Report to: SSE Renewables Developments (UK) Ltd

Contract No: J509

Phase 1 and NVC survey at Gordonbush Extension Wind Farm: 2013 Survey Results

Author:	Fraser Milne	August 2013
Checked by:	Kathy Ader	September 2013

Northern Ecological Services, North Wing, Aboyne Castle Business Centre, Aboyne, Aberdeenshire, AB34 5JP. Tel: 013398 87407,

nes@northecol.co.uk, www.northecol.co.uk

SUMMARY

BACKGROUND

A National Classification Survey (NVC) was undertaken on the proposed Gordonbush Extension Wind Farm site, Sutherland (NC844132). Special emphasis was given to identifying Ground Water Dependent Terrestrial Ecosystems (GWDTEs).

MAIN FINDINGS

- The majority of the site supports M17 *Trichophorum-Eriophorum* mire and M15 *Trichophorum-Erica* wet heath. Drier slopes support H10 *Calluna-Erica* heath and H12 *Calluna-Vaccinium* heath. Acid M6 *Carex-Sphagnum* mire marks out flush lines, typically along the fringes of watercourses. Other communities include small areas of U4 *Festuca-Agrostis-Galium* grassland, bracken and U6 *Juncus-Festuca* grassland.
- The blanket bog has been subject to historic draining, peat cutting and, more recently, burning. This has modified the floristics in certain areas giving rise to a drier bog community largely dominated by *Trichophorum germanicum* and *Calluna vulgaris*. In other, flatter areas, drainage has had a limited impact on floristics with good levels of *Sphagnum* still present.
- Burning has also created a hybrid wet/dry heath community with affinities to the M15 *Trichophorum-Erica* wet heath and H10 *Calluna-Erica* dry heath.
- Ground water dependent terrestrial ecosystems are largely restricted to M6 flushes.
- Species of local interest include *Sphagnum fuscum* and *Drosera anglica*.

CONTENTS

1. INTRODUCTION

Background

1.1 This report presents the results of a National Vegetation Classification survey (NVC) of the proposed Gordonbush Extension Wind Farm site carried out during August 2013.

Aims & Objectives

1.2 The aims of the survey were to map the semi-natural communities within the boundary of the Core Development Area (Fig. 1) to National Vegetation Classification (NVC) (Rodwell 1991a, 1991b, 1992, 1995) level with accompanying habitat maps, quadrat data and target notes illustrating the distribution and extent of each community over the site. A habitat map utilising the Phase 1 Habitat Survey system (JNCC 2007) has also been produced. This will beused to inform the potential environmental impacts of the proposed Development particularly on Ground Water Dependent Terrestrial Ecosystems (GWDTEs).

Topography

1.3 The 4.47 km² site comprises gently sloping upland plateau rising with ground elevations ranging from approximately 150m Above Ordnance Datum (AOD) in the south-west of the site to approximately 330m AOD in the north-east of the site. It is situated between the Allt a' Mhuilinn and Allt Smeorail rivers, small tributaries of which drain the site, including the Allt nan Nathraichean. The ground is characterised by level blanket peats, shallow valleys and small hillocks supporting drier heathland vegetation.

Geology and soils

1.4 The majority of the site is underlain by the Kildonan Psammite Formation composed of psammite and micaceous psammite (British Geological Survey). Soils are strongly acidic Glacial Till and peats.

Land use

1.5 The site is grazed by deer. Blanket bog on the site has been historically drained and cut for peat and, more recently (c. 10 years ago), burnt due to a heather beetle outbreak.

Survey limitations

1.6 Burning in some areas of the site has modified the species composition of the communities and has blurred community boundaries. This has made assignation of a definitive NVC community difficult in some areas, with some communities only showing loose associations with the published tables.

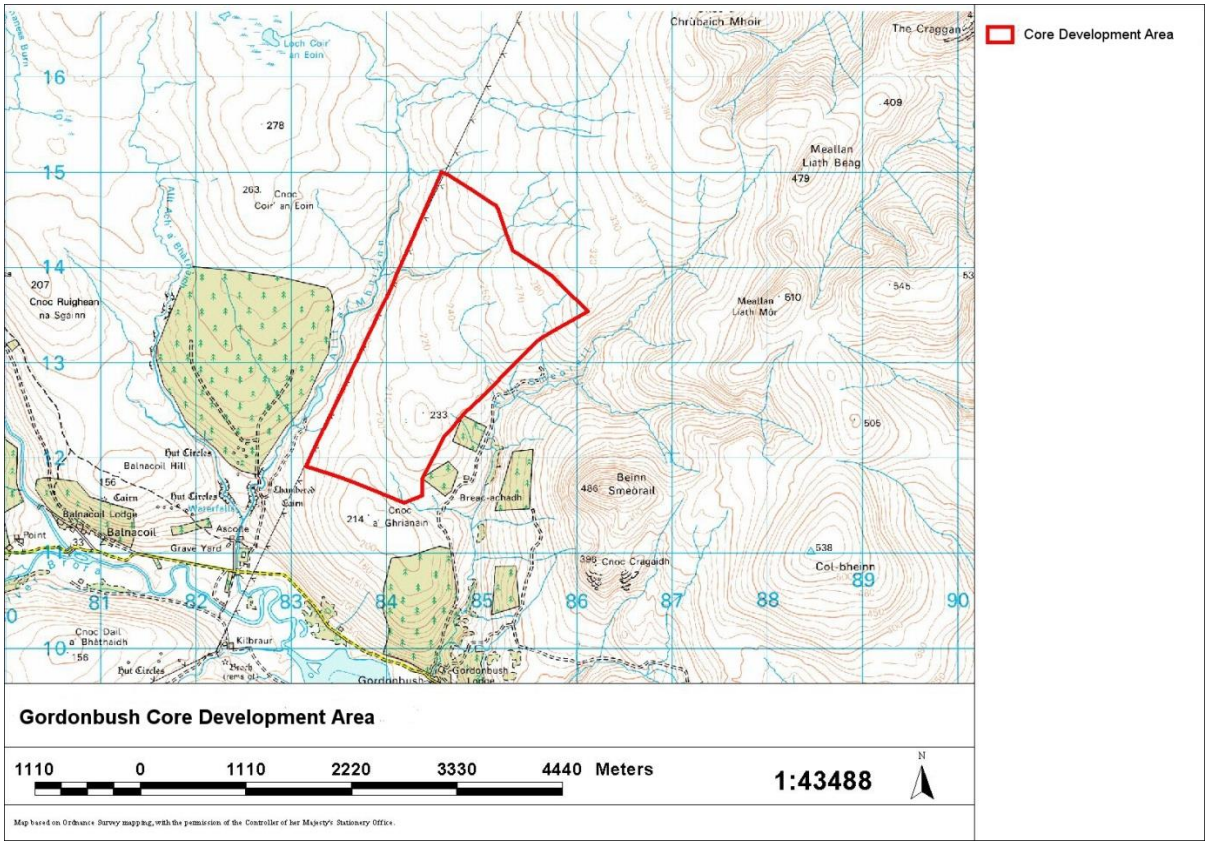


Fig 1: The Core Development Area

2. METHODOLOGY

Field methods

2.1 The surveyor walked over the site to identify all the vegetation communities present within the survey area and pick out any features of special interest. Homogenous stands of vegetation were identified and mapped onto a 1:10,000 field map,underlain by aerial photos.

2.2 Where intricate mosaics of vegetation types were encountered, the approximate proportion of each community was noted as a percentage of total cover. A target note was used to describe areas of vegetation too small to map, typically less than 0.2 ha.

2.3 Quadrat data were taken for communities of high conservation interest or where there was difficulty assigning a community in the field. Quadrats and target notes (latter given in Appendix I) were recorded using a hand held GPS device. Sample size was based on a 2m by 2m quadrat. Species were recorded using the DOMIN scale in accordance with Rodwell *et al.* (1991).

Domin score	Percentage ground cover
10	91-100%
9	76-90
8	51-75
7	34-50
6	26-33
5	11-25
4	4-10
3	many individuals
2	<4 several individuals
1	few individuals

2.4 Photographs were taken to highlight important habitats or habitat features which may be affected by the Development.

Data processing

2.5 Data processing involves converting the information recorded in the field into descriptive text, digitised maps and NVC community tables. Converting the field map information into ArcView shape files creates a digitised NVC polygon map. This is typically achieved by redrawing the field maps onto digital maps that are overlain by orthorectified aerial photographs.

