

moray offshore renewables ltd

Environmental Statement

Technical Appendix 4.7 A - Terrestrial Ecology Technical Report

Telford, Stevenson, MacColl Wind Farms
and associated Transmission Infrastructure
Environmental Statement



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1. Introduction

This Technical Appendix describes terrestrial ecology baseline conditions derived from desk study and contemporary field surveys (2011) specifically associated with onshore elements of the transmission infrastructure of the MORL Zone as described in the Telford, Stevenson and MacColl Wind Farms and Associated Transmission Infrastructure Environmental Statement:

- Baseline field survey methodology for breeding bird, phase 1 habitat, protected species, bat roost and habitat suitability, and freshwater pearl mussel surveys;
- Baseline desk study results from Seabird 2000, WeBS (Wetland Bird Survey), RSPB (Royal Society for the Protection of Birds), wintering pink-footed goose assessment, the NE LBAP (Northeast Local Biodiversity Action Plan) and the NBN (National Biodiversity Network); and
- Baseline field survey results from breeding bird, phase 1 habitat, protected species and bat roost and habitat suitability.

A summarised account of this information is provided in ES Chapter 4.7 – Terrestrial Ecology. Badger sett results are provided in Technical Appendix 4.7 B Terrestrial Ecology Confidential Appendix.

2. Conservation Designations

Nine conservation designations accompany species and habitat records throughout this report:

2.1 Habitats Directive

European Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (EU Habitats Directive) was adopted in 1992 in response to the Bern Convention. This Directive is transposed into UK law by the Conservation of Habitats and Species Regulations 2010 (together with the Conservation (Natural Habitats, &c.) Regulations 1994). The Directive requires Member States to maintain habitats listed on Annex I at a favourable conservation status through a network of SACs (Special Areas of Conservation).

2.2 Birds Directive

The European Union meets its obligations for birds through Directive 2009/147/EC (EU Birds Directive) on the conservation of wild birds (codified version of the European Council Directive 79/409/EEC as amended). This legislation was adopted in 1979 in

response to increasing concern about declines in Europe's wild birds. The Directive emphasises the protection of habitat for endangered and migratory birds listed on Annex I through a network of SPAs (Special Protection Areas).

2.3 Conservation of Habitats and Species Regulations 2010

In Scotland, the Conservation of Habitats and Species Regulations 2010 (together with the Conservation (Natural Habitats, &c.) Regulations 1994) transpose the Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) into UK law. The Regulations protect European sites and European protected species. The Regulations make it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in rare and endangered animals listed on Schedule 2.

2.4 Wildlife and Countryside Act 1981

The Wildlife and Countryside Act 1981 consolidates existing national legislation to implement the Bern Convention and Birds Directive in the UK. The Act received royal assent in 1981. It protects native species, controls the release of non-native species, enhances the protection of SSSIs (Sites of Special Scientific Interest) and builds upon rights of way rules. Special penalties are available for offences related to rare and endangered birds, listed on Schedule 1, and animals, listed on Schedule 5.

2.5 Birds of Conservation Concern

The population status of UK birds is reviewed every five years to provide an up-to-date assessment of conservation priorities. The 2009 review of Birds of Conservation Concern (BoCCs) allocated 246 species onto red, amber or green lists. Seven quantitative criteria were used to assess population status: global conservation status, recent decline, historical decline, European conservation status, rare breeders, localised species and international importance.

2.6 UK BAP Priority Habitats and Species

The UK BAP (UK Biodiversity Action Plan), published in 1994, is the UK's response to the Convention on Biological Diversity (CBD) which the UK signed in Rio de Janeiro in 1992. Action plans for the most threatened habitats and species have been written to aid recovery. The current list of UK BAP priority habitats and species, reviewed in 2007, contains 65 habitats and 1,150 species. Selection of this list followed consideration by expert working groups against a set of criteria based on international importance, rapid decline and high risk.

2.7 Protection of Badgers Act 1992

Badgers are protected by the Protection of Badgers Act 1992, which consolidates previous legislation. Under the Act, it is an offence to kill, injure or take a badger; dig for a badger; cruelly ill-treat a badger; possess or control a dead or live badger; damage or destroy a badger sett (obstruct access, cause a dog to enter the sett, or disturb a badger while it is occupying the sett). Licenses to undertake some actions can be issued from SNH (Scottish Natural Heritage) if justified.

2.8 Scottish Biodiversity List

The SBL (Scottish Biodiversity List), published in 2005, is a list of flora, fauna and habitats which Scottish Ministers consider to be important for Scottish biodiversity conservation. The list was developed by a partnership of organisations, specifically, the Scottish Biodiversity Forum as well as the Scottish public. The criteria include scientific criteria as well as a social criterion of culturally important species and habitats based on a survey of the Scottish public.

2.9 NE LBAP Priority Habitats and Species

The NE LBAP aims to protect and enhance local biodiversity across Aberdeen, Aberdeenshire and Moray. Formed in 1996, it is a partnership of statutory and voluntary agencies and individuals. The NE LBAP develops Local Action Plans which set out measures to conserve priority habitats and species. Once published, plans are implemented and periodically reviewed.

3. Baseline Field Survey Methodology

3.1 Baseline Field Survey Management

Baseline field surveys were carried out from May to September 2011 to quantify use of the onshore cable route by breeding birds, protected mammals and freshwater pearl mussel, and to map habitats and assess their potential to support bats. The onshore cable route included a 250 m buffer which formed the 'ecology survey area'. This totalled 44.5 km² and was used throughout the baseline field surveys (except the breeding bird survey, Section 3.3). To facilitate management of the baseline field surveys, the ecology survey area was overlaid by 43 x 2km² 'ecology survey tiles' (Figures 1 and 2).

3.2 SNH Guidance on Determining Baseline Ecology

During a meeting between MORL and SNH on 28 February 2011, SNH gave the following guidance to determine the baseline ecology of the onshore cable route:

3.2.1 Baseline Desk Study

SNH advised that baseline desk study of all protected species be carried out using the following organisations:

- WeBS;
- RSPB; and
- NBN.

SNH recommended that baseline desk study be carried out of potential disturbance to wintering geese using data from local goose management schemes.

3.2.2 Baseline Field Surveys

SNH advised that the following baseline field surveys be carried out:

- Phase 1 habitat survey (to include consideration of peat habitats);
- Protected species surveys for otter, badger, water vole, red squirrel, Scottish crossbill and bats; and
- Freshwater pearl mussel survey of the River Ugie.

A targeted baseline field survey for Scottish crossbill was not thought necessary after phase 1 habitat survey results revealed limited extent of suitable coniferous woodland habitat. Also, a targeted baseline field survey for bats was delayed until a more precise cable route location had been selected.

SNH suggested that baseline field surveys for wildcat and pine marten were unlikely to be necessary. Indeed, phase 1 habitat survey results revealed limited extent of suitable coniferous woodland habitat, hence surveys for these protected species were not carried out. SNH confirmed that baseline field surveys for great crested newt and reptiles would not be required.

3.3 Breeding Bird Survey Methodology

Breeding bird surveys were carried out from 10 May to 01 July 2011 (Figure 1 and Appendix A).

RSPB were consulted on desk study approach and baseline field survey methodology (Table 1 and Appendix B).

Table 1. RSPB baseline consultation

Organisation	Consultation response
Kathleen Sinclair, Assistant Conservation Officer for Northeast Scotland, RSPB	Recommended consideration of breeding herring gulls at Bullers of Buchan near Boddam, which forms part of Buchan Ness to Collieston Coast SPA (Appropriate Assessment may be required if construction takes place during breeding season) (19 July 2011).

When this survey was commissioned in early May 2011, the onshore cable route was 1 km wide throughout its length. Two parallel transects ran the length of the route, 500 m apart, and surveyors walked each transect and recorded ornithological activity 250 m to the left and right, thus covering the 1 km width of the route. This methodology progressed for rounds 1, 2 and 3 of the breeding bird survey. A round comprised a visit to each ecology survey tile in the ecology survey area. However on 16 June 2011, towards the end of round 3, the onshore cable route was widened in some areas to allow for inclusion of additional route options within the preliminary onshore export cable design. These areas were called 'additional survey areas' and new transects were established to capture them. These areas were surveyed during round 3 only, where possible. The onshore cable route prior to the 16 June 2011 widening, plus the additional survey areas, became the ecology survey area used for all subsequent baseline field surveys.

