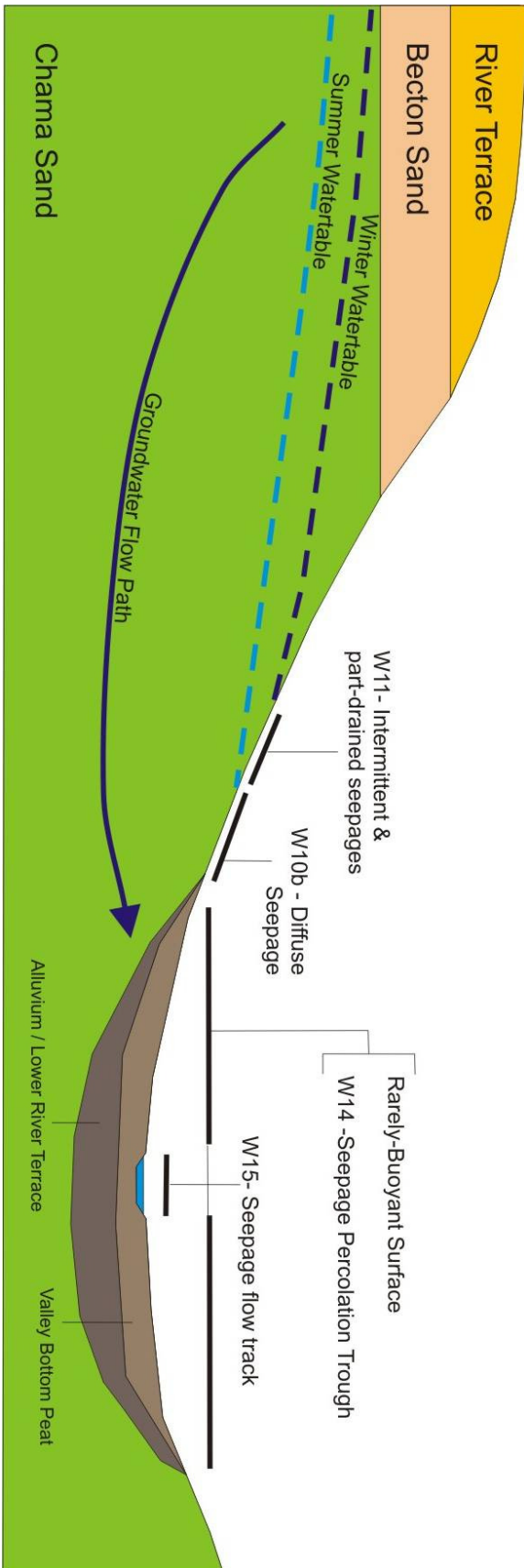
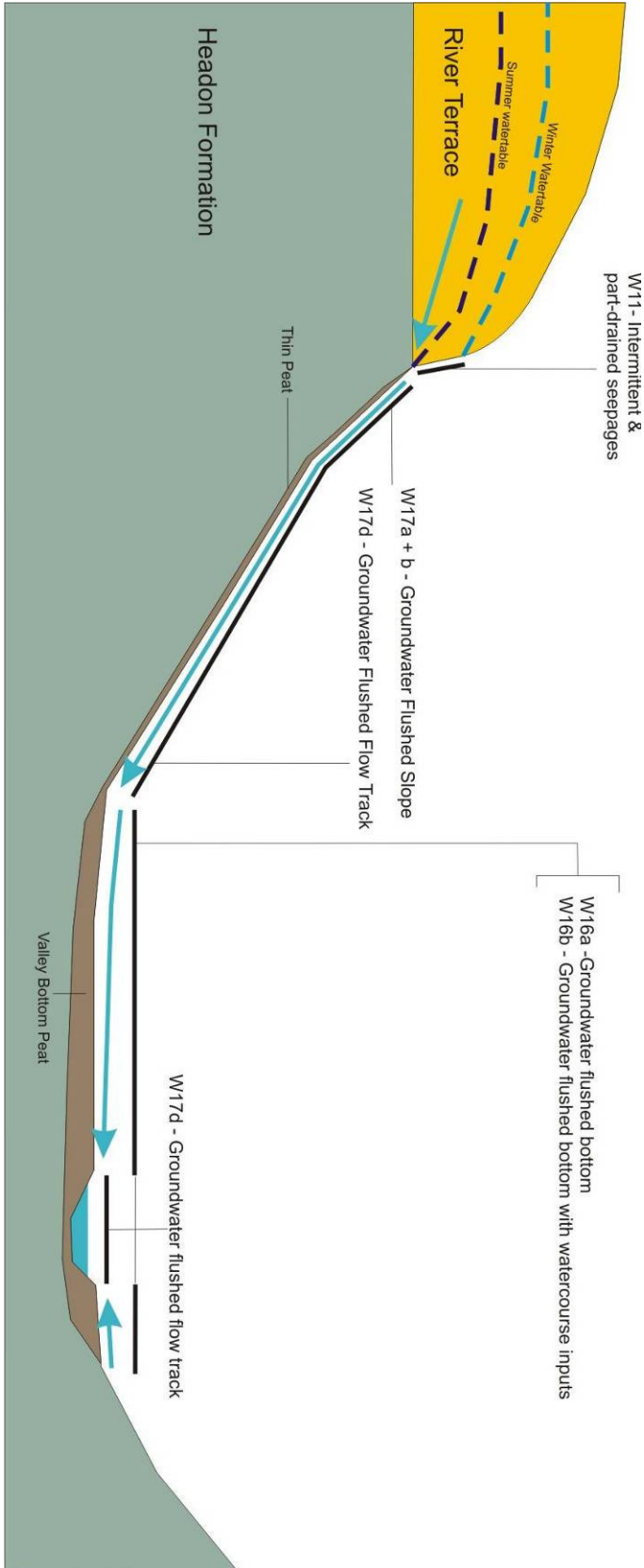


Figure 1-14: Conceptual Model Diagram: South-eastern part of site (near Crabhat Inclosure)