2.6 The location of target notes are also recorded as ArcView shape files taken directly from an excel database of their positions. The communities have also been assigned the appropriate Phase1 alpha-numeric code for the purposes of producing a habitat map.

2.7 Use was made of MATCH and Tablefit computer programs to provide indicators of potential NVC communities, but was not relied upon to provide a definitive match.

2.8 Nomenclature for vascular plant species follows Stace (2010) and nomenclature for bryophyte species follows Smith (2004).

3. SURVEY RESULTS

3.1 Table 1 below summarises the Phase 1 habitats and associated NVC communities recorded on site (See Appendix II for habitat maps).

Phase 1 Habitat code	Phase 1 Habitat	Associated NVC communities	Hectares	% Total Area
B1.1	Unimproved acid grassland	**U4a** *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, typical sub-community **U6** *Juncus squarrosus-Festuca ovina* grassland	5.82	1.3%
C1.1	Bracken	**U20** *Pteridiumn aquilinum-Galium saxatile* community	0.96	0.2%
D1.1	Dry acid heath	**H12a** *Calluna vulgaris-Vaccinium myrtillus* heath, *Calluna vulgaris* sub-community **H10a** *Calluna vulgaris-Erica cinerea* heath, typical sub-community	42.04	9.4%
D2	Wet heath	**M15b** *Trichophorum germanicum-Erica tetralix* wet heath, typical sub-community	135.66	30.2%
D5	Dry heath/acid grassland mosaic	**H10a** *Calluna vulgaris-Erica cinerea* heath, typical sub-community **H12a** *Calluna vulgaris-Vaccinium myrtillus* heath, *Calluna vulgaris* sub-community **U4a** *Nardus stricta-Galium saxatile* grassland, species-poor sub-community	1.47	0.6%
E1.6.1	Blanket bog	**M17a***Trichophorum germanicum-Eriophorum vaginatum blanket* mire*, Drosera rotundifolia-Sphagnum spp.* sub-community	213.10	55.4%
E1.7	Wet modified bog	**M17a***Trichophorum germanicum-Eriophorumvaginatum blanket* mire*, Drosera rotundifolia-Sphagnum spp.* sub-community	34.65	
E2.1	Acid/neutral flush	**M6c** *Carex echinata-Sphagnum recurvum/auriculatum* mire, *Juncus effuses* sub-community	12.98	2.9%

Table 1: Phase 1 Habitats & principal NVC communities

Acid Grassland Communities (5.82ha – 1.3% of site)

U4a *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, typical sub-community

U6 *Juncus squarrosus-Festuca ovina* grassland

3.2 Acid grassland is not a major component of the site. Small examples are typically found along river valleys e.g. Allt nan Nathraichean and around more heavily grazed areas and historic settlements e.g. Balnacreig. The majority takes the form of the *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland. Damper soils or gleyed podsols on flat or gently-sloping ground, typically around the edges of blanket bog, can support small patches of the U6 *Juncus squarrosus-Festuca ovina* grassland, although this community is not well developed and difficult to separate from the U4 community. The grassland is often sedge rich with frequent *Carex nigra* and a little *Carex echinata,* indicating a transition to grassy M6 flush.

3.3 *Festuca-Agrostis-Galium* grasslands occur throughout upland Britain from south-west England to Orkney and Shetland; they also occur in some parts of the lowlands. The Typical and *Holcus-Trifolium* sub-communities are common throughout the uplands (Averis 2004).

Bracken(0.96ha – 0.2% of site)

U20 *Pteridium aquilinum-Galium saxatile* community

3.4 Small stands of bracken occur along the sides of river valleys e.g. Allt nan Nathraichean, typically in a mosaic with acid grassland, but nowhere is it extensive.

Dry Dwarf Shrub Heath(42.04ha – 9.4% of site)

H12a*Calluna vulgaris-Vacciniu mmyrtillus* heath, *Calluna vulgaris* sub-community

H10a*Calluna vulgaris-Erica cinerea* heath, typical sub-community

3.5 Better drained soils over more steeply sloping ground support dry heathland vegetation largely dominated by *Calluna vulgaris* with *Erica cinerea*. This is a species poor community affected by burning. There is a probability that it is derived from wet heath in some areas, as reflected in the frequent occurrence of wet heath species e.g. *Trichophorum germanicum, Erica tetralix* and *Eriophorum angustifolium.* This creates a hybrid community with similarities with both M15 wet heath and H10/12 dry heath. More typical H10 and H12 dry heath occurs along the sides of steeper river valleys e.g. Allt nan Nathraichean, where the mature heather can reach over 60cms. Elsewhere, small patches of dry heath stand out as dark patches within the bog and wet heath communities where soils are thinner and drier.

NVC code	*M15/H10*
Quadrat Number	**8**
Grid reference	84661284
Recorder	FM
Species Name	DOMIN
Calluna vulgaris	9
Hypnum cupressiforme	5
Trichophorum germanicum	5
Erica tetralix	4
Pleurozium schreberi	4
Eriophorum angustifolium	3

Erica cinerea	3
Cladonia portentosa	2

Table 2: Typical quadrat for hybrid wet/dry heath community affected by burning

3.6 *Calluna-Erica* heath is widespread in western and northern Britain from Devon to Shetland, and is most common in the western Highlands and the Hebrides.

3.7*Calluna-Vaccinium* heath occurs widely in the British uplands from south-west England to Shetland, and has been recorded from most upland areas apart from parts of the Hebrides. It accounts for most of the *Calluna* heathland in the central and eastern Highlands, the eastern parts of the Southern Uplands, the Pennines, the eastern Lake District and eastern Wales. It is most common in the northern Pennines and eastern Scotland (Averis 2004).

Wet Dwarf Shrub Heath Communities(135ha – 30.2% of site)

M15b *Trichophorum germanicum-Erica tetralix* wet heath, typical sub-community

3.8 Wet dwarf shrub heath is the second most common community on site after blanket bog. It occurs on the majority of the gently sloping ground and ridges with peaty soils. Some of the more modified areas of blanket bog are converting to this community, particularly around drainage ditches.

3.9 It is typically dominated by *Trichophorum germanicum* with *Calluna vulgaris, Erica tetralix, Eriophorum angustifolium, Sphagnum capillifolium* and *Molinia caerulea,* creating a yellow/brown sward. The scarcity of dwarf shrubs in many stands may be a result of heather beetle outbreak and subsequent burning. This community is also more heavily grazed by deer. It also marks out drier areas of peat cutting within the blanket bog.

NVC code	*M15b*
Quadrat Number	**2**
Grid reference	83991264
Recorder	FM
Species Name	DOMIN
Trichophorum germanicum	8
Calluna vulgaris	5
Erica tetralix	5
Eriophorum angustifolium	4
Sphagnum capillifolium	4
Molinia caerulea	4
Hypnum jutlandicum	3
Narthecium ossifragum	3
Pleurozium schreberi	3
Aulacomnium palustre	3
Deschampsia flexuosa	2

Table 3: Typical quadrat for M15b wet heath

3.10*Trichophorum-Erica* wet heath is widespread in the north and west of Britain. It is most common in the western Highlands, where the Typical and *Cladonia* sub-communities cover very large areas (Averis 2004).

Blanket Bog Communities(247.8ha – 55.4% of site)

M17a*Trichophorum germanicum-Eriophorum vaginatum blanket* mire*, Drosera rotundifolia-Sphagnum spp.* sub-community

3.11 This is the dominant community on site covering all areas of deepest, wet peats. It is typically dominated by *Trichophorum germanicum, Eriophorum vaginatum, Calluna vulgaris, Erica tetralix* and *Eriophorum angustifolium* with varying amounts of *Sphagnum capillifolium* and *Sphagnum papillosum*. Other common associates include *Narthecium ossifragum, Drosera rotundifolia, Drosera anglica, Myrica gale* and *Pleurozia purpurea.*There can also be a little *Sphagnum fuscum* and *Sphagnum magellanicum* in the least disturbed areas with the deepest peats.