No additional breeding bird surveys were carried out in 2012 given the timescales for the completion of the ES. However the onshore cable route habitats are relatively homogenous (Section 5.2) and the breeding bird assemblage is typical of such habitats (Section 5.1). The main key species, corn bunting, breeds late in the season (Section 4.2) and therefore it is considered that the 2011 breeding bird survey data are sufficiently robust to represent the ornithology of the onshore cable route.

The breeding bird survey followed CBC (Common Bird Census) methodology (Gilbert *et al.*, 1998; Marchant, 1983). The survey was carried out from 1 hr before dawn to 6 hrs after dawn and three rounds of the survey were completed (apart from the additional survey areas which were surveyed during round 3 only, where possible). The survey was undertaken in good visibility, avoiding persistent rain or fog, excessive cold or heat, and wind exceeding Beaufort force 4. The location and behaviour of all birds were recorded directly onto 1:10,000 Ordnance Survey maps using standard BTO (British Trust for Ornithology) notation.

In the office, records were digitised using GIS software and territory analysis was carried out on the resulting maps. Birds were assumed to be holding territory if one or more of the following behaviours were observed:

- Displaying or singing;
- Presence of a nest, eggs or young (including newly-fledged);

- Agitated behaviour, specifically, alarm calls or distraction display; and/or
- A territorial dispute.

In the absence of any of these behaviours, a pair observed together in suitable habitat was considered to be holding a territory. Other records were considered to be non-breeding birds.

Within rounds, multiple records of the same species were considered to be either the same or different bird(s) using professional judgement. This was done by examining the information recorded by surveyors, as well as known variations in territory size of species in different habitats.

Where surveyors had not recorded whether multiple records of the same species were the same or different bird(s), a separation distance appropriate to the species was applied. Multiple records within this distance were considered to be the same bird(s), while multiple records beyond this distance were considered to be different bird(s).

Overall estimation of the number of territories was undertaken by examining records from the three survey rounds and employing professional judgement. For skylark, the round with the highest number of singing males was used. For meadow pipit, round 1 was used (during this round fledged juveniles would not yet be visible) to calculate density of pairs per km².

3.4 Phase 1 Habitat Survey Methodology

This survey was carried out from 18 to 26 July 2011 (Figure 2 and Appendix C).

This survey defined phase 1 habitat type and extent across the 44.5 km² of the ecology survey area following standard JNCC (Joint Nature Conservation Committee) (2010) guidelines. The phase 1 habitat classification and associated field survey technique provides a relatively rapid system to record semi-natural vegetation and other wildlife habitats. Each habitat type is defined by way of a brief description and is allocated a specific name, alpha-numeric code and unique mapping colour. The system has been widely used and continues to act as the standard phase 1 technique for habitat survey across the UK. The ecology survey area was walked, habitats were inspected and delineated directly onto 1:10,000 Ordnance Survey maps using standard phase 1 alphanumeric notation. Target notes (TNs) were made to highlight features of interest or any aspect too small to be mapped, these were supported by photos and GPS coordinates. Target notes are referred to throughout the text and in figures by a sequential number prefixed with TNE or TNT, e.g. TNE17 or TNT3. Where designated conservation sites, areas of high biodiversity or peat in the superficial geology were encountered, these were

mapped to NVC (National Vegetation Classification) level (Rodwell, 1991-2006; Rodwell, 2006) using 2x2 m quadrats. For peat in the superficial geology, depth was measured <50 cm and >50 cm to aid classification of phase 1 and NVC bog categories.

3.5 Protected Species Survey Methodology

This survey was carried out from 18 July to 31 August 2011 (Figure 2 and Appendix D).

Field evidence of the following protected species was searched for across the 44.5 km² of the ecology survey area:

- Otter;
- Badger;
- Water vole; and
- Red squirrel.

3.5.1 Otter

All safely accessible watercourses in the ecology survey area were searched for field evidence of otter. Evidence was recorded directly onto 1:10,000 Ordnance Survey maps. Photos and GPS coordinates were taken to support recordings made on maps. Otter field evidence recorded is as described by Bang and Dahlstrøm (2001) and SNH (2008):

- **Holts:** these are underground features where otters live. They can be tunnels within banksides, underneath rootplates or boulder piles, and even man-made structures such as disused drains. Holts are used by otters to rest during the day and are the usual site of natal or breeding sites. Otters may use holts permanently or temporarily;
- **Couches:** these are above-ground resting sites. They may be partly sheltered or fully exposed. Couches may be regularly used, especially in reedbeds and on in-stream islands. They have been known to be used as natal and breeding sites. Couches can be very difficult to identify, sometimes consisting of no more than an area of flattened grass or earth, and are best identified by the presence of other field evidence (e.g. spraints). Where rocks or rock armour are used as couches, these can be almost impossible to identify without observing the otter in-situ;
- **Feeding evidence:** the remains of prey items may be found at preferred feeding stations. Remains of fish, crabs or skinned amphibians can indicate the presence of otter;
- **Spraints:** otter faeces can be used to mark territories, often on in-stream boulders. They can be present within or outside the entrances of holts and couches. Spraints have a characteristic smell and often contain fish remains;

- **Prints:** otters have characteristic footprints that can be found in soft ground and muddy areas;
- **Paths:** these are terrestrial routes that otters take when moving between resting sites and watercourses, or at high flow conditions when they will travel along bank sides in preference to swimming; and
- **Slides and play areas:** slides are typically worn areas on steep slopes where otters slide on their bellies, often found between holts/couches and watercourses. Play areas are used by juvenile otters in play, and are often evident by trampled vegetation and the presence of slides. These are often positioned in sheltered areas adjacent to the natal holt.

3.5.2 Badger

All suitable habitat in the ecology survey area was searched for field evidence of badger. Evidence was recorded directly onto 1:10,000 Ordnance Survey maps. Photos and GPS coordinates were taken to support recordings made on maps. Badger field evidence recorded is as described by Neal and Cheeseman (1996), Bang and Dahlstrøm (2001) and SNH (2001):

- **Setts:** these are wider than they are tall with a flattened bottom, they are typically 30 cm across;
- **Spoil heaps:** these are heaps of earth excavated by badgers. Material is often coarse due to badgers' large paws and claws, and heaps may contain scratched rocks, badger remains or hairs. Spoil heaps outside entrances of a well-established sett can be very large, and often have a well-defined furrow or groove from sett entrance to spoil heap;
- **Foraging signs:** badgers often dig 'snuffle holes' for worms or soil-dwelling grubs. These are typically conical in shape, 10-15 cm across, with material dug out on more than one side. Badgers also occasionally dig up wasps' and bees' nests in late summer;
- **Latrines:** these are small pits similar to snuffle holes which contain badger faeces. Faeces can be soft and muddy in appearance, or contain wing cases of insects, husks of grain or stones/pips of berries. Latrines are often, though not always, found close to setts and can comprise one to more than a dozen pits. Importantly, they are also used as territorial boundary markers;
- **Prints:** badger prints are very distinctive, with a broad, kidney-shaped pad and five toes lined up at the front. Fore prints (4.5-6.5 cm across) are larger than hind prints (4.0-5.0 cm across), and the imprints of claw ends are further away from the toes on fore prints as the claws are much longer;
- **Runs:** well-used badger runs are often very conspicuous. Runs typically link between sett entrances, or lead away from a sett towards foraging grounds or other setts. They can also be found well away from setts, often where badgers cross roads or go through gaps beneath fences;

- **Scratching posts:** setts often have one or more scratching posts nearby, the bark on the trees will be scored, shredded or completely removed up to a height of 1 m; and
- **Hair:** these are white or whitish with a black band towards the tip. They are 7-10 cm long, the black band is 1-2 cm and the white tip is about 1 cm, they are quite coarse and oval in cross-section. Hairs are often found stuck in brambles or barbed wire fences.