### 1.6.1 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, W17b, W17d and W10b with narrow zone of W11 above.

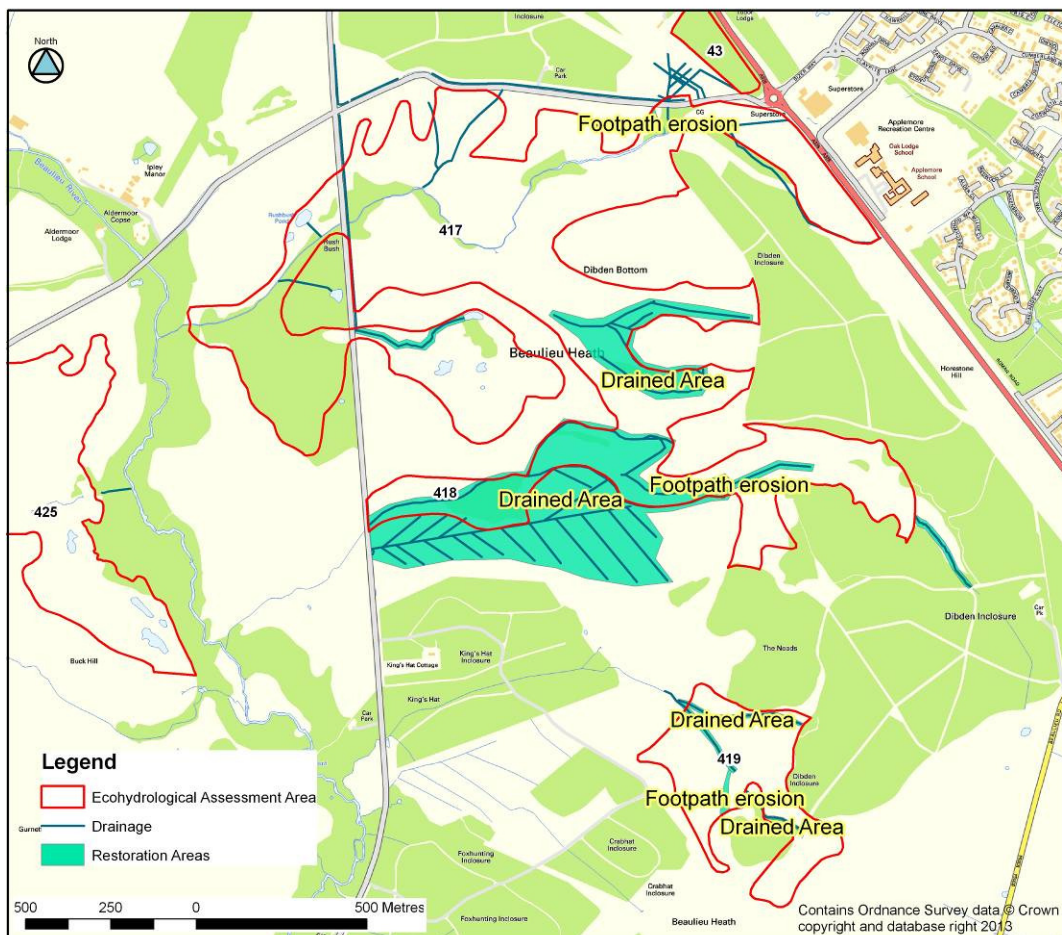
Valley bottom wetlands - W10b, W11, W14, W15, W16a, W16b and W17d.

## 1.7 Damage and Restoration

### 1.7.1 Damage

There are several areas of hydrological damage (see Figure 1-15). In most cases the damage relates to artificial drainage. However, locally there is also damage related to footpath erosion and potentially a footbridge ponding water and causing an impediment to flow.

Figure 1-15: Restoration Areas Map





## 1.7.2 Restoration

It is understood that restoration work has already been undertaken at Dibden Bottom (in two phases: December 1999 and January 2001) and that this involved raising water levels by blocking drains in valley mire and wet heath areas. It is recommended that the effectiveness of this restoration be assessed using water level monitoring data (see next section). Depending on the findings of this assessment, further restoration work may be required.

Note that Figure 1-15 does not distinguish between restored and non-restored areas. It shows those areas potentially in need of restoration or further restoration.

**Table 1-3: Restoration Area Summary Table**

Restoration Area	Damage Type	Restoration Proposals	Improvement	Constraints and Issues
Drained areas - widespread	Drainage	Block drains where appropriate (and not already blocked)	Raise water levels to encourage restoration of valley mire and related wetland habitats.	The herringbone pattern of drainage is not within the SSSI.
South-eastern area (Noads Mire) and localised areas on Unit 425	Footpath erosion	Monitoring and possible re-surfacing	Protect mire and wet heath habitats from further erosion. Prevent ruts from forming routes for rapid runoff.	
North-east of Unit 417	Footpath erosion and ponding of water	Monitoring and possible remedial action to prevent ponding (e.g. installation of new upsized structure)	Reduced impediment to flow of water will allow mire and wet grassland habitats to be restored	Short-term disruption to footpath users

## 1.8 Monitoring requirements

### 1.8.1 Water Monitoring

It is understood that groundwater levels on Dibden Bottom have been monitored using 17 dipwells<sup>1</sup>. However, these data were not available for review as part of this project, and the locations of the dipwells are not known (although they are known to be arranged in transects).

Continued monitoring of groundwater levels (in shallow boreholes) and surface water levels (in stilling wells installed in ditches and streams) would be useful on this site, especially within the valley bottom wetlands affected by drainage. It would help inform the details of any further restoration work and would also help to determine whether the existing restoration was working.

The existing monitoring network should be reviewed, and additional monitoring added if necessary. Monitoring could be undertaken using automatic dataloggers, limiting the need for visits by Natural England staff or contractors. Dataloggers could potentially be installed within existing dipwells on the site.

<sup>1</sup> Allen, R. (2005) *Soil and Water in the New Forest and the Valley Mires*. [online] Available at <http://www.soilandwater.co.uk/index.php?id=33&click=0> [accessed 20th December 2012]

## 1.8.2 Vegetation

Within unit 417 Scot's Pine seedlings were beginning to encroach into wet heath areas; this should be monitoring with fixed point photography and transect studies to ensure that it does not continue to spread. Similar monitoring should be implemented in relation to localised areas of footpath erosion.

Where drainage restoration works are implemented, fixed point quadrat surveying should be implemented to assess the changes in vegetation communities present.