3.12 Drainage ditches have been dug, particularly to the north and north-west, creating a drier, modified community largely dominated by *Calluna vulgaris* and *Trichophorum germanicum* with a reduced *Sphagnum* cover. However, the drainage ditches in flatter areas seem to have had minimal effect on bog floristics. The bog was also burnt about ten years ago to reduce heather beetle outbreaks. Areas to the south of the site have been historically cut for peat.

3.13 The wettest areas, e.g. NC8477 1448 in the north west, have affinities with the M18 *Erica-Sphagnum* mire, particularly where there is abundant *Sphagnum papillosum* and a little *Sphagnum magellanicum,* but the other associates for that community are mostly absent. Drosera species, including *D.anglica,* can be quite common and are strongly indicative of the community. *Myrica gale* can also be common in some stands, especially to the west of the site. The moss *Racomitrium lanuginosum* can also be common in some areas. Mature stands of *Calluna vulgaris* that escaped burning have been killed off by heather beetle in some areas (see target notes).

NVC code	*M17a*	*M17a*	*M17a*	*M17a*		
Quadrat Number	**1**	**3**	**5**	**6**		
Grid reference (8-figure)	83561243	84191288	84731444	84921433		
Recorder	FM	FM	FM	FM		
Species	**DOMIN**				**Freq**	**Range**
Trichophorum germanicum	8	7	7	6	V	6-8
Eriophorum vaginatum	6	6	7	7	V	6-7
Sphagnum capillifolium	5	6	6	5	V	5-6
Calluna vulgaris	4	5	5	5	V	4-5
Erica tetralix	5	5	4	5	V	4-5
Eriophorum angustifolium	4	4	4	5	V	4-5
Sphagnum papillosum	4	4	5	4	V	4-5
Narthecium ossifragum	4	3	3	3	V	3-4
Drosera rotundifolia	3	3	3	3	V	3

Potentilla erecta	3		2	4	IV	2-4
Drosera anglica		2	2	2	IV	2
Myrica gale	4	3			III	3-4
Racomitrium lanuginosum			3	4	III	3-4
Aulacomnium palustre	2	3			III	2-3
Cladonia portentosa	2			3	III	2-3
Sphagnum fuscum			4		II	4
Molinia caerulea	3				II	3
Pleurozia purpurea				3	II	3
Pleurozium schreberi	3				II	3
Sphagnum tenellum		3			II	3
Anthoxanthum odoratum	2				II	2
Deschampsia flexuosa	2				II	2
Hypnum jutlandicum	2				II	2
Luzula multiflora		2			II	2

Table 4: Quadrats for M17a

3.14*Trichophorum-Eriophorum* mire is widespread in upland areas of western Britain. It is most common and extensive in the western and northern Highlands and the Hebrides (Averis 2004).

Acid/Neutral Flush Communities(12.98ha – 2.9% of site)

M6c – *Carex echinata-Sphagnum recurvum/ auriculatum* mire, *Juncus effusus* sub-community

3.15 Acid/neutral flushing is not particularly common on site. Small flushes dominated by *Juncus effusus* and *Sphagnum fallax* occur along the fringes of river valleys marking out seepage lines. The most widespread area of concentrated flushing occurs along the Ristocky Burn near Balnacreig (NC8485 1345) and next to the old stone sheepfold (NC8427 1348). The dense sward is dominated by *Juncus effusus, Carex nigra* and *Carex echinata* over a layer of *Sphagnum fallax, Polytrichum commune* and *Sphagnum palustre.* A little *Carex panicea* and *Carex pulicaris* indicates flushing by more neutral waters. These are more common around the sheepfold site (TN 12).Some stands support a little *Carex rostrata,* bringing the community close to the M4 *Carex rostrata-Sphagnum recurvum* mire.

3.16 *Carex echinata-Sphagnum* mires are common throughout the uplands from Cornwall north to Shetland. They are the most widespread soligenous mires in the British uplands. The two sedge-dominated sub-communities are ubiquitous. The two rush-dominated sub-communities are widespread in Wales, northern England and southern Scotland, but are less common in the northern Highlands and the Outer Hebrides (Averis 2004).

NVC code	*M6c*	*M6c*		
Quadrat Number	**4**	**7**		
Grid reference (8-figure)	84281353	85041358		
Recorder	FM	FM		
Species	DOMIN		Freq	Range

Juncus effusus	7	8	V	7-8
Sphagnum fallax	7	6	V	6-7
Carex nigra	5	5	V	5
Polytrichum commune	4	5	V	4-5
Agrostis canina	3	4	V	3-4
Holcus lanatus	3	4	V	3-4
Sphagnum palustre	3	4	V	3-4
Potentilla erecta	3	3	V	3
Ranunculus acris	2	2	V	2
Carex echinata	7		III	7
Agrostis stolonifera	4		III	4
Juncus acutiflorus	4		III	4
Molinia caerulea	4		III	4
Calliergonella cuspidata	3		III	3
Carex panicea	3		III	3
Carex pulicaris	3		III	3
Deschampsia cespitosa		3	III	3
Eriophorum angustifolium	3		III	3
Luzula multiflora	3		III	3
Epilobium palustre		2	III	2
Galium palustre		2	III	2
Trichophorum germanicum		2	III	2
Viola palustris	2		III	2

Table 5: Quadrats for M6c

Notable species

3.17The communities recorded support two species of local interest, *Drosera anglica a*and *Sphagnum fuscum.*

Groundwater Dependent Terrestrial Ecosystems(GWDTE) and Level of Importance

3.18SEPA currently defines GWDTEs on the basis of specific NVC communities. SEPA Guidance Note 4 (SEPA 2012) and UKTAG (2009) provide a table detailing the definition of GWDTEs as per the NVC. The UKTAG list provides a scoring system, where a score of 1 is for highly groundwater dependent habitats; 2 for moderately dependent groundwater habitats and 3 is for habitats with a low groundwater dependency. The list gives different scoring for habitats occurring in Scotland. A map showing the distribution of GWDTE across the site, based on the Scottish GWDS, is shown in Appendix II.

3.19Table 2 summarises the Ground Water Dependency Score for each NVC community recorded on site and states their level of importance in terms of UK and European legislation.

NVC Community	GWDS[1]		Level of Importance	Site Description
	UK	Scot		
U4a *Festucaovina-Agrostiscapillaris-Galiumsaxatile* grassland, typical sub-community **Acidic Grassland**	3	3		Small stands restricted to river valleys.
U6 *Juncussquarrosus-Festucaovina*grassland. **Acid Grassland**	2	2		Occurs on thinner, peaty soils with impeded drainage. Very limited occurrence.
H12a *Calluna vulgaris-Vacciniummyrtillus* heath, *Calluna vulgaris* sub-community **H10a** *Calluna vulgaris-Erica cinerea* heath, typical sub-community. **Dry Heath**	3	3	European Dry Heath is an Annex 1 habitat under the EC Directive 92/43/EEC on the Conservation of Natural Habitats and Wildlife Fauna (The Habitats Directive). It is also a priority habitat in the UK BAP,falling under Upland Heathland.	Common in steep river valleys and more freely drained slopes.
M15b *Trichophorumgramanicum-Erica tetralix* wet heath, typical sub-community. **Wet Heath**	2	2	Northern Atlantic wet heath with *Erica tetralix* is an Annex 1 habitat under the EC Directive 92/43/EEC on the Conservation of Natural Habitats and Wildlife Fauna (The Habitats Directive). It is also a priority habitat in the UK BAP, falling under Upland Heathland.	Widespread over gently sloping ground and ridges. Not particularly ground water dependent on site.
M17a*Trichophorumgermanicum-Eriophorumvaginatum blanket* mire*, Droserarotundifolia-Sphagnum spp.* sub-community. **Blanket Bog**	3	3	Active blanket bog is a Priority Habitat under Annex 1 of the EC Directive 92/43/EEC on the Conservation of Natural Habitats and Wildlife Fauna (The Habitats Directive). It is also a priority habitat in the UK BAP, falling under Blanket Bog.	Widespread over deeper, wetter peats.