3.5.3 Water Vole

All suitable habitat in the ecology survey area was searched for field evidence of water vole. Evidence was recorded directly onto 1:10,000 Ordnance Survey maps. Photos and GPS coordinates were taken to support recordings made on maps. Water vole field evidence includes:

- **Burrows:** these are wider than they are tall, 4-8 cm across and usually surrounded by characteristic grazed 'lawns'. There may be droppings near burrow entrances, but no spoil heaps;
- **Feeding stations:** these are often located along runs or haul-out platforms at the water's edge. At the base of vegetation, they consist of neatly clipped stems of grass, sedge or rush up to 10 cm long with grooved teeth marks at the cut ends;
- **Latrines:** these are typically found at prominent points along watercourses such as flat stones or bare earth. They contain lozenge-shaped droppings, approximately 8-12 mm long and 4-5 mm wide. Fresh droppings are greenish, changing to black when older;
- **Prints:** these are star-shaped, although hard to tell apart from prints of brown rat; and
- **Runs:** these usually occur within 3 m of a watercourse. They are low tunnels pushed through vegetation, 5-9 cm across and branching, linking the watercourse with feeding areas and burrow entrances.

3.5.4 Red Squirrel

All suitable habitat in the ecology survey area was searched for field evidence of red squirrel. Evidence was recorded directly onto 1:10,000 Ordnance Survey maps. Photos and GPS coordinates were taken to support recordings made on maps. Coniferous forests were targeted, particularly those containing Scots pine, and were inspected for the presence of dreys and feeding evidence, specifically, stripped pine cones.

3.6 Bat Roost and Habitat Suitability Survey Methodology

This survey was carried out from 18-26 July 2011 in parallel with the phase 1 habitat survey (Figure 2 and Appendix C).

Potential habitat suitability for bats was assessed across the 44.5 km² of the ecology survey area. As surveyors walked the ecology survey area recording phase 1 habitats, habitats were also considered for their potential suitability to support roosting, foraging or commuting bats. Surveyors categorised habitats to be of high, medium or low suitability for bats, based on roosting, foraging or commuting suitability criteria (Table 2). Thus, potential bat roosts (buildings, bridges, mature trees), commuting routes (linear features such as hedgerows and lines of trees) and foraging habitat (water bodies, marshy grassland, cow fields) were classed to be of low, medium or high value. Photos, target notes and GPS coordinates were taken to support recordings made on maps. In the office, habitat suitability was digitised using GIS software and overlain onto aerial imagery. Interpretation notes were made based on the target notes and habitat suitability. A future, targeted baseline field survey for bats was then recommended.

Table 2. Bat habitat suitability criteria

Potential habitat suitability	Roosting habitat	Foraging habitat	Commuting habitat
High	Woodlands: any trees with roost potential – cracks, crevices and other gaps. Diverse choice of roosts. Caves, tunnels, mines and ice houses with humid atmospheres and sheltered, stable temperature conditions. Low disturbance.	High insect abundance. Native woodland, trees and hedgerows offering abundant shelter and diverse edge habitat. Slow flowing or still freshwater features with sheltered, vegetated edges. Low disturbance from lighting, pollutants and human activity. Pasture fields with cows.	Continuous, unbroken linear features (with little or no artificial lighting present) providing shelter and/or foraging opportunities and connectivity with other landscape features including roosting and foraging habitat. Includes treelines, woodland edge, hedgerows, waterways, walls, woodland tracks, road and drainage networks and buildings.
Medium	Roost sites and access points in cracks, crevices and gaps present, but not ideal due to size, disturbance, exposure.	Moderate insect abundance. Native woodland, trees and hedgerows offering some shelter and edge habitat. Fast flowing freshwater features offering some sheltered edges.	Partly discontinuous features offering some shelter and/or foraging opportunities. Continuous features with some form of artificial lighting.

Potential habitat suitability	Roosting habitat	Foraging habitat	Commuting habitat
Low	<p>No suitable roost sites or access points visible.</p> <p>Less than one tree in 100 has roost potential due to age or species.</p> <p>High disturbance.</p> <p>Direct lighting on features.</p>	<p>Coniferous woodland, improved agriculture and built-up areas with low plant diversity and/or insect abundance.</p> <p>Lack of shelter, poorly connected to roost sites and commuting routes.</p> <p>High disturbance levels from lighting, pollutants and human activity.</p>	<p>Discontinuous features offering no shelter and/or isolated from potential roosting and/or foraging areas.</p> <p>Abundant artificial lighting.</p>

3.7 Freshwater Pearl Mussel Survey Methodology

This survey was carried out from 09 August to 04 September 2011 (Figure 3 and Appendix E).

The freshwater pearl mussel habitat suitability and presence/absence survey was carried out along the River Ugie and its tributaries within a 100 m upstream buffer and a 500 m downstream buffer of the onshore cable route. The total length of watercourse within these buffers was 20.2 km. The survey was carried out in bright light, low, clear flow, and in water sufficiently shallow for safe wading. The River Ugie flow regime was above base level during some of the survey period.

An initial bankside survey assessed river substrate to estimate habitat suitability. Freshwater pearl mussel favour gravel substrates, cobbles, crevices, lees of larger boulders and overhanging banks (SNH, 2003). Once an apparently suitable stretch was identified, the river was entered at the nearest point and an in-channel survey carried out. Searches were made using an underwater viewing aid called a bathyscope, in an upstream direction, inspecting favourable sites. Loose debris and trailing weed were moved aside but the river bed was not disturbed. Fast-flowing shallow riffles and slow, deep channels and pools were entered where possible. Some areas could not be safely accessed due to very deep water or silty substrate, however such areas were few and small and thus did not affect assessment of the River Ugie for freshwater pearl mussel. Photos and GPS coordinates were taken to support recordings.

Other river habitat data were recorded:

- Channel type;
- Channel substrate;
- Average channel width and depth;
- Bankside vegetation; and
- Adjacent land use.

SNH and the Ugie Angling Association were consulted to confirm baseline field survey methodology and provide historical records (Table 3 and Appendices F and G).

Table 3. Freshwater pearl mussel consultations

Organisation	Consultation response
Ewan Lawrie, Area Officer for Aberdeenshire (North), and David Law, Senior Casework Manager, both SNH	Recommended that River Ugie should be surveyed for freshwater pearl mussel (28 February 2011).
Dr Iain Sime, Policy and Advice Manager for Freshwater and Wetlands, SNH	Confirmation on freshwater pearl mussel survey methodology (Appendix F) (08 July 2011).
Bob Davidson, River Ugie Water Bailiff, Ugie Angling Association	Provision of freshwater pearl mussel records (09 August 2011).
Bob Davidson, River Ugie Water Bailiff, Ugie Angling Association	Provision of freshwater pearl mussel records (23 August 2011).
Colin McLeod, Data Manager, SNH	Discussion about freshwater pearl mussel records (Appendix G) (31 August 2011).

4. Baseline Desk Study Results

4.1 Coastal Birds Results

4.1.1 Seabird 2000

Relevant seabird breeding colony records were sought from Seabird 2000. Records were received for one colony (Table 4 and Figure 4).

Table 4. Seabird 2000 seabird breeding colony records

Location	Seabird breeding colony
Fraserburgh town	63 pairs of herring gull

Seabird 2000 is a complete census of the entire breeding seabird population of Great Britain and Ireland. It was coordinated by the JNCC in partnership with other organisations such as SNH and RSPB. Beginning in 1998 and completed in 2002, Seabird 2000 counted over 8 million breeding seabirds at 3,300 coastal colonies, 900 inland colonies and 170 islands.

4.1.2 WeBS

Relevant wetland bird count data were sought from WeBS. Records were received for two count sites: Fraserburgh Bay (at the proposed cable landfall area) and Loch of Strathbeg (approximately 2.5 km from the onshore cable route at its nearest point) (Tables 5 and 6 and Figure 4).