**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)
D	417, 418, 419 and 425	Dibden Bottom 1 & 2 and 3, The Noads Mire and Ferny Croft North	Fixed point camera survey (specifically focussing on extent of pine scrub encroachment, areas where footpaths are impeding flows and footpath erosion/poaching) Fixed point quadrat survey	The following new installations are recommended, although existing dipwells could also be used for groundwater monitoring on Dibden Bottom:  6 boreholes and 4 stilling wells (10 installations in total):  417: 3 boreholes and 2 stilling wells 418: 1 boreholes and 1 stilling well 419: flush-dominated – no monitoring recommended 425: 2 boreholes and 1 stilling well Plus associated monitoring and data processing

## 2 Maps

**Map 1: Location**

**Map 2: Aerial Photography**

**Map 3: Topography, Hydrology and Wetland Distribution**

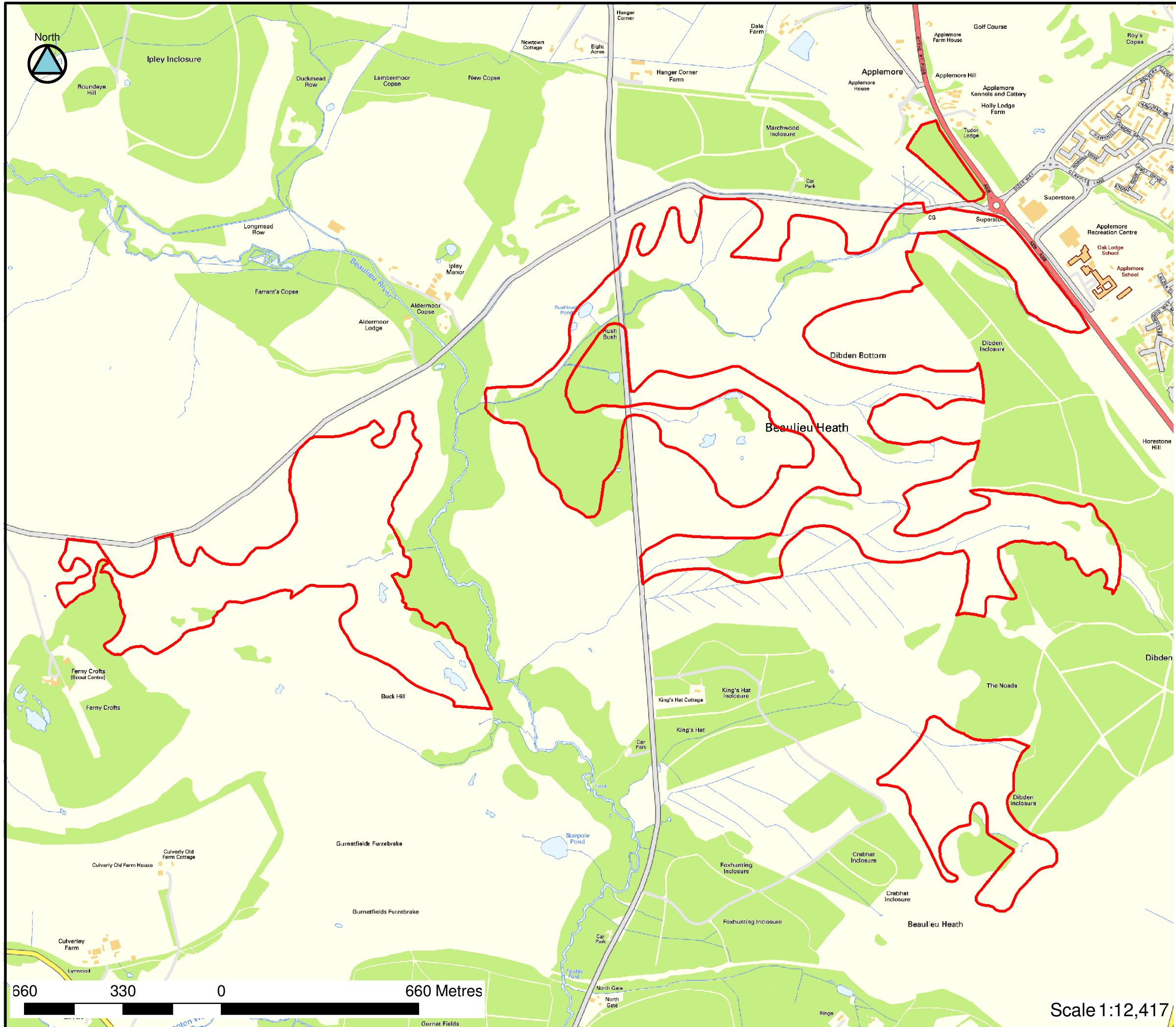
**Map 4: Phase One Habitat**

**Map 5: Drift Geology**

**Map 6: Bedrock Geology**

**Map 7: Eco-Hydrology Map**

**Map 8: Restoration Plan**



**LEGEND**

 Ecohydrological Assessment Area

Contains Ordnance Survey data © Crown copyright and database right 2013.