[1] GWDS = Ground Water Dependency Score (UKTAG 2009) 1 = High, 2 = Moderate, 3 = Low

M6c*Carexechinata-Sphagnum recurvum/auriculatum* mire, *Juncuseffusus*sub-community	1	1	A Priority Habitat in the UK BAP for upland flushes fens and swamps.	Marks out drainage and seepage lines, but is restricted on site.

Table 2: Summary GWDSs and level of importance.

3.20 Ground water dependent ecosystems are not common on site. The M17 blanket bog is an ombrogenous (rain fed) community. Although certain sub-communities of M15 wet heath are more ground water dependent than others, especially the M15a sub-community (not present on site), the M15b sub-community is not thought to be especially dependent on ground water on site.

3.21The only truly GWDTE on site is the M6c, comprising acidic flushes along the fringes of water courses and valley bottoms. However, this is a fairly species-poor community of limited floristic diversity.

3.22An obligation to conserve certain habitats is laid upon the UK Government by a number of international nature conservation conventions and directives. The most important of these is the *EU Directive on the Conservation of Natural Habitats and Wild Fauna and Flora (92/43/EEC).* This directive lists habitats that are important in the EU primarily because they are rare, vulnerable or endangered. In addition, the UK and Local Biodiversity Action Plans (LBAP) lists a number of habitats as *priority habitats*. Blanket bog, wet heathand dry heath areas are included in the definitions of ‘Blanket Bog’, ‘Northern Atlantic wet heaths with *Erica tetralix*’ and ‘European Dry Heath’ respectively as Annex I priority habitats on the EU Habitats Directive. They are also UK and Local BAP priority habitats.

4. REFERENCES

Averis, A.M. et. al. (2004) An Illustrated Guide to British Upland Vegetation. JNCC

Burnett, J.H. (1964) The vegetation of Scotland. Oliver & Boyd.

Cooper, E. &MacKintosh, J. (1996).NVC review of Scottish grassland surveys. Scottish Natural Heritage Review No.65.

Joint Nature Conservation Committee (2007).Handbook for Phase 1 HabitatSurvey, Revised reprint. JNCC, Peterborough.

Rodwell, J.S. (1991a). British Plant Communities Vol 1.Woodlands & Scrub. Cambridge University Press, Cambridge.

Rodwell, J.S. (1991b). British Plant Communities Vol 2.Mires and Heaths. Cambridge University Press, Cambridge.

Rodwell, J.S. (1992). British Plant Communities Vol 3.Grasslands and Montane Communities. Cambridge University Press, Cambridge.

Rodwell, J.S. (1995). British Plant Communities Vol 4.Aquatic Communities, Swamps and Tall-Herb Fens. Cambridge University Press, Cambridge.

Rodwell, J.S. et. al. (2000) Review of coverage of the National vegetation Classification. JNCC report No. 302.

SEPA (2012) Land Use Planning System SEPA Guidance Note 4: Planning guidance on windfarm developments

Smith, A.J.E. (2004). The Moss Flora of Britain and Ireland. Cambridge University Press

Stace, C. (2010). New Flora of the British Isles (3rd edition). Cambridge University Press, Cambridge.

Stewart, A., Pearman, D.A. & Preston, C.D. (1994).Scarce Plants in Britain. Joint Nature Conservation Committee, Peterborough.

UKTAG (2009) list of NVC communities and associated groundwater dependency scores.

Online resources:

UK Annex 1 Interest Features
Online atlas of the British & Irish Flora

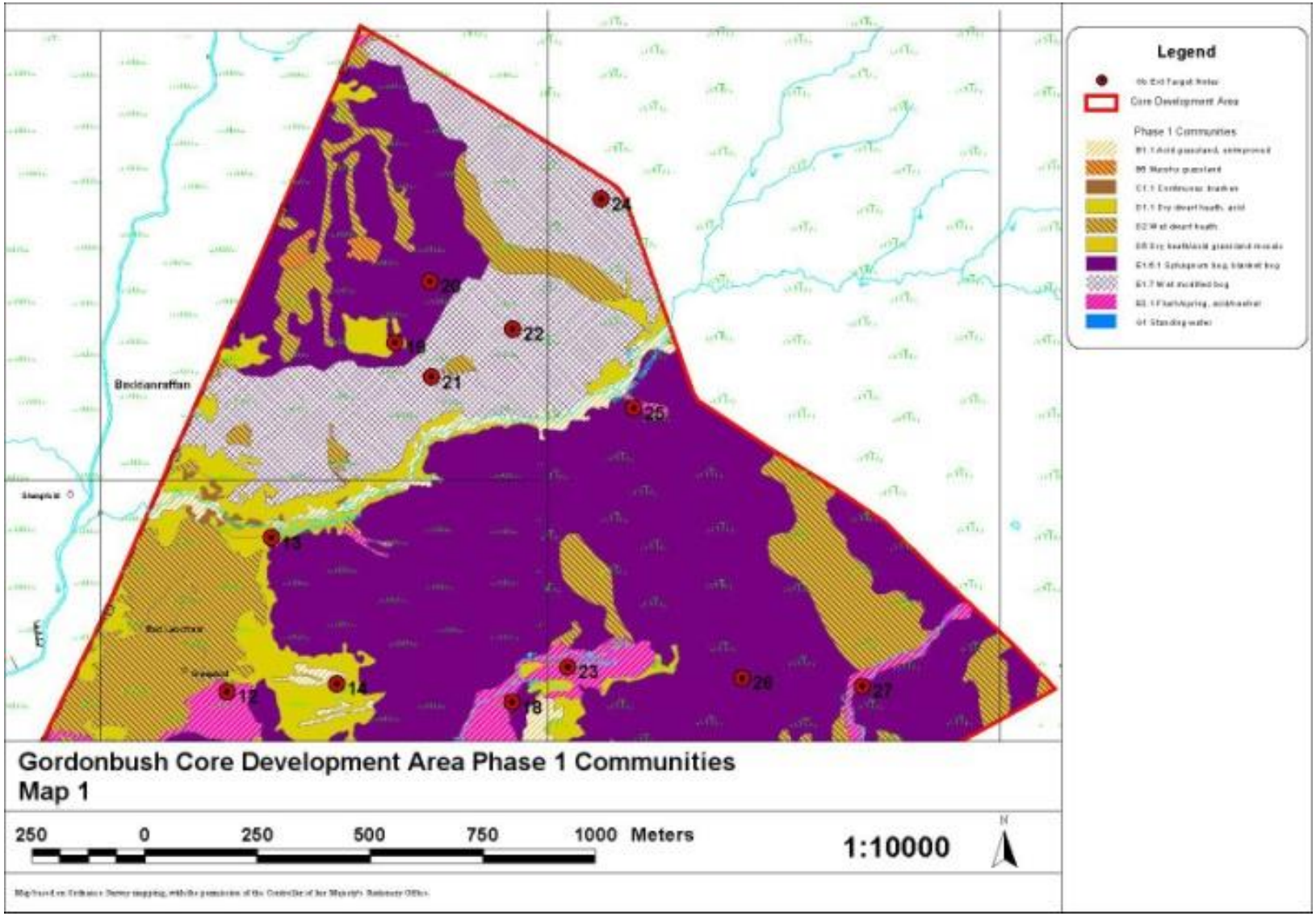
APPENDIX I: TARGET NOTES

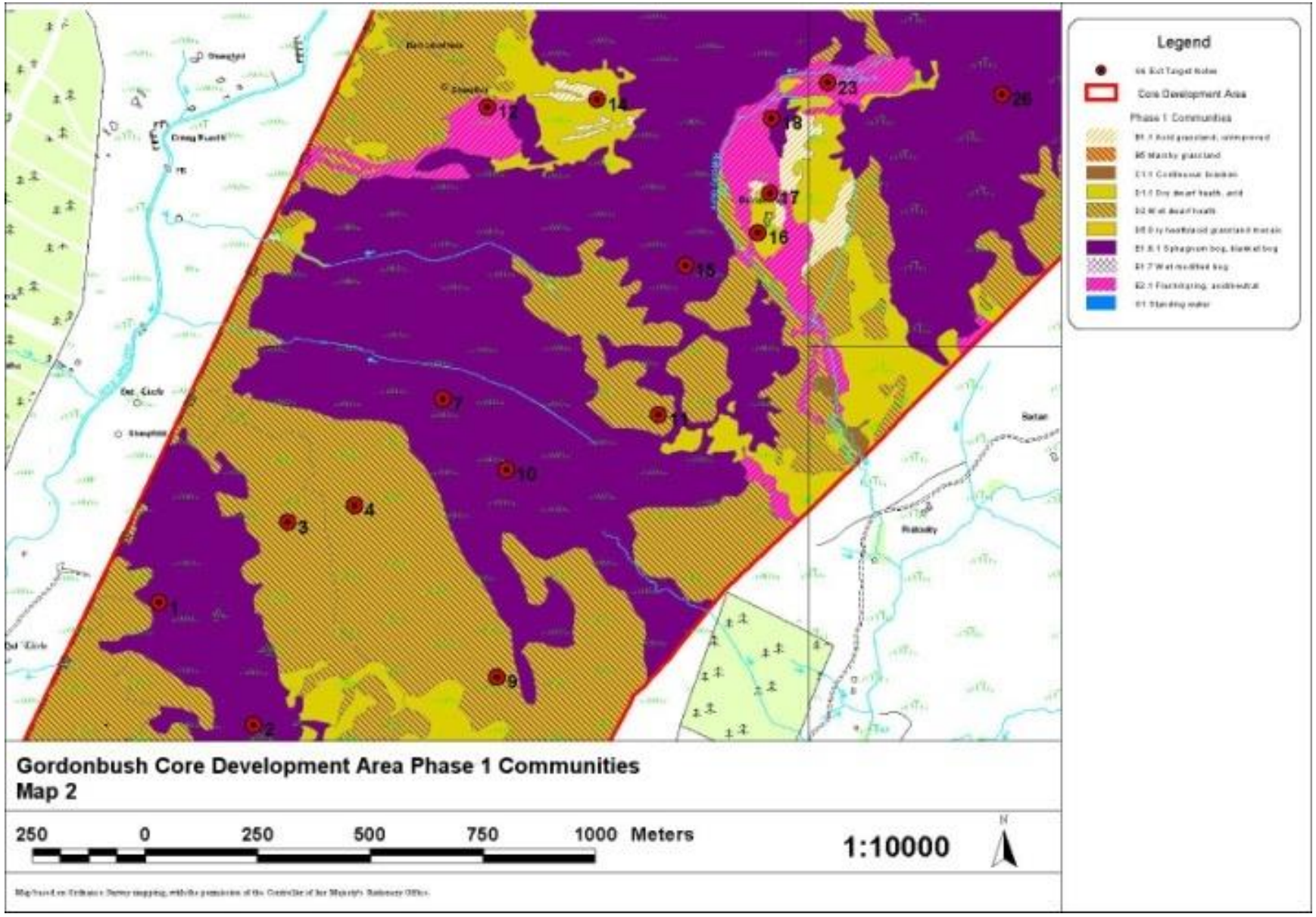
NO	10 fig grid ref	Target note
1	NC8356012431	Cut over M17a blanket bog dominated by *Eriophorum vaginatum, Trichophorum germanicum, Erica tetralix* and *Calluna vulgaris*. Drier ridges are dominated by *Calluna vulgaris, Molinia caerulea* and *Aulacomnium palustre.*
2	NO8377012160	Mature stands of heather affected by heather beetle.
3	NO8384512609	Hybrid community of dry M15 wet heath and H10 dry heath over previously burnt areas. Dominated by *Calluna vulgaris, Erica tetralix* and *Trichophorum germanicum.*
4	NO8399412647	Dry M15 wet heath largely dominated by *Trichophorum germanicum.*
5	NO8408711781	Old peat cuttings support M17a blanket bog with *E. vaginatum, E. angustifolium, E. tetralix, C. vulgaris, N. ossifragum, M. gale, S. papillosum, S. capillifolium, S. tenellum, D. rotundifolia.*
6	NO8413911713	Small pool with *Eleocharis palustris*, *Carex rostrata* and *Potentilla palustris*. Surrounded by M6c *Juncus effusus* flushing.
7	NO8419012883	Good quality M17a bog despite drainage ditches. Good Sphagnum cover including *S. papillosum*.
8	NO8423112033	Patchy dry heath with *C. vulgaris, E. angustifolium, T. germanicum, E. tetralix* over *Hypnum cupressiforme* and *Pleurozium schreberi* derived from burning.
9	NO8431012266	Further dry wet heath with *T. germanicum* dominant.
10	NO8433012727	Mature stands of heather affected by heather beetle.
11	NO8466812848	Dry wet heath derived from burning dominated by *Trichophorum germanicum*with*C. vulgaris* and *E. tetralix* over *Hypnum* and a little *Cladonia*. No *Sphagnum*.
12	NO8428813531	Sedge rich flushed area dominated by *Juncus effusus*, *Juncus acutiflorus, Carex nigra* & *Carex echinata*. Acid-neutral flushing.
13	NO8438613872	South facing slopes support H10 dry heath and bracken. The valley floor supports U4 acid grassland with bracken. North facing slopes support H12 dry heath with bracken and scattered rowan trees.
14	NO8453213548	Species poor dry heath previously burnt. Dominated by *Calluna vulgaris* with *Deschampsia flexuosa, Trichophorum germanicum, Potentilla erecta, Hypnum cupressiforme, Hylocomium splendens* and *Erica tetralix*. Hybrid dry wet heath/dry heath community.
15	NO8472713180	Mature stands of heather affected by heather beetle.