Table 5. WeBS wetland bird count data for Fraserburgh Bay count site, one year period from October 2009 to June 2010

Bird species (alphabetical order)	Peak monthly count for year October 2009-June 2010		
	Peak count	Month	No. counts
Bar-tailed godwit	1	Nov	8
Black-headed gull	87	Oct	8
Common gull	15	Oct	8
Cormorant	82	Nov	8
Curlew	16	Jan	8
Dunlin	4	Oct, Nov & Jan	8
Eider	122	Nov	8
Goldeneye	4	Mar	8
Great black-backed gull	278	Dec	8
Great northern diver	2	Jan	8
Grey heron	18	Oct	8
Herring gull	210	Mar	8
Long-tailed duck	2	Jun	8
Mallard	12	Mar	8
Oystercatcher	71	Nov	8
Red-breasted merganser	1	Mar	8
Redshank	92	Nov	8
Red-throated diver	2	Nov	8
Sanderling	13	Nov	8
Shag	30	Jan	8
Turnstone	20	Jan	8

(Data supplied by the Wetland Bird Survey (WeBS), a partnership between the British Trust for Ornithology, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee (the latter on behalf of the Council for Nature Conservation and the Countryside, the Countryside Council for Wales, Natural England and Scottish Natural Heritage) in association with the Wildfowl and Wetlands Trust.)

Table 6. WeBS wetland bird count data for Loch of Strathbeg count site, five year period from July 2005 to June 2010 (species for which mean peak monthly count across five years is <1 are not presented, 'unidentified gull' also not presented)

Bird species (alphabetical order)	Peak monthly count per year														Mean peak monthly count across 5 yrs	
	July 2005-June 2006			July 2006-June 2007			July 2007-June 2008			July 2008-June 2009			July 2009-June 2010			
	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	Peak count	Mont h		No. count s
Arctic tern	2,100	Jul	12	45	Aug	12	1,210	Jul	9	204	Jul	6	38	Jul	4	719.4
Barnacle goose (Svalbard population)	2,168	Oct	12	181	Oct	12	63	Jan	12	62	Oct	10	67	Oct	11	508.2
Bar-tailed godwit	1	Aug	12	0	-	12	0	-	12	3	Sep	10	1	Aug	11	1.0
Black-headed gull	855	Nov	12	414	Apr	12	3,420	Mar	11	200	May	10	354	Jul	9	1,048.6
Black-tailed godwit	15	Sep	12	25	Dec	12	3	Jul	12	23	Aug	10	9	Aug	11	15.0
Common gull	1,060	Nov	12	263	Sep	12	220	Jan	11	89	Mar	7	96	Mar	9	1,728.0
Common sandpiper	1	Jul	12	3	May	12	1	Aug	12	0	-	10	0	-	11	1.0
Common scoter	0	-	12	90	Jun	12	0	-	12	0	-	10	0	-	11	18.0
Common tern	449	Jul	12	375	May	12	554	Jul	9	116	Jul	6	61	Jul	4	311.0
Common/arctic tern	0	-	12	157	Jun	12	110	Jul	9	0	-	6	0	-	4	53.4
Coot	276	Oct	12	194	Oct	12	121	Aug	12	323	Sep	10	393	Nov	11	261.4
Comorant	154	Oct	12	97	Dec	12	121	Feb	12	106	Jul	10	72	Sep	11	110.0
Curlew	788	Jul	12	740	Sep	12	557	Feb	12	550	Oct	10	435	Mar	11	614.0
Dunlin	139	Jan	12	68	Sep	12	32	Aug	12	55	Feb	10	183	Aug	11	95.4
Eider	208	Oct	12	365	Oct	12	102	Mar	12	48	Sep	10	5	Nov & Apr	11	145.6
Gadwall	12	May	12	8	Aug & Apr	12	12	May & Jun	12	19	Apr	10	36	Mar	11	17.4
Garganey	6	Aug	12	1	Jul & May	12	5	May	12	6	May	10	0	-	11	3.6
Golden plover	1,176	Nov	12	3,500	Oct & Dec	12	4,500	Oct	12	579	Oct	10	604	Oct	11	2,071.8
Goldeneye	202	Sep	12	334	Dec	12	146	Aug	12	159	Mar	10	217	Feb	11	211.6
Goosander	8	Feb	12	10	Jan	12	5	Feb, Mar & Apr	12	0	-	10	29	Mar	11	10.4

Bird species (alphabetical order)	Peak monthly count per year														Mean peak monthly count across 5 yrs	
	July 2005-June 2006			July 2006-June 2007			July 2007-June 2008			July 2008-June 2009			July 2009-June 2010			
	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	Peak count	Mont h		No. count s
Great black-backed gull	795	Dec	12	525	Jan	12	171	Nov	11	51	Oct	10	79	May	9	324.2
Great crested grebe	4	Apr	12	6	Aug	12	6	Aug	12	8	Apr & May	10	11	Apr	11	7.0
Great northern diver	1	Nov & May	12	0	-	12	9	Feb	12	0	-	10	0	-	11	2.0
Green sandpiper	0	-	12	1	Aug	12	0	-	12	5	Aug	10	3	Aug	11	1.8
Greenshank	5	Aug	12	3	Jul	12	7	Oct	12	13	Aug	10	5	Aug	11	6.6
Grey plover	0	-	12	1,200	Mar	12	0	-	12	0	-	10	0	-	11	240.0
Greylag goose	853	Dec	12	95	Feb	12	253	Dec	12	21	Apr	10	14	Feb	11	247.2
Heron	15	Sep	12	16	Dec	12	13	Sep & Oct	12	11	May	10	18	May	11	14.6
Herring gull	4,342	Dec	12	227	Jul	12	246	May	11	15	Oct	10	92	Aug	9	984.4
Kittiwake	1,130	Jul	12	3,282	Jul	12	785	Jun	11	37	Jul	10	0	-	9	1,046.8
Knot	1	Apr	12	20	Aug	12	40	Aug	12	32	Aug	10	37	Aug	11	26.0
Lapwing	1,695	Dec	12	2,163	Oct	12	1,234	Aug	12	1,629	Aug	10	1,074	Aug	11	1,559.0
Lesser black-backed gull	40	Jun	12	127	Jul	12	4	Aug & Jun	11	0	-	10	1	Jul & Aug	9	34.4
Little grebe	3	Oct	12	3	Aug, Sep & Apr	12	1	Sep, Oct, Dec & Apr	12	1	Feb & Mar	10	4	May	11	2.4
Little stint	0	-	12	10	Sep	12	0	-	12	0	-	10	0	-	11	2.0
Long-tailed duck	1	Jan & Feb	12	5	Nov	12	9	Feb	12	0	-	10	0	-	11	3.0
Mallard	525	Nov	12	978	Sep	12	968	Dec	12	450	Jan	10	572	Nov	11	698.6
Moorhen	12	Aug	12	15	Nov	12	8	Jan	12	6	Jul & May	10	7	Aug & Apr	11	9.6