660 330 0 660 Metres



Scale 1:12,417


MAP 1

Site Location

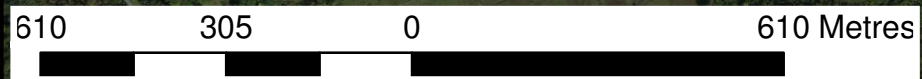




### LEGEND

 Ecohydrological Assessment Area

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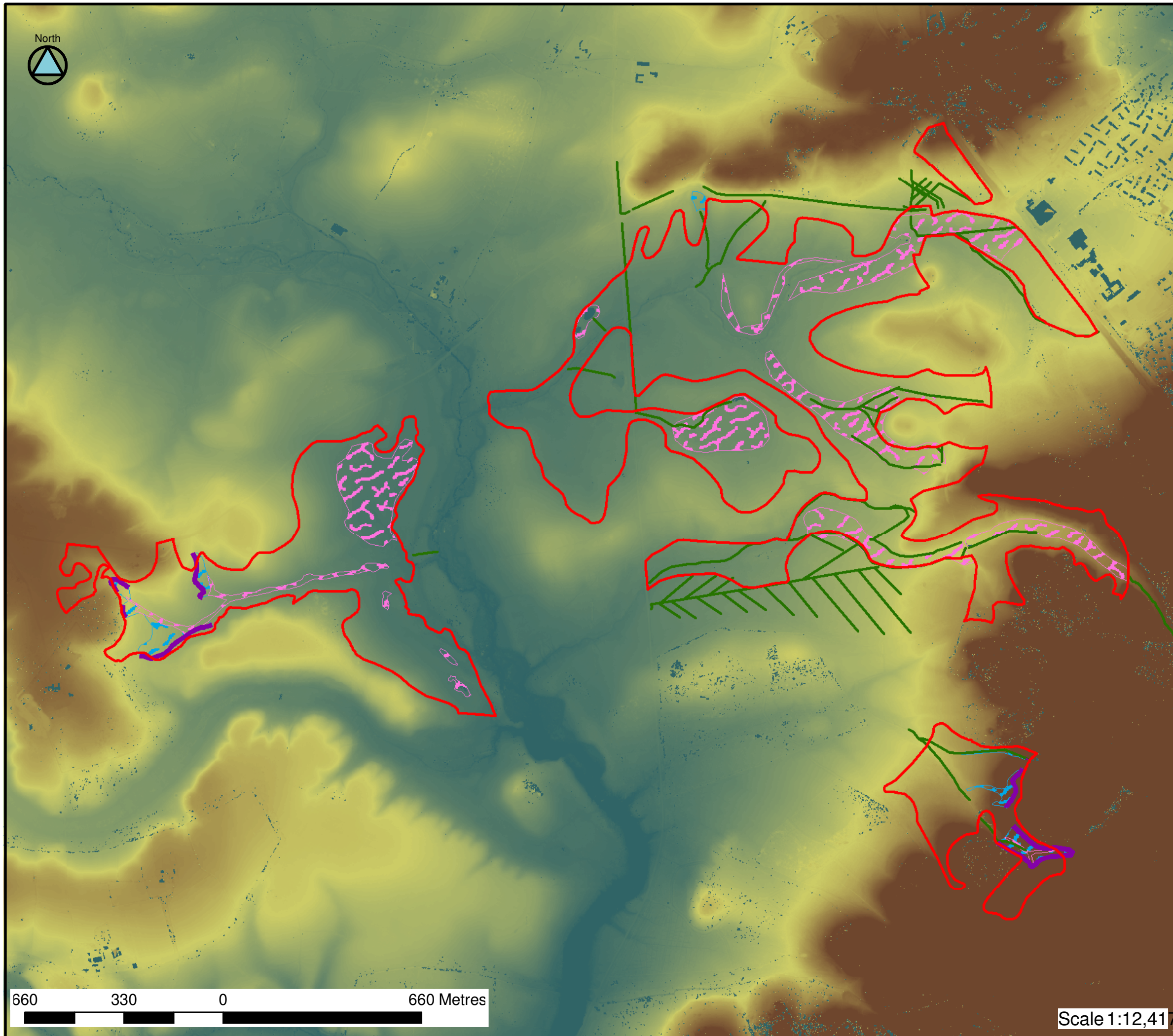


Scale 1:12,417

### MAP 2

Aerial Photography



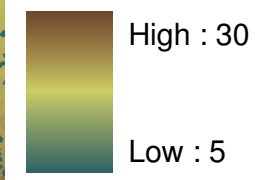


**LEGEND**

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

**LIDAR**

**mAOD**



© Forest Research based on Cambridge University Technical Services and New Forest NPA data.



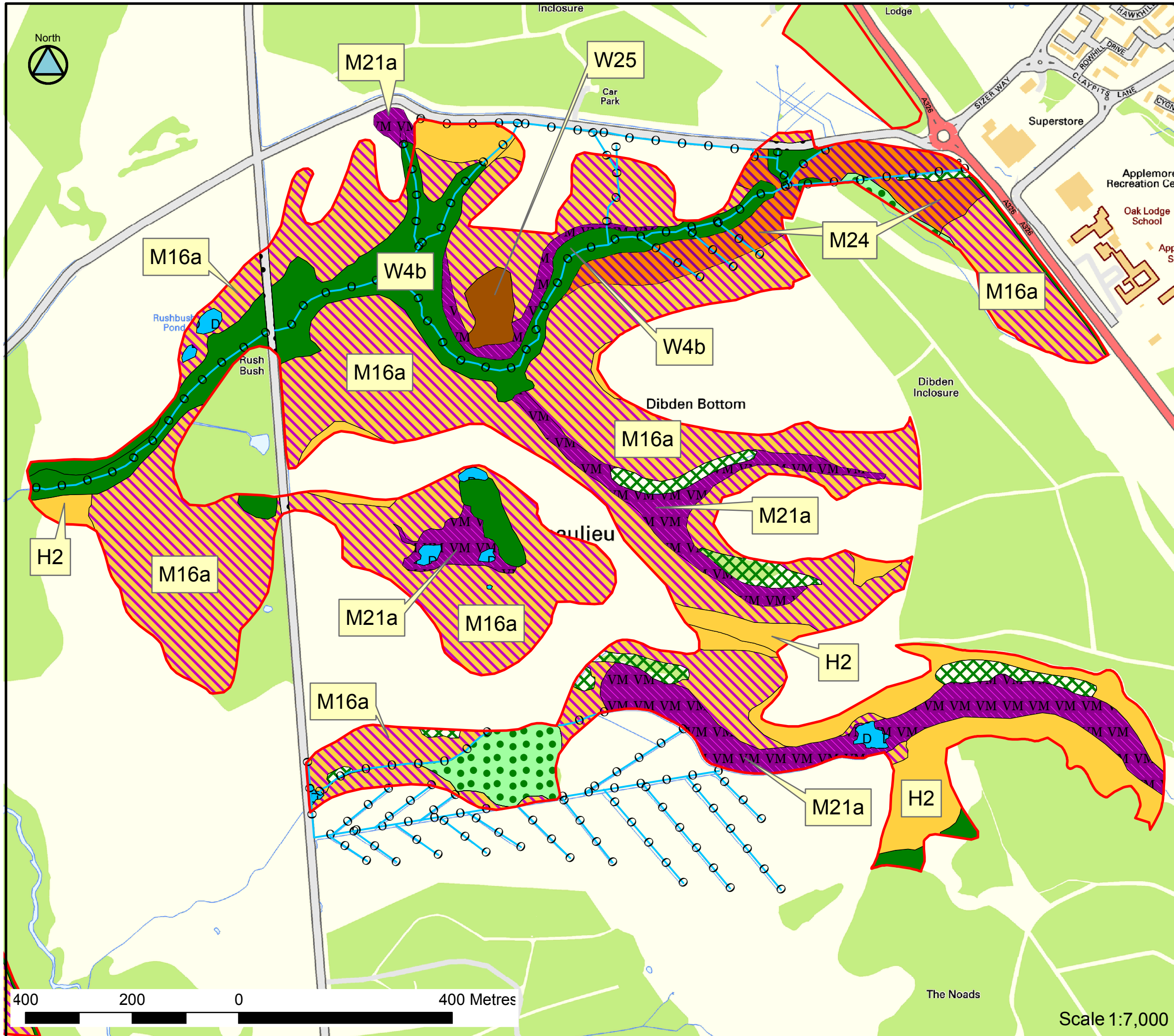
**MAP 3**

Topography, Hydrology and Wetland Distribution



Scale 1:12,417





### LEGEND

- Ecohydrological Assessment Area
- A1.1.1
- A1.3.1
- A2.1
- B5
- C1.1
- D1.1
- D2
- E3.1
- E3.2
- G1.4
- J4
- G2.3