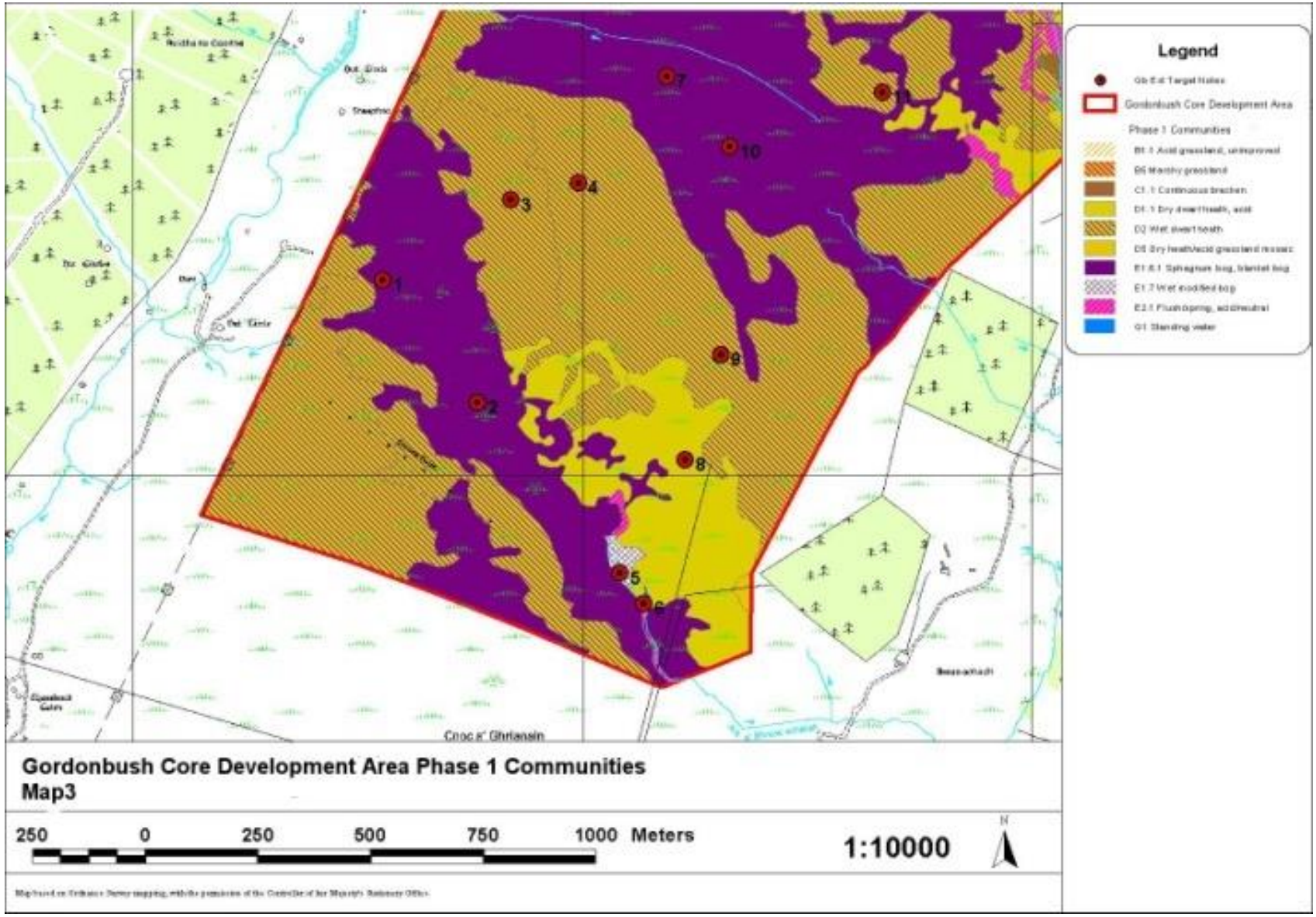
16	NO8488913253	Hybrid wet heath/dry heath community dominated by *Calluna vulgaris, Trichophorum germanicum, Erica tetralix and Eriophorum angustifolium over Hypnum* moss. Species poor, derived from burning.
17	NO8491413341	M6 flushing surrounded by U4/U6 grassland dominated by *Juncus squarrosus, Agrostis capillaris, Anthoxanthum odoratum, Carex nigra, Luzula multiflora, Galium saxatile, Potentilla erecta* and *Deschampsia flexuosa.*
18	NO8491913507	Further M6c acid flushing.
19	NO8466114305	Dry/wet heath hybrid, species poor, burnt with *Calluna vulgaris, Trichophorum germanicum, Erica tetralix, Eriophorum angustifolium, Pleurozium schreberi, Hypnum cupressiforme, Juncus squarrosus* and *Narthecium ossifragum.*
20	NO8473814441	Relatively undisturbed M17a blanket bog with *Sphagnum fuscum* and *Drosera anglica.*
21	NO8474214229	Drier, drained M17a blanket bog where *Calluna* more dominant.
22	NO8492114335	M17a bog becoming more alpine in character with increasing amounts of *Racomitrium lanuginosum* and *Cladonia portentosa*. Also *Pleurozia purpurea.*
23	NO8504313585	Flushed area dominated by Juncus effusus, Sphagnum fallax, Sphagnum palustre, Carex nigra. Surrounded by sedge rich U4 grassland.
24	NO8511614623	Dry wet heath/blanket bog hybrid with areas dominated by *T. germanicum and E. Angustifolium* and others by *E. vaginatum, C. vulgaris, E. tetralix, S. papillosum with P. purpurea, R. lanuginosum, D. anglica*
25	NO8519014160	M6c acid flush dominated by *Juncus effusus*, *Sphagnum fallax* with a little *Carex rostrata*.
26	NO8542713560	Relatively undisturbed M17a blanket bog with good Sphagnum cover including *Sphagnum papillosum, Pleurozia purpurea* and *Drosera anglica.*
27	NO8569313542	M6c acid flush dominated by *Juncus effusus, Sphagnum fallax*. Water Vole habitat.