Bird species (alphabetical order)	Peak monthly count per year															Mean peak monthly count across 5 yrs
	July 2005-June 2006			July 2006-June 2007			July 2007-June 2008			July 2008-June 2009			July 2009-June 2010			
	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	
Mute swan	265	Jul	12	275	Aug	12	174	Jul	12	229	Jul	10	206	Aug	11	229.8
Oystercatcher	33	Apr	12	36	Feb	12	74	Mar	12	11	Aug	10	34	Nov	11	37.6
Pink-footed goose	28,944	Oct	12	37,396	Oct	12	35,974	Oct	12	23,333	Jan	10	50,426	Oct	11	35.2 4.6
Pintail	61	Oct	12	20	Jan	12	19	Dec	12	21	Sep	10	11	Feb	11	26.4
Pochard	65	Oct	12	62	Oct	12	45	Sep	12	80	Oct	10	44	Sep	11	59.2
Purple sandpiper	3	Apr	12	1	Dec	12	0	-	12	3	Jan	10	0	-	11	1.4
Red-breasted merganser	19	Oct	12	32	Jan	12	56	Mar	12	34	Feb	10	26	Feb	11	33.4
Redshank	22	Jan & Feb	12	66	Sep	12	21	Dec	12	18	Aug	10	49	Apr	11	35.2
Red-throated diver	8	Nov	12	13	Mar	12	39	Mar	12	4	Sep	10	0	-	11	12.8
Ringed plover	84	May	12	23	Sep	12	20	Aug	12	11	May	10	26	May	11	32.8
Ruff	21	Sep	12	8	Sep	12	6	Aug	12	11	Aug	10	17	Aug	11	12.6
Sanderling	28	May	12	12	Jan	12	9	Aug	12	22	Aug	10	5	Sep	11	15.2
Sandwich tern	9	Apr	12	7	Sep	12	13	Apr	9	55	Sep	6	4	Apr	4	17.6
Scaup	2	Jan	12	2	Dec	12	2	Oct & May	12	5	Oct	10	1	Aug & Jun	11	2.4
Shag	3	Aug	12	15	Nov	12	76	Oct	12	130	Oct	10	0	-	11	44.8
Shelduck	61	May	12	29	Mar	12	23	May	12	28	Jun	10	21	Mar	11	32.4
Shoveler	47	Sep	12	23	Apr	12	33	Sep	12	84	Oct	10	60	Sep	11	49.4
Slavonian grebe	2	Dec	12	0	-	12	1	Oct & Jun	12	2	Oct	10	0	-	11	1.0
Snipe	21	Nov	12	11	Sep	12	7	Sep	12	12	Feb	10	14	Aug	11	13.0
Snow goose	1	Sep	12	1	Oct	12	0	-	12	1	Jan	10	3	Jan	11	1.2
Teal	2,457	Oct	12	1,083	Oct	12	1,391	Dec	12	805	Sep	10	496	Aug	11	1,246.4
Tufted duck	448	Aug	12	403	Sep	12	939	Aug	12	551	Aug	10	295	Aug	11	527.2

Bird species (alphabetical order)	Peak monthly count per year															Mean peak monthly count across 5 yrs
	July 2005-June 2006			July 2006-June 2007			July 2007-June 2008			July 2008-June 2009			July 2009-June 2010			
	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	Peak count	Mont h	No. count s	
Turnstone	7	May	12	12	Sep & Dec	12	1	Feb & May	12	0	-	10	0	-	11	4.0
Velvet scoter	5	Oct	12	0	-	12	0	-	11	0	-	11	0	-	11	1.0
Water rail	2	Nov & Feb	12	212	Oct & Nov	12	9	Sep	12	2	Feb	10	1	Nov & Jun	11	3.2
Whooper swan	680	Nov	12	285	Dec	12	92	Nov	12	252	Oct	10	182	Oct	11	298.2
Wigeon	3,649	Nov	12	1,288	Dec	12	1,363	Dec	12	1,208	Jan	10	1,565	Nov	11	1,814.6
Woodcock	0	-	12	1	Dec	12	13	Oct	12	0	-	10	0	-	11	2.8

(Data were supplied by the Wetland Bird Survey (WeBS), a partnership between the British Trust for Ornithology, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee (the latter on behalf of the Council for Nature Conservation and the Countryside, the Countryside Council for Wales, Natural England and Scottish Natural Heritage) in association with the Wildfowl and Wetlands Trust.)

WeBS is a joint scheme coordinated by the BTO, RSPB and JNCC in association with the Wildfowl and Wetlands Trust (WWT). The scheme monitors non-breeding waterbird (wildfowl, wader and seabird) populations across the UK to provide a scientific basis for their conservation.

The records received from WeBS are 'core counts'. Core counts are coordinated for approximately 2,500 coastal and inland wetland sites throughout the UK. Counts are made monthly, for a range of species, throughout the year.

4.2 Corn Bunting Results

Relevant corn bunting information for northeast Scotland was sought from RSPB. RSPB advised that the 30 territories recorded during the breeding bird survey (Section 5.1) may comprise <7 % of the northeast Scotland population and <5 % of the total Scottish population.

Corn bunting is a red-listed BoCC, a UK BAP priority species, a NE LBAP priority species and listed on the SBL. The species is a scarce resident breeder in northeast Scotland where it is at the northern extremity of its breeding range. There are an estimated 550-600 corn bunting territories in Aberdeenshire and Moray, this number comprises 64 % of the Scottish population and 6 % of the UK population. The northeast Scotland population has declined significantly in the past two decades. Most birds occur in the Buchan plain of Aberdeenshire, now the Scottish stronghold, in several hotspots between Rattray and Rosehearty. Here, densities can reach 21 males/km² and the hotspots are therefore among the most densely populated areas of corn bunting in the UK (Francis and Cook, 2011).

Corn buntings occur in open, lowland arable and mixed farmland. Nests are built on the ground within crops or dense, grassy vegetation. The following nesting habitats are favoured (Forrester *et al.*, 2007):

- Cereals;
- Set-aside;
- Improved grassland (ungrazed);
- Unimproved grassland (ungrazed);
- Brassica crops;
- Pea crops;
- Bean crops;
- Linseed crops; and
- Bulbs.

The following winter feeding habitats are favoured (Forrester *et al.*, 2007):

- Cereal stubbles;
- Oilseed rape stubbles;
- Livestock feed sites;
- Grain spills;
- Unharvested crops; and
- Newly sown spring cereals.

Corn buntings typically rear two broods per year, first clutches are laid from late May and second clutches are laid as late as mid-August, thus chicks can still be in the nest well into September (Forrester *et al.*, 2007). Early nests are usually built in autumn-sown cereals or grass managed for silage and later nests in spring-sown cereals; the chick diet is centred on insects (Francis and Cook, 2011).

Corn buntings are largely sedentary and form flocks from late October to early May. In winter the flocks sometimes move locally when deep snow or ploughing of stubble reduces food supplies. The species has very similar breeding and winter distributions (Forrester *et al.*, 2007).

RSPB were consulted to provide any relevant information on corn bunting presence (Table 7).

Table 7. RSPB corn bunting consultation

Organisation	Consultation response
Hywel Maggs, Conservation Officer for Northeast Scotland, and Kathleen Sinclair, Assistant Conservation Officer for Northeast Scotland, both RSPB	Discussion about corn bunting presence within the onshore cable route. Hywel Maggs confirmed Aberdeenshire was remaining UK stronghold for the species. He agreed that potential construction impacts on the species would be low and of a temporary nature. It was verified that there is no ideal season for construction as corn bunting are present all year round (31 August 2011).

4.3 Wintering Pink-footed Goose Results

Assessment of wintering pink-footed geese was based on the following data:

- SNH and environmental data: all data and anecdotal information relevant to wintering pink-footed geese near Loch of Strathbeg SPA;
- Online resources: Scottish Government and JNCC websites; and
- Relevant legislation: Council Directive 79/409/EEC (Birds Directive) and Council Directive 92/43/EEC (Habitats Directive).

4.3.1 Species Information

The pink-footed goose is a passage migrant and winter visitor to the UK. The Greenland/Icelandic population winters almost exclusively in the UK (Mitchell and Hearn, 2004), totalling some 300,000 birds (Mitchell, 2011). Geese arrive in Scotland early to mid-September, with numbers peaking in mid-October at key arrival sites including Loch of Strathbeg. Following arrival, birds shift south as winter progresses. Numbers peak again in Scotland in late March prior to migration, coinciding with the progression of spring grass further northwards (Fox *et al.*, 1994). Geese return to Greenland/Iceland breeding grounds mid to late April, with the majority of birds having departed the UK by early May (Mitchell and Hearn, 2004).

During winter, pink-footed goose flocks are highly mobile. A study in northeast Scotland found that geese (including those roosting at Loch of Strathbeg) continually shift between roosts, probably due to a variety of factors including disturbance and snowfall (Giroux, 1991). Geese usually feed close to their roost site, typically within 5-10 km, but may travel more than 20 km. Most foraging takes place during the day, with occasional night-time feeding if full moon and clear skies permit. Crops and grasses are consumed (Mitchell and Hearn, 2004).