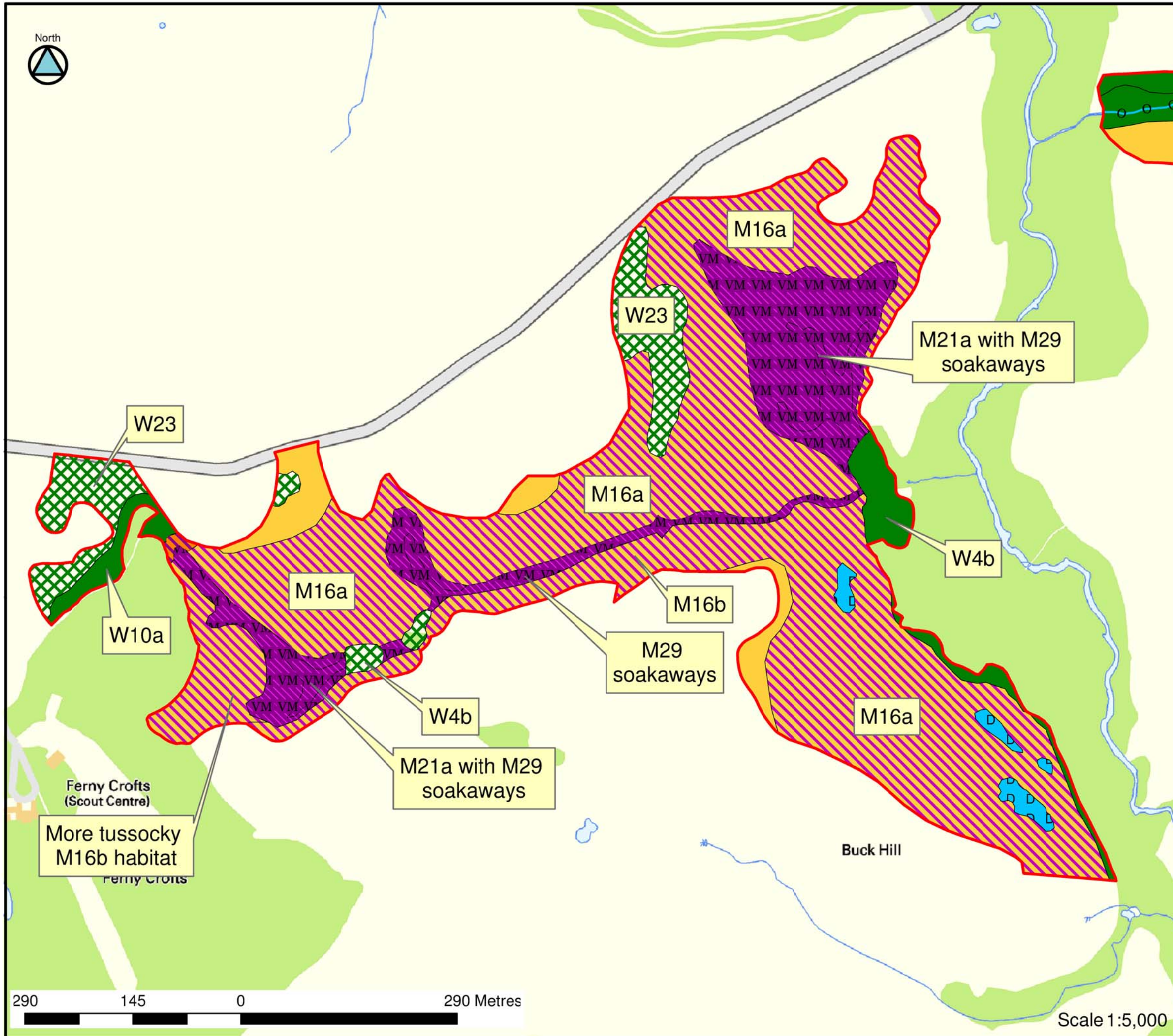
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**MAP 4**  
Phase One Habitat

Scale 1:7,000





**LEGEND**

- Ecohydrological Assessment Area
- Habitat**
- A1.1.1
- A2.1
- B5
- D1.1
- D2
- E3.1
- G1.4
- G2.3