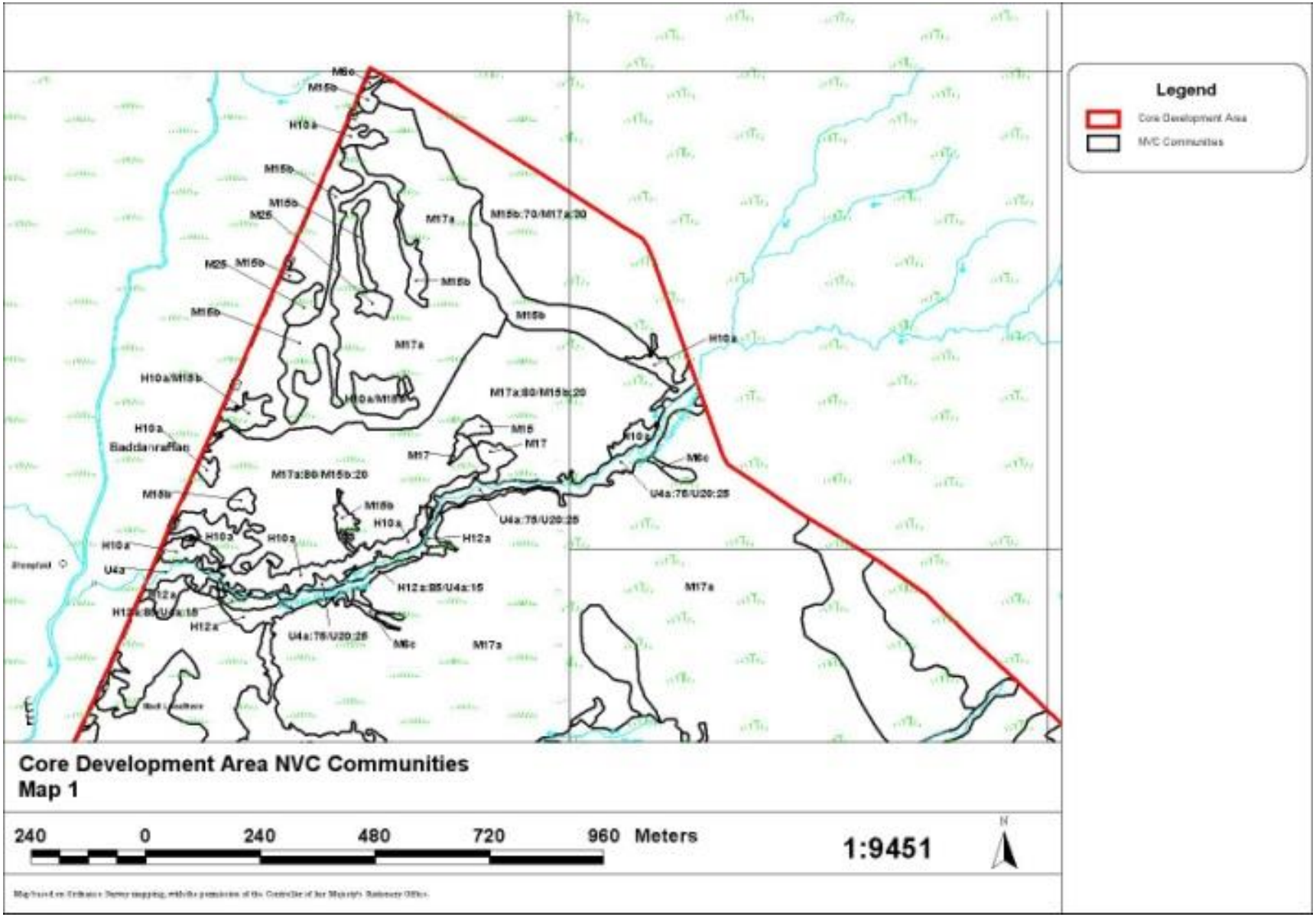
APPENDIX II: VEGETATION MAPS

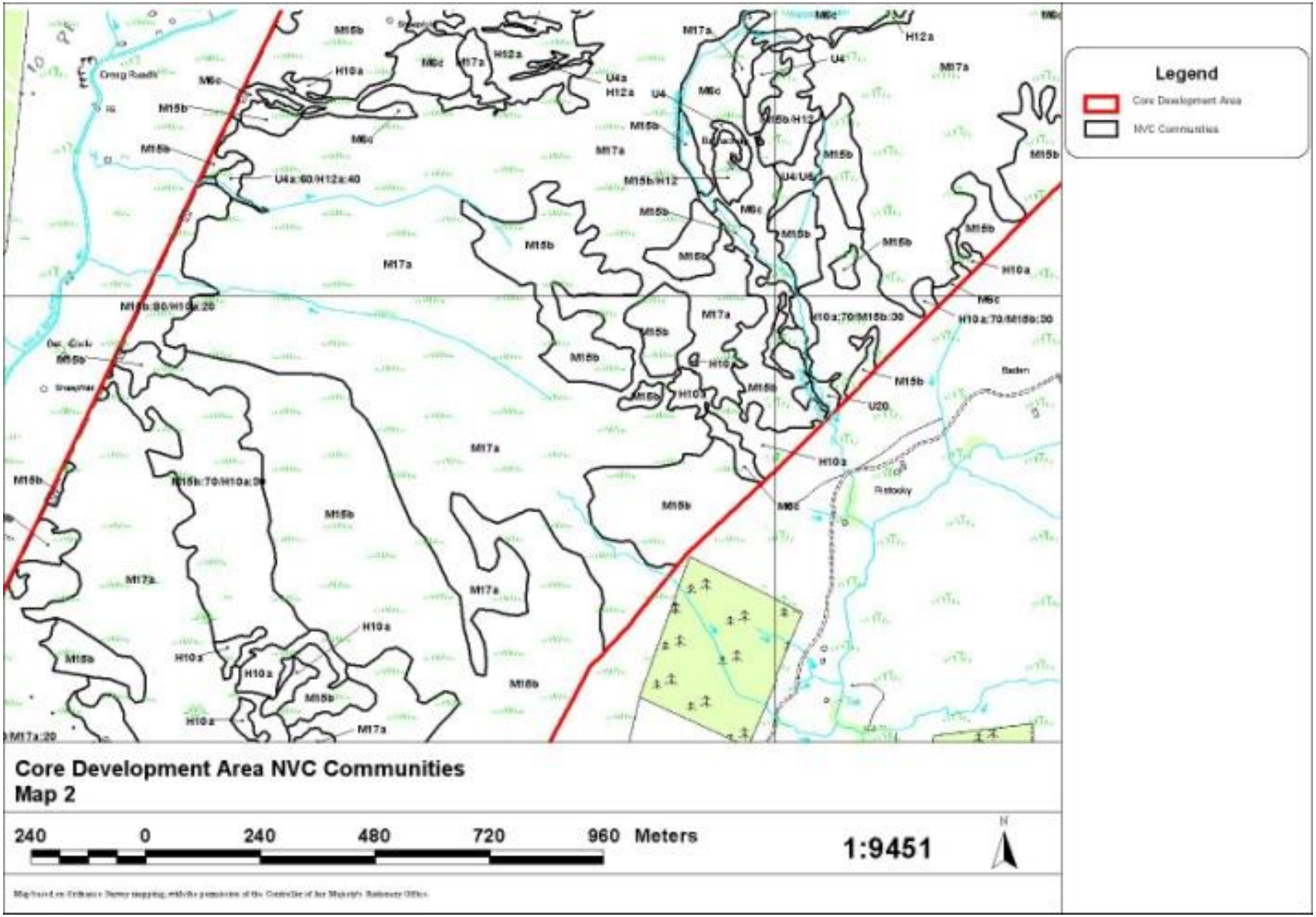
- Phase 1 Habitat & Target Note Maps
- NVC Maps
- Ground Water Dependent Terrestrial Ecology Map

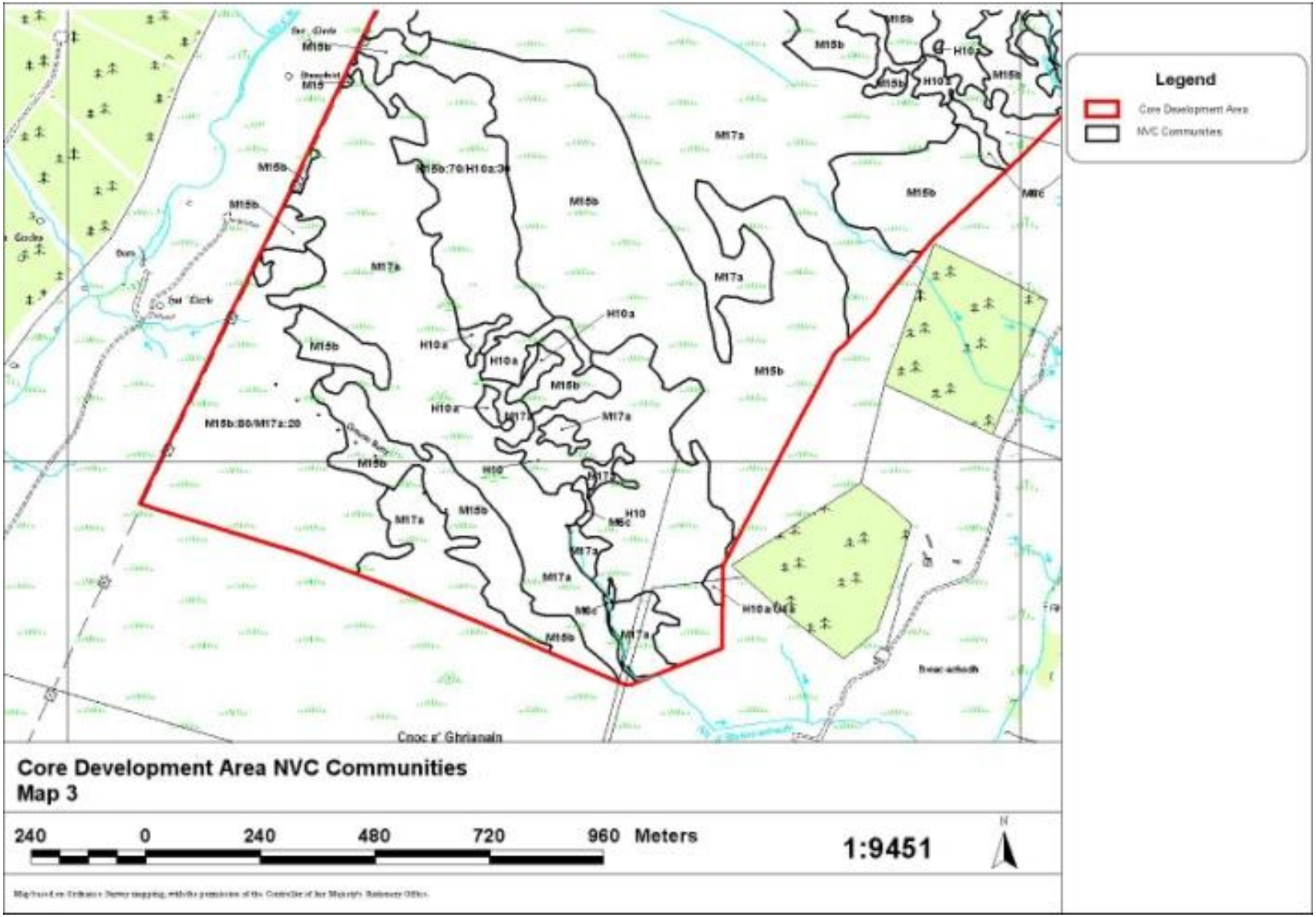

Legend
Core Development Area
Phase 1 Communities
Beckanraffan
24
20
22
19
21
25
13
23
26
27
12
14
18
Gordonbush Core Development Area Phase 1 Communities
Map 1
250 0 250 500 750 1000 Meters
1:10000
N