4.3.2 Loch of Strathbeg SPA

Loch of Strathbeg SPA qualifies for designation under the Birds Directive for regularly supporting wintering wildfowl populations of European importance. It is an important stopover site for UK wintering and migrating pink-footed, greylag and barnacle geese. It is a designated SPA, SSSI and Ramsar site, and an RSPB reserve. The pink-footed goose is an SPA qualifying species, with winter numbers of 39,924 individuals (mean 5 year peak monthly count 1991/2-1996/6), 17.7 % of the wintering eastern Greenland/Iceland/UK population. For detail on designated sites refer to Chapter 4.1 – Designated Sites of the ES.

4.3.3 SNH Goose Management Scheme

The SNH Loch of Strathbeg GMS (Goose Management Scheme) operates northwest of Peterhead and encompasses 87 km² of eligible land north and east of a boundary line connecting Rosehearty, Strichen, Mintlaw and Peterhead. This desk study benefits from the significant amount of literature and data generated by the GMS.

The GMS, first piloted 1994, operates during March and April. At this time, the number of pink-footed geese moving north through the area is at its highest prior to migration to northern breeding rounds, building up to approximately 20,000 birds. Although the species is not threatened, birds are vulnerable in late spring having lost condition during the winter. The scheme is organised on the basis of a land use zonation system comprising feeding, buffer and scaring zones.

Conflict with agriculture arises due to loss of 'first spring grass bite', grazing of winter cereals, trampling and removal of seed from spring sown fields (cereals and grasses), leading to the delayed turn-out of livestock and damage to commercial crops. Originally, geese in the area were estimated to consume up to 60 % of spring grass yield and 20 % of potential silage yield. The overall impact of geese on agriculture in the area has been estimated to represent a loss in profit of £216,500 per year (Scottish Executive, 2005). A Scottish Executive investigation estimated economic losses of £236,000 per year (Patterson and Thorpe, 2007).

In 2004, SNH commissioned a report into the feeding distribution of geese wintering at Loch of Strathbeg in March and April. This aimed to identify areas most heavily used by feeding geese and to see how and if these areas coincided with the boundary of the existing Loch of Strathbeg GMS adopted in 2004. The survey area included the area bounded by the coast between Peterhead and Rosehearty and by a line connecting Rosehearty, Strichen, Mintlaw and Peterhead.

Key GMS Findings, 2004-07

The first 1997 report (Keller *et al.*, 1997) was unavailable for the purposes of this baseline desk study, therefore key GMS information and data were taken from Patterson and Thorpe (2006b) and Patterson and Thorpe (2007).

In 2004, eight surveys were completed between 07 March and 18 April. Goose distribution was determined by driving fixed transects. Flock counts recorded in March were higher than those recorded in April. Most records were of pink-footed geese and all geese were feeding on pastures.

In March 2004, flock distribution varied considerably between the five survey days. On two days, most flocks were recorded inside the GMS boundary, and on three days, most flocks were recorded outside the boundary. Inside the GMS boundary, flocks were concentrated northwest and southeast of Loch of Strathbeg, and in a wide area south of the loch. Outside the GMS boundary, flocks were concentrated southwest of Fraserburgh and in a river valley south of the study area.

In April 2004, kernel analysis was used to identify areas most heavily used by geese. Two areas were identified, one northwest of Loch of Strathbeg and one southeast, which together accounted for 50 % of flocks. A third area which accounted for 25 % of flocks surrounded the previous two areas, an area southwest of Fraserburgh and an area southwest of the GMS boundary.

Overall in March and April, the majority of geese were recorded within the GMS boundary, however there was considerable variation in flock location between survey days.

Goose Distribution in Relation to GMS Fields

In March, approximately one third (27.4-35.5 %) of geese recorded within the whole study area were recorded within fields of the management scheme, and almost half (39.6-49.8 %) of the geese recorded within the management scheme boundary were recorded within fields of the management scheme. Similar, but higher, values were noted for April. Feeding zone fields were found to be more favourable, accounting for over two thirds of flocks and birds recorded. In April, preference for field type was less pronounced with more birds being recorded within buffer zones.

The mean number of geese found during March and April surveys represented 94 % and 91 % of the mean Loch of Strathbeg roost count for those months, respectively. These figures account for a significant majority of birds associated with the SPA.

Within the GMS boundary, the most heavily used areas formed the basis of refuge selection for the scheme during 2002-2004. Only two areas outside the boundary of the existing management scheme were identified, one just to the southwest of Fraserburgh and one to the southwest of the scheme boundary. Due to considerable variation in use of areas by geese over a two month period the future use of these sites is not certain.

Key GMS results from monitoring goose use of refuges during 2004-2007 are presented in Table 8.

Table 8. Monitoring goose use of refuges 2004-2007

	2004		2005		2006		2007	
	March	April	March	April	March	April	March	April
% of total Loch of Strathbeg goose population supported by sites included within the scheme	40 %	68 %	24 %	43 %	42 %	73 %	47 %	76 %
% of total roost population supported by RSPB Loch of Strathbeg grass fields	7 %	8 %	2.1 %	6 %	6 %	15 %	14 %	22 %
Reference	Patterson and Thorpe, 2006a		Patterson and Thorpe, 2006c		Patterson and Thorpe, 2006d		Patterson and Thorpe, 2007	

In 2004, geese were found to increasingly use the scheme's refuges as birds gradually learned the location of undisturbed feeding locations. This suggests it has taken some time for geese to learn these locations (Patterson and Thorpe, 2006a).

By 2005 it was apparent the scheme had enjoyed a pattern of continuous increase in goose use as observed in the original 1994-97 pilot scheme. The reasons for this were complex but might have been explained by the birds' preference for feeding

on newly-sown barley elsewhere and not grasses within the scheme fields. Use of fields would therefore tend to be more dependent on preferred (higher calorific) food sources than the knowledge of safe feeding sites in some years, though this requires further study (Patterson and Thorpe, 2006c).

4.3.4 Consultation

SNH and RSPB were consulted on baseline desk study approach and to provide any relevant information (Table 9 and Appendix B).

Table 9. SNH and RSPB pink-footed goose consultation

Organisation	Consultation response
Ewan Lawrie, Area Officer for Aberdeenshire (North), and David Law, Senior Casework Manager, both SNH	Recommended that potential impacts on wintering geese should be assessed through baseline desk study (28 February 2011).
Kathleen Sinclair, Assistant Conservation Officer for Northeast Scotland, RSPB	Recommended consideration of wintering pink-footed geese at Loch of Strathbeg SPA (Appropriate Assessment may be required if construction takes place during winter) (Appendix B) (19 July 2011).
Ewan Lawrie, SNH Area Officer for Aberdeenshire (North)	Highlighted international importance of Loch of Strathbeg for wintering pink-footed geese. Refers to study by University of Aberdeen which indicates geese are highly mobile in their feeding behaviour. Suggests goose population is fluid, with flocks constantly departing and arriving. Goose numbers peak in spring and autumn. Most SNH data relate to March and April when goose numbers are highest. Goose distribution in fields relates to a number of factors, not least crop in field, with a preference for shorter grass (28 July 2011).

4.4 Protected Habitats and Species Results

4.4.1 NE LBAP

Priority habitats, birds and mammals most likely to occur within the onshore cable route were sought from the NE LBAP. Twenty-five priority habitats (Table 10) and 48 priority bird and mammal species (Table 11) were found.