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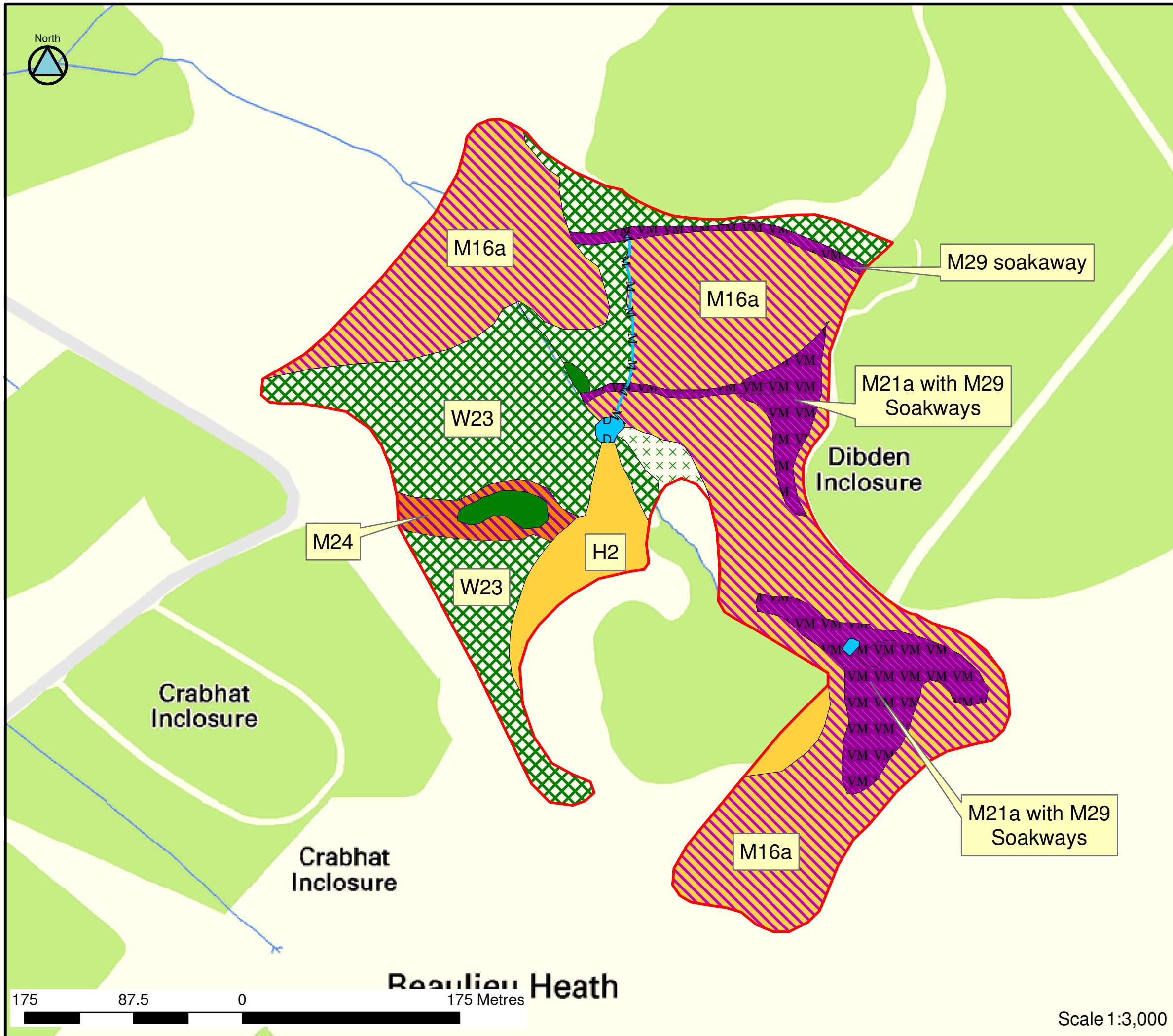


**MAP 4**  
Phase One Habitat

290 145 0 290 Metres

Scale 1:5,000





**LEGEND**

- Ecohydrological Assessment Area
- Habitat**
- A1.1.1
- A2.1
- A2.2
- B5
- D1.1
- D2
- E3.1
- G1.4
- G2.2

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**MAP 4**

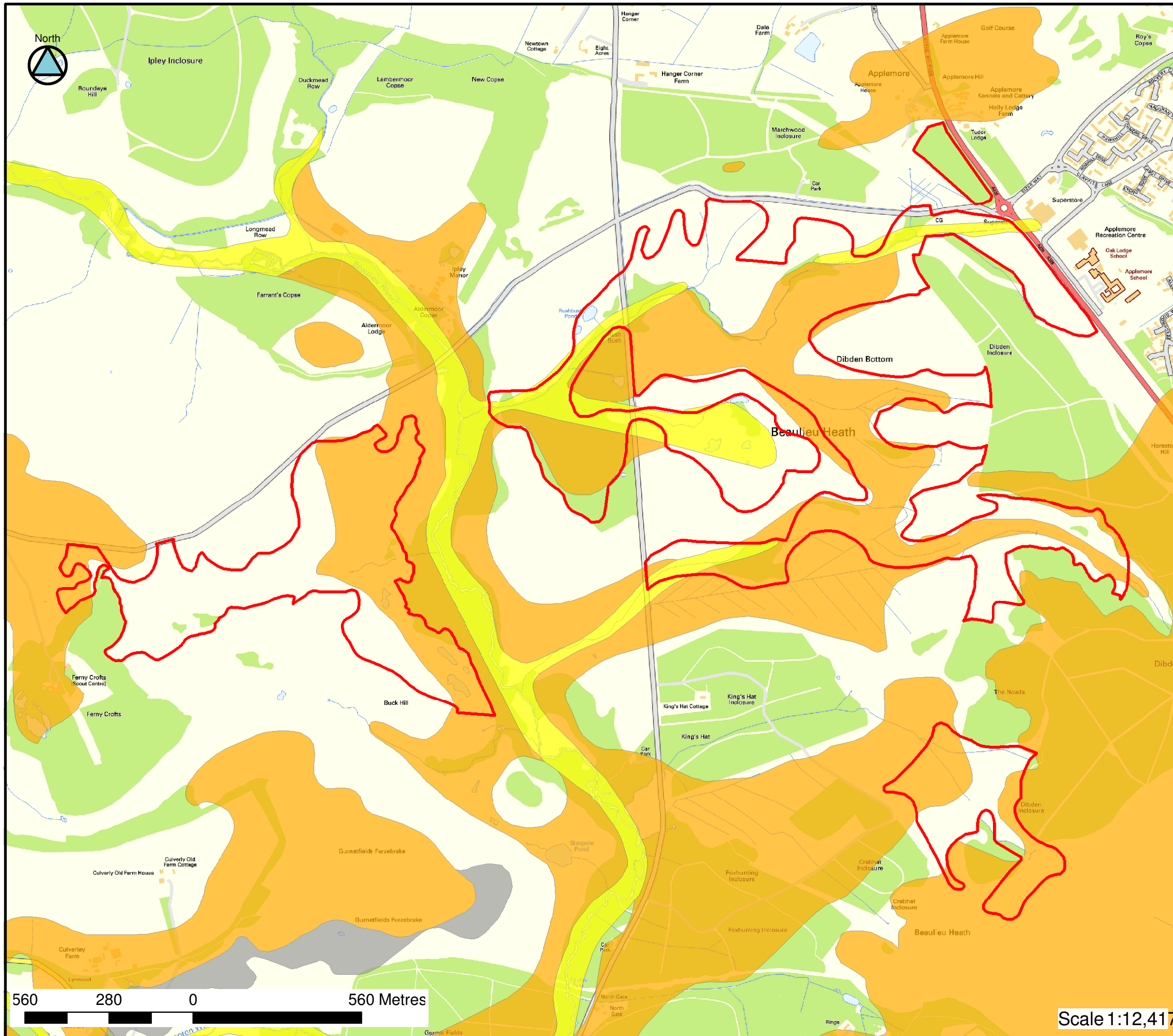
Phase One Habitat

Scale 1:3,000

**Reculieu Heath**







**LEGEND**

- Ecohydrological Assessment Area
- No Drift
- Other Deposits
- Alluvium - Clay, Silt, Sand and Gravel
- 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