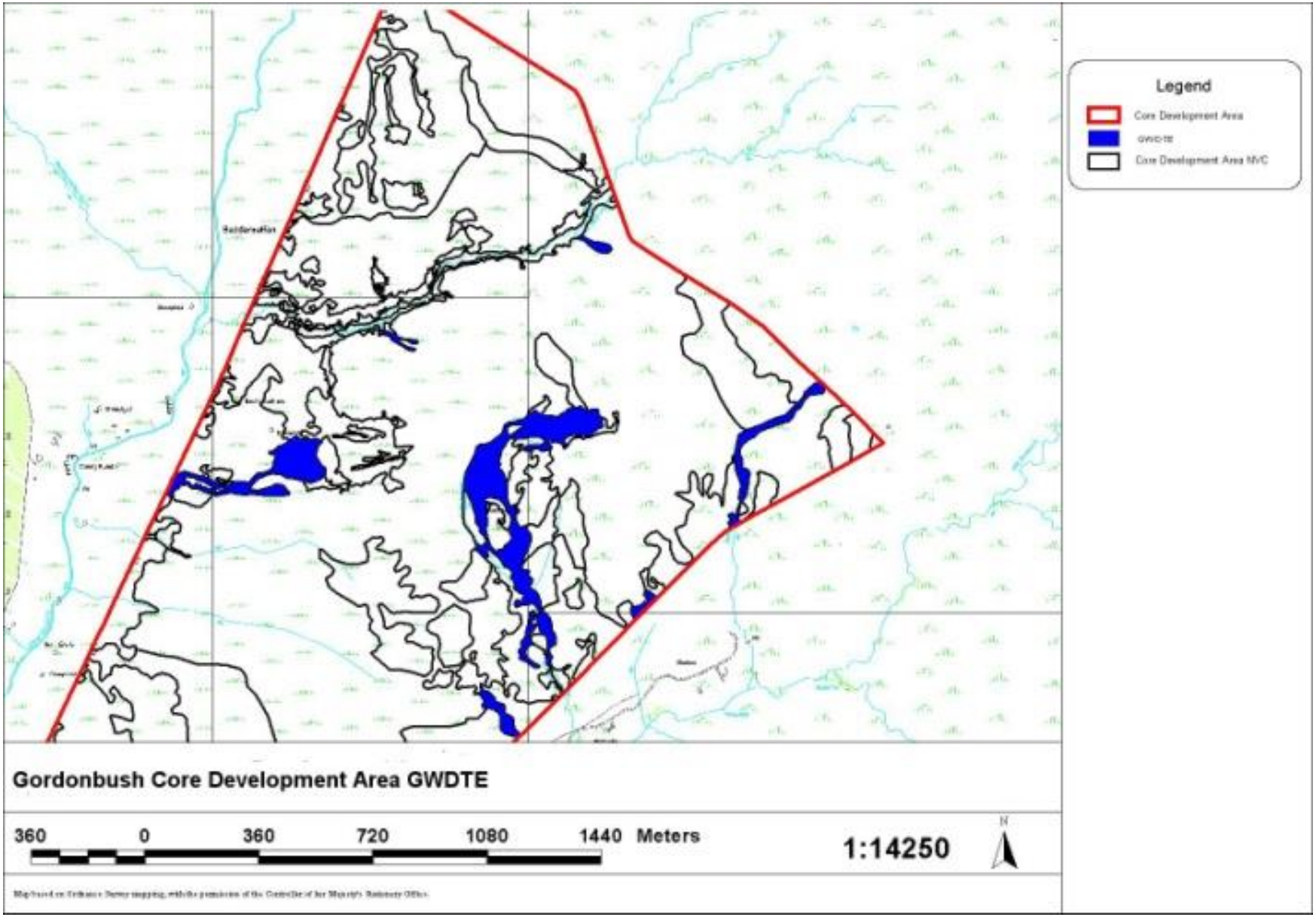

Legend
Core Development Area
Phase 1 Communities
Gordonbush Core Development Area Phase 1 Communities
Map 2
250 0 250 500 750 1000 Meters
1:10000
N

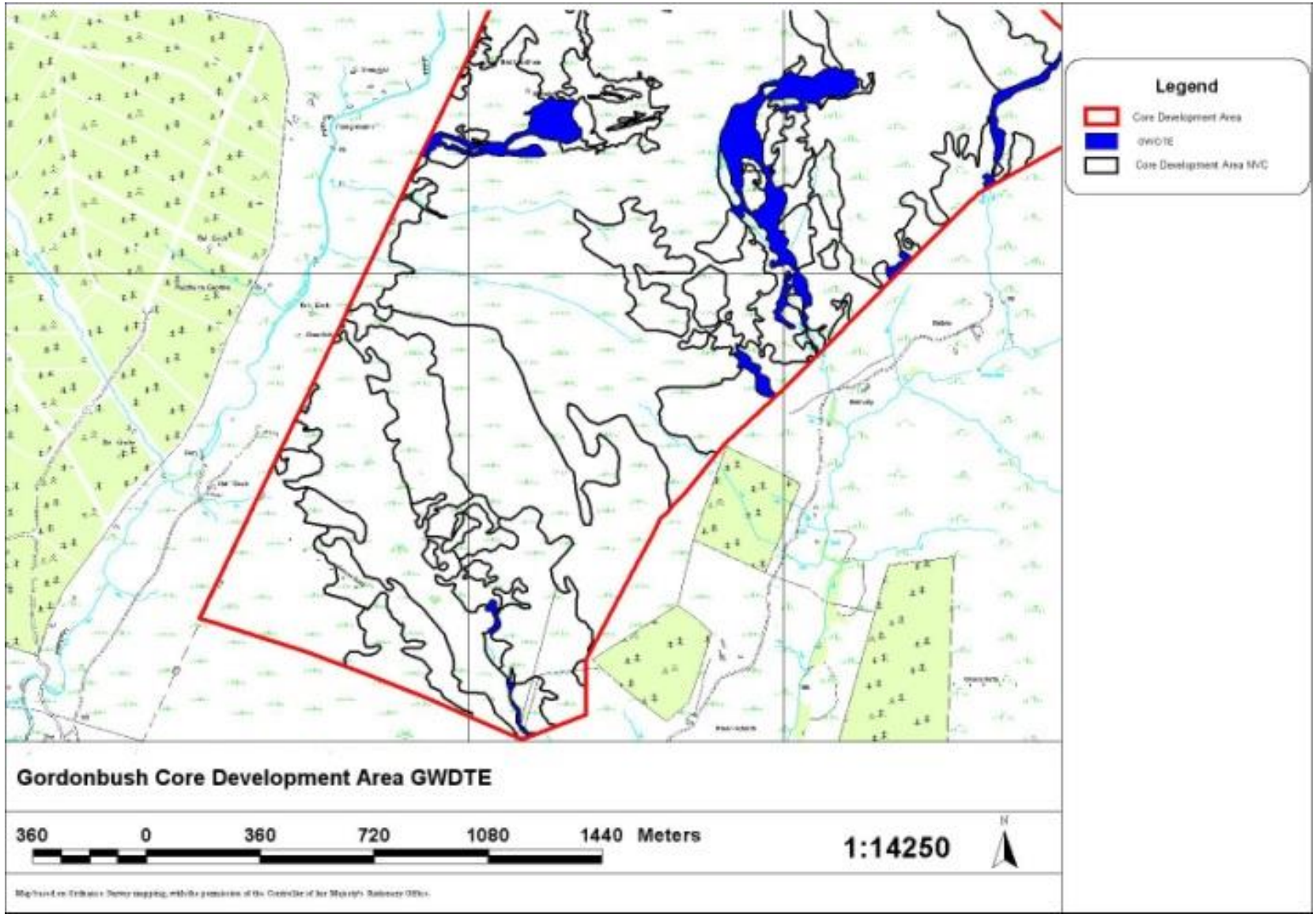

Legend
Gordonbush Core Development Area
Phase 1 Communities
Gordonbush Core Development Area Phase 1 Communities
Map3
250 0 250 500 750 1000 Meters
1:10000
N


Legend
Core Development Area
NVC Communities
M15b
H10a
M25
M17a
M15b:70/M17a:30
M17a:80/M15b:20
M15
M17
Baddanraffan
U4a:75/U20:25
H12a
H12a:85/U4a:15
Core Development Area NVC Communities
Map 1
240 0 240 480 720 960 Meters
1:9451
N


Legend
Core Development Area
NVC Communities
Core Development Area NVC Communities
Map 2
240 0 240 480 720 960 Meters
1:9451
N


Legend
Core Development Area
NVC Communities
M15b
M17a
H10a
M15b:70/H10a:30
M15b:80/M17a:20
Cnoc a' Ghrianain
Core Development Area NVC Communities
Map 3
240 0 240 480 720 960 Meters
1:9451
N


Legend
Core Development Area
GWDTE
Core Development Area NVC
Gordonbush Core Development Area GWDTE
360 0 360 720 1080 1440 Meters
1:14250
N


Legend
Core Development Area
GWDTE
Core Development Area NVC
Gordonbush Core Development Area GWDTE
360 0 360 720 1080 1440 Meters
1:14250
N