Table 10. NE LBAP priority habitats

Habitat type	NE LBAP priority/UK BAP priority habitat	NE Habitat Action Plan	Plan status
Coastal			
UK/NE priority	Coastal sand dunes	Coastal sand dunes and shingle	Development of action plan in progress
UK/NE priority	Coastal vegetated shingle	Coastal sand dunes and shingle	Development of action plan in progress
UK/NE priority	Maritime cliff and slope	Maritime cliff and slope	Development of action plan 2004
Locally important	Coastal heath and shrub	Coastal heath and scrub	Development of action plan 2004
Farmland and grassland			
UK/NE priority	Cereal field margins	Farmland/field margins and boundary habitats	Implementation in progress

Habitat type	NE LBAP priority/UK BAP priority habitat	NE Habitat Action Plan	Plan status
UK broad/locally important	Arable and cultivated land	Farmland	Implementation in progress
UK broad/locally important	Boundary and linear feature	Field margins and boundary habitats	Implementation in progress
UK/NE priority	Lowland meadow (neutral grassland)	Species-rich grassland	Implementation in progress
UK broad/locally important	Improved grassland	Species-rich grassland	Implementation in progress
Woodland			
UK/NE priority	Lowland wood pastures and parkland	Wood pasture, parkland and boundary trees	Development of action plan in progress
Locally important	Birch woodland	Broadleaved woodland	Development of action plan since 2004
Locally important	Scrub	Broadleaved woodland	Development of action plan since 2004
UK/NE priority	Wet woodland	Wet and riparian woodland	Implementation in progress
Locally important	Riparian woodland	Wet and riparian woodland	Implementation in progress
UK broad/locally important	Planted coniferous woodland	Planted coniferous woodland	Development of action plan 2005
Bog			
UK/NE priority	Lowland raised bog	Lowland raised bog	Implementation in progress
UK/NE priority	Blanket bog	Blanket bog	Implementation in progress
Wetland and Freshwater			
UK/NE priority	Reedbeds	Wetland	Development of action plan 2004
UK/NE priority	Fens	Wetland	Development of action plan 2004
UK/NE priority	Coastal and floodplain grazing marsh	Wetland	Development of action plan 2004
UK broad/locally important	Fen, carr, marsh, swamp and reedbed	Wetland	Development of action plan 2004
UK broad/locally important	Rivers and burns	Rivers and burns	Development of action plan in progress
UK broad/locally important	Standing open water	Lochs and ponds	Development of action plan 2004-05
Locally important	Ponds	Lochs and ponds	Development of action plan 2004-05
Urban			
UK broad/locally important	Urban	Urban areas	Implementation in progress

Table 11. NE LBAP priority birds and mammals

Species (alphabetical order)	Habitat type	NE Species Action Plan	
		Species action addressed through relevant Habitat Action Plan	Species with dedicated North East Species Action Plan
UK priority species			
Black grouse	Montane, heath and bog	✓	
Brown hare	Farmland and grassland	✓	
Bullfinch	Woodland	✓	
Capercaillie	Woodland	✓	
Common scoter	Coastal and marine	✓	
Corn bunting	Farmland and grassland	✓	
Grey partridge	Farmland and grassland	✓	
Linnet	Farmland and grassland	✓	
Otter	Wetland and freshwater	✓	
Pipistrelle bat	Woodland	✓	
Red squirrel	Woodland		✓
Reed bunting	Wetland and freshwater, mountain, heath and bog	✓	
Scottish crossbill	Woodland	✓	
Skylark	Farmland and grassland	✓	
Song thrush	Woodland	✓	
Spotted flycatcher	Woodland	✓	
Tree sparrow	Woodland	✓	
Water vole	Wetland and freshwater		✓
UK species of conservation concern			
Arctic tern	Coastal and marine	✓	
Barn owl	Farmland and grassland	✓	
Bearded tit	Freshwater and wetland	✓	
Common tern	Coastal and marine	✓	
Crested tit	Woodland	✓	
Curlew	Coastal and marine	✓	
Daubenton's bat	Woodland/freshwater/farming and grassland		✓
Dotterel	Montane, heath and bog	✓	
Eider	Coastal and marine	✓	
Golden eagle	Montane, heath and bog	✓	
Golden plover	Montane, heath and bog	✓	
Goldeneye	Freshwater and wetland	✓	
Grasshopper warbler	Farming and grassland	✓	
Hen harrier	Montane, heath and bog	✓	
Kestrel	Montane, heath and bog	✓	
Lapwing	Farmland and grassland	✓	
Lesser redpoll	Woodland	✓	
Little tern	Coastal and marine	✓	
Redshank	Coastal and marine	✓	
Sandwich tern	Coastal and marine	✓	
Slavonian grebe	Coastal and marine	✓	
Snipe	Freshwater and wetland	✓	
Snow bunting	Montane, heath and bog	✓	
Spotted crane	Freshwater and wetland	✓	
Tree pipit	Freshwater and wetland	✓	
Twite	Farming and grassland	✓	
Water rail	Freshwater and wetland	✓	

Species (alphabetical order)	Habitat type	NE Species Action Plan	
		Species action addressed through relevant Habitat Action Plan	Species with dedicated North East Species Action Plan
Water shrew	Freshwater and wetland	✓	
Yellowhammer	Farming and grassland	✓	
Locally important species			
Ptarmigan	Montane, heath and bog	✓	

4.4.2 NBN

Relevant bird, mammal and freshwater pearl mussel records within the onshore cable route were sought from the NBN. One hundred and thirty-two bird species (green-listed BoCCs without conservation designations were not included) were found, these are presented alongside six conservation designations (Table 12). Six mammal species were found, these are also presented alongside six conservation designations (Table 13).

Table 12. NBN bird records (in BNG squares NK04, NK05, NK06, NK14 and NJ96)

Bird species (alphabetical order)	Conservation designation					
	Annex I of Birds Directive (European protected)	Schedule 1 of Wildlife and Countryside Act 1981 (UK-protected)	BoCC	UK BAP priority species	NE LBAP priority species	SBL
Arctic tern	✓	-	Amber	-	✓	✓
Avocet	✓	✓	Amber	-	-	-
Barn owl	-	✓	Amber	-	✓	✓
Barnacle goose	✓	-	Amber	-	-	✓
Bar-tailed godwit	-	-	Amber	-	-	✓
Bean goose	-	-	Amber	-	-	✓
Bearded tit	-	✓	Amber	-	✓	✓
Bewick's swan	✓	✓	Amber	✓	-	✓
Bittern	✓	✓	Red	✓	-	✓
Black guillemot	-	-	Amber	-	-	-
Black-headed gull	-	-	Amber	-	-	✓
Black-necked grebe	-	✓	Amber	-	-	✓
Black-tailed godwit	-	✓	Red	✓	-	✓
Black-throated diver	✓	✓	Amber	✓	-	✓
Brambling	-	✓	Green	-	-	✓
Brent goose	-	-	Amber	✓	-	-
Bullfinch	-	-	Amber	✓	✓	✓
Common crossbill	-	-	Green	✓	✓	✓

Bird species (alphabetical order)	Conservation designation					
	Annex I of Birds Directive (European protected)	Schedule 1 of Wildlife and Countryside Act 1981 (UK- protected)	BoCC	UK BAP priority species	NE LBAP priority species	SBL
Common sandpiper	-	-	Amber	-	-	-
Common tern	✓	-	Amber	-	✓	✓
Corn bunting	-	-	Red	✓	✓	✓
Corncrake	✓	✓	Red	✓	-	✓
Crane	-	-	Amber	-	-	-
Cuckoo	-	-	Red	✓	-	-
Curlew	-	-	Amber	✓	✓	✓
Dunlin	✓	-	Red	-	-	✓
Dunnock	-	-	Amber	-	-	-
Eider	-	-	Amber	-	✓	-
Fieldfare	-	✓	Red	-	-	-
Fulmar	-	-	Amber	-	-	-
Gadwall	-	-	Amber	-	-	-
Gannet	-	-	Amber	-	-	-
Garganey	-	✓	Amber	-	-	✓
Glaucous gull	-	-	Amber	-	-	-
Golden plover	✓	-	Amber	-	-	✓
Goldeneye	-	✓	Amber	-	✓	-
Grasshopper warbler	-	-	Red	✓	✓	-
Great black-backed gull	-	-	Amber	-	-	-
Great northern diver	✓	-	Amber	-	-	✓
Greenshank	-	✓	Green	-	-	-
Grey partridge	-	-	Red	✓	✓	✓
Grey plover	-	-	Amber	-	✓	-
Grey wagtail	-	-	Amber	-	-	-
Greylag goose	-	✓	Amber	-	-	-
Guillemot	-	-	Amber	-	-	-
Hen harrier	✓	✓	Red	-	✓	✓
Herring gull	-	-	Red	✓	-	✓
Hobby	-	✓	Green	-	-	✓
Hooded crow	-	-	Green	-	-	✓
House martin	-	-	Amber	-	-	-
House sparrow	-	-	Red	✓	-	-
Iceland gull	-	-	Amber	-	-	-
Jack snipe	-	-	Amber	-	-	-
Kestrel	-	-	Amber	-	✓	✓
Kittiwake	-	-	Amber	-	-	-
Knot	-	-	Amber	-	-	-
Lapwing	-	-	Red	✓	✓	✓
Lesser black-backed gull	-	-	Amber	-	-	-
Lesser redpoll	-	-	Red	✓	✓	-
Lesser white-fronted goose	✓	-	Green	-	-	-
Linnet	-	-	Red	✓	✓	✓
Little egret	✓	-	Amber	-	-	-