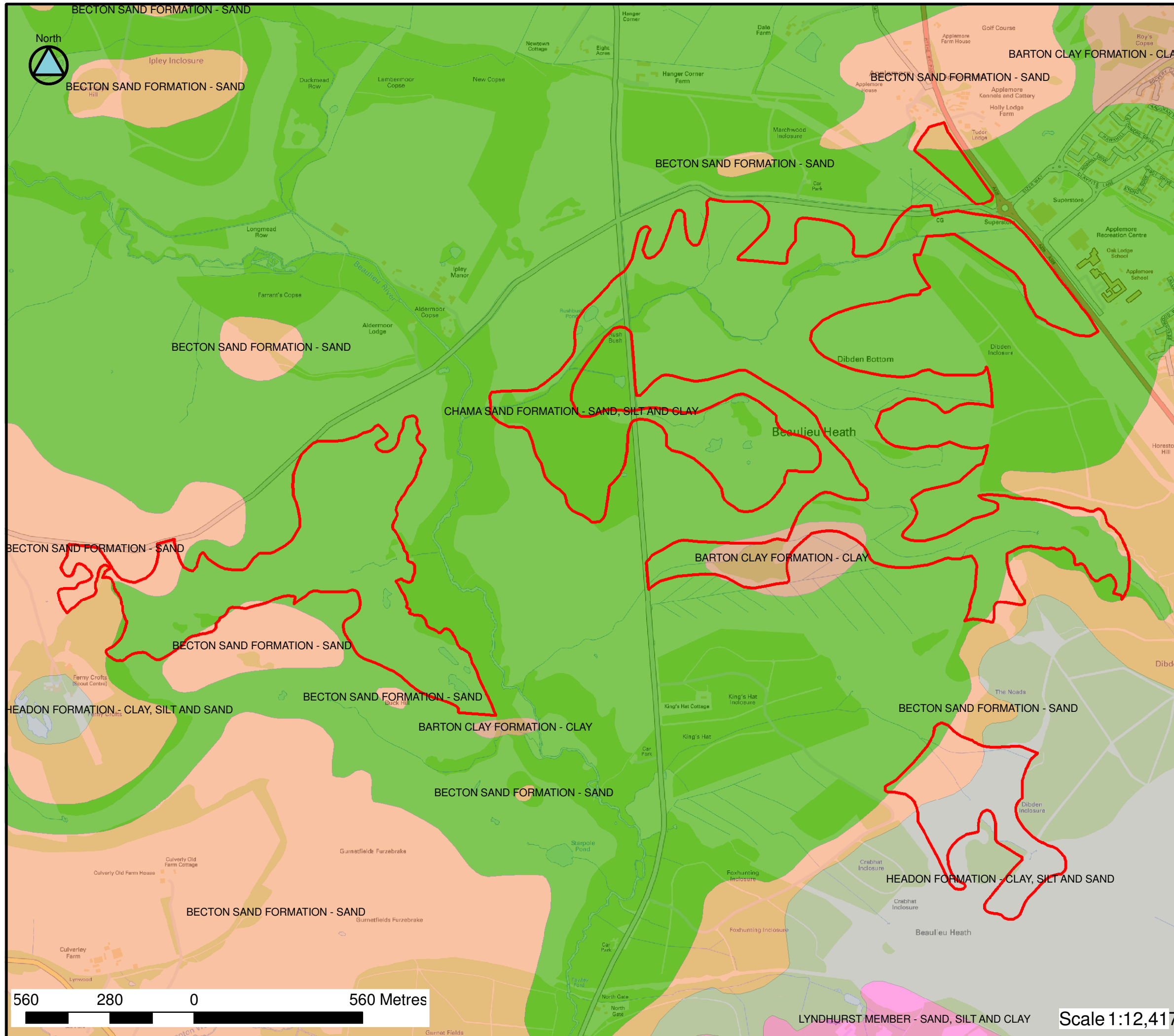
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Scale 1:12,417

MAP 5

Drift Geology

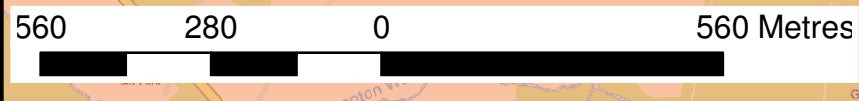


- ### LEGEND
- Ecohydrological Assessment Area
  - Other Rock Types
  - Headon and Osbourne Beds - Clay, Silt and Sand
  - Headon Formation - Clay, Silt and Sand
  - Lyndhurst Member - Sand, Silt and Clay
  - Becton Sand Formation - Sand
  - Becton and Chama Sand Formation - Sand, Silt and Clay
  - Becton 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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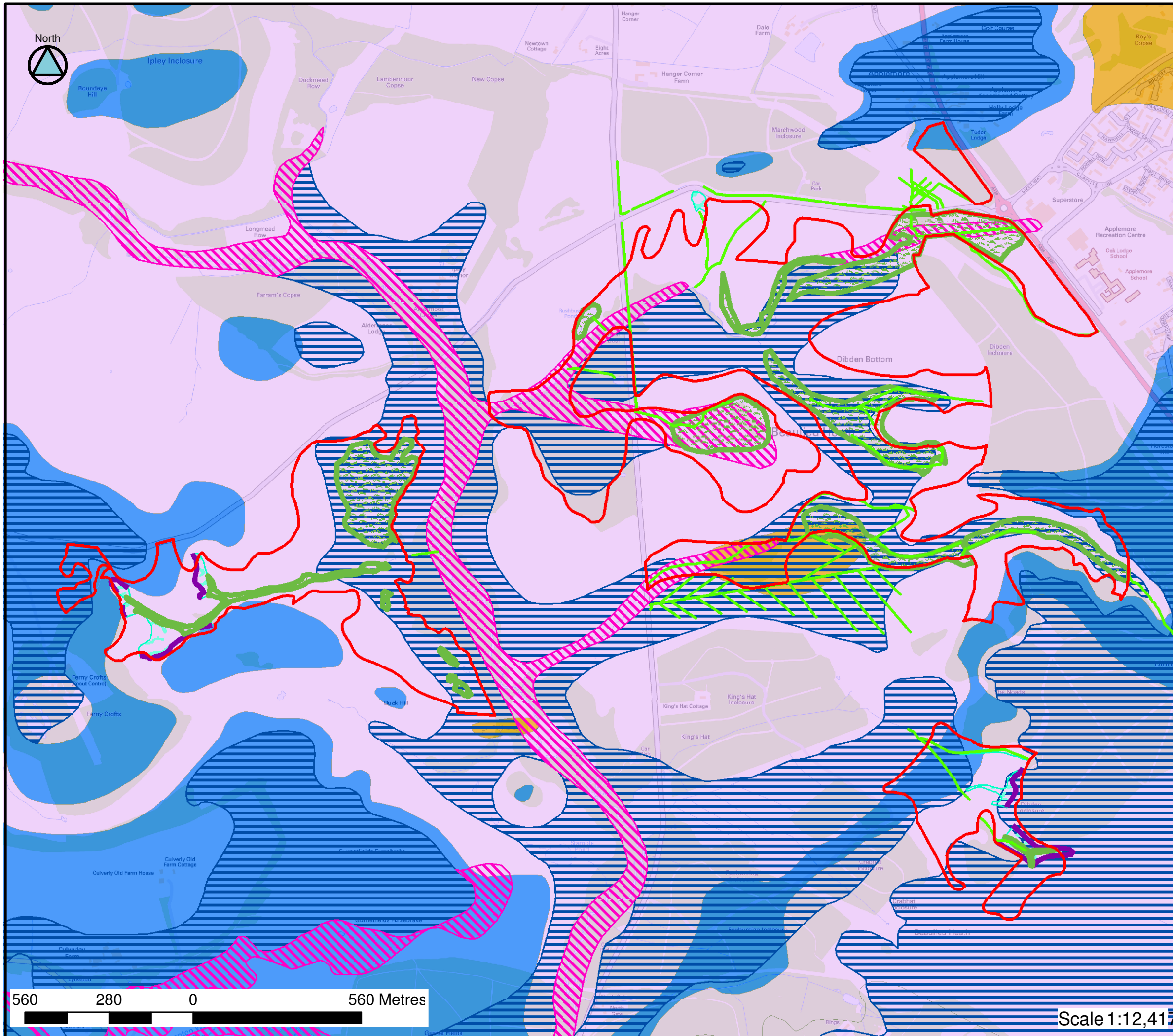


**MAP 6**  
 Bedrock Geology



Scale 1:12,417





**LEGEND**

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

**Drift Hydrogeology**

- Aquifer
- Aquifer/Aquitard
- Aquitard

**Bedrock Hydrogeology**

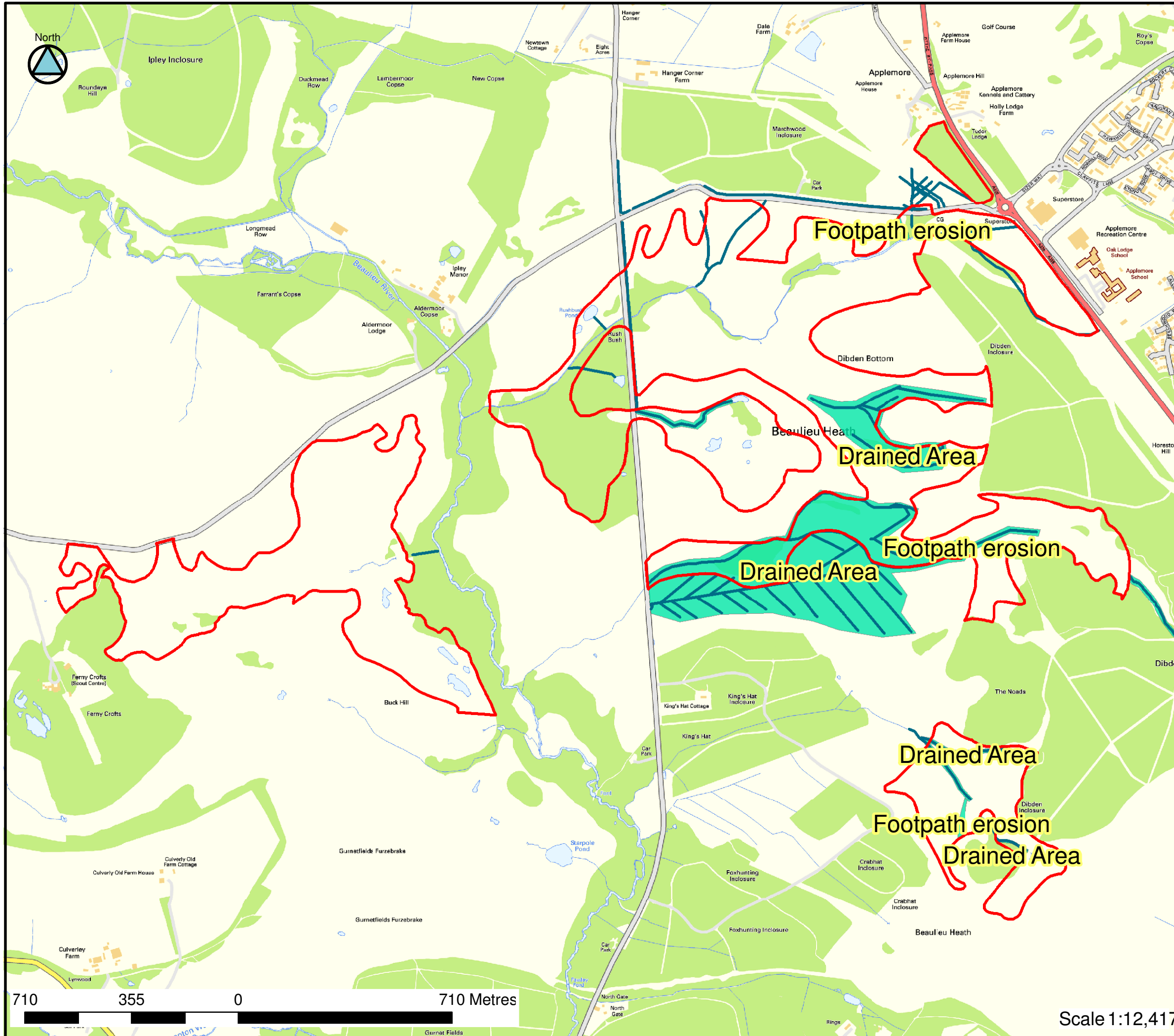
- Aquifer
- Aquifer/Aquitard
- Aquitard

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**MAP 7**  
 Eco-hydrology

Scale 1:12,417



**LEGEND**

- Ecohydrological Assessment Area
- Drainage
- Restoration Areas

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Scale 1:12,417

**MAP 8**  
Restoration Plan