Bird species (alphabetical order)	Conservation designation					
	Annex I of Birds Directive (European protected)	Schedule 1 of Wildlife and Countryside Act 1981 (UK- protected)	BoCC	UK BAP priority species	NE LBAP priority species	SBL
Little grebe	-	-	Amber	-	-	-
Little gull	✓	✓	Amber	-	-	-
Little tern	✓	✓	Amber	-	✓	✓
Long-tailed duck	-	✓	Green	-	-	-
Mallard	-	-	Amber	-	-	-
Marsh harrier	✓	✓	Amber	-	-	✓
Meadow pipit	-	-	Amber	-	-	-
Merlin	-	✓	Amber	-	-	✓
Mistle thrush	-	-	Amber	-	-	-
Montagu's harrier	✓	✓	Amber	-	-	-
Osprey	✓	✓	Amber	-	-	✓
Oystercatcher	-	-	Amber	-	-	-
Peregrine	✓	✓	Green	-	-	✓
Pink-footed goose	-	-	Amber	-	-	-
Pintail	-	✓	Amber	-	-	-
Pochard	-	-	Amber	-	-	✓
Puffin	-	-	Amber	-	-	-
Purple sandpiper	-	✓	Amber	-	-	✓
Quail	-	✓	Amber	-	-	-
Razorbill	-	-	Amber	-	-	-
Red grouse	-	-	Amber	✓	-	-
Red-backed shrike	✓	✓	Red	✓	-	✓
Redshank	-	-	Amber	-	✓	-
Redstart	-	-	Amber	-	-	-
Red-throated diver	✓	✓	Amber	-	-	✓
Redwing	-	✓	Red	-	-	✓
Reed bunting	-	-	Amber	✓	✓	✓
Ring ouzel	-	-	Red	✓	-	✓
Ringed plover	-	-	Amber	-	-	-
Robin	-	-	Green	-	-	✓
Sand martin	-	-	Amber	-	-	-
Sandwich tern	✓	-	Amber	-	✓	✓
Scaup	-	✓	Red	✓	-	✓
Shag	-	-	Amber	-	-	-
Shelduck	-	-	Amber	-	-	-
Short-eared owl	✓	-	Amber	-	-	✓
Shoveler	-	-	Amber	-	-	-
Siskin	-	-	Green	-	-	✓
Skylark	-	-	Red	-	✓	✓
Slavonian grebe	✓	✓	Amber	-	✓	✓
Smew	✓	-	Amber	-	-	✓
Snipe	-	-	Amber	-	✓	-
Snow bunting	-	✓	Amber	-	✓	✓
Song thrush	-	-	Red	✓	✓	✓

Bird species (alphabetical order)	Conservation designation					
	Annex I of Birds Directive (European protected)	Schedule 1 of Wildlife and Countryside Act 1981 (UK- protected)	BoCC	UK BAP priority species	NE LBAP priority species	SBL
Spoonbill	✓	✓	Amber	-	-	-
Spotted crane	✓	✓	Amber	-	✓	✓
Spotted flycatcher	-	-	Red	✓	✓	✓
Starling	-	-	Red	✓	-	-
Stock dove	-	-	Amber	-	-	-
Swallow	-	-	Amber	-	-	-
Swift	-	-	Amber	-	-	✓
Teal	-	-	Amber	-	-	-
Tree pipit	-	-	Red	✓	✓	-
Tree sparrow	-	-	Red	✓	✓	✓
Tufted duck	-	-	Amber	-	-	-
Turnstone	-	-	Amber	-	-	-
Twite	-	-	Red	✓	✓	-
Water rail	-	-	Green	-	✓	-
Wheatear	-	-	Amber	-	-	-
Whimbrel	-	✓	Red	-	-	-
Whinchat	-	-	Amber	-	-	-
White-fronted goose	✓	-	Red	✓	-	✓
White-tailed eagle	✓	✓	Red	-	-	✓
Whitethroat	-	-	Amber	-	-	-
Whooper swan	✓	✓	Amber	-	-	✓
Wigeon	-	-	Amber	-	-	-
Willow warbler	-	-	Amber	-	-	-
Woodcock	-	-	Amber	-	-	✓
Yellow wagtail	-	-	Red	✓	-	✓
Yellowhammer	-	-	Red	✓	✓	-

Table 13. NBN mammal records (in BNG squares NK04, NK05, NK06, NK14 and NJ96)

Mammal species (alphabeti cal order)	Conservation designation						NBN record
	Schedule 2 of Conservatio n of Habitats and Species Regulations 2010 (European protected)	Schedule 5 of Wildlife and Countryside Act 1981 (UK- protected)	UKBAP priority species	NE LBAP priority species	SBL	Protection of Badgers Act 1992	
Badger	-	-	-	-	✓	✓	Few records, all pre-1979

Mammal species (alphabetical order)	Conservation designation						NBN record
	Schedule 2 of Conservation of Habitats and Species Regulations 2010 (European protected)	Schedule 5 of Wildlife and Countryside Act 1981 (UK-protected)	UKBAP priority species	NE LBAP priority species	SBL	Protection of Badgers Act 1992	
Otter	✓	✓	✓	Species Action addressed through relevant Habitat Action Plan	✓	-	Multiple records, all pre-1991
Red squirrel	-	✓	✓	Dedicated Species Action Plan	✓	-	NK032571 (2009) NJ990610 (2000) NJ942612 (2010)
Water vole	-	✓	✓	Dedicated Species Action Plan	✓	-	NK0654 NK0264
Pine marten	-	✓	✓	-	-	-	NK0952

The NBN was formed in 2000 and is a partnership of many UK conservation organisations. Previously, there was a vast amount of biodiversity data gathered over the years by various organisations and individuals, held in various formats. Now, the NBN acts as a 'data warehouse' for a broad range of this biodiversity information.

5. Baseline Field Survey Results

5.1 Breeding Bird Survey Results

Baseline field survey results show that the habitat within the onshore cable route supports a typical assemblage of farmland and coastland birds. A total of 80 species were recorded within the 44.5 km² of the onshore cable route. None of the 36 green-listed BoCCs was considered for territory analysis (Table 14). Of the red and amber-listed BoCCs considered for territory analysis, 29 were taken forward for analysis resulting in 1,154 territories (Table 15 and Figures 6-20). Fifteen red and amber-listed BoCCs were not taken forward for territory analysis because either too few records were made or breeding behaviour was not observed (Table 16). Results are presented alongside six conservation designations.

Table 14. Breeding bird survey results: green-listed BoCCs not considered for territory analysis

Bird species (alphabetical order)	Conservation designation					No. of records	No. of birds per record
	Annex I of Birds Directive (European protected)	Schedule 1 of Wildlife & Countryside Act 1981 (UK-protected)	UKBAP priority species	NE LBAP priority species	SBL		
Blackbird	-	-	-	-	-	77	87
Blackcap	-	-	-	-	-	4	4
Blue tit	-	-	-	-	-	44	49
Buzzard	-	-	-	-	-	58	61
Canada goose	-	-	-	-	-	3	53
Carrion crow	-	-	-	-	-	146	213
Chaffinch	-	-	-	-	-	321	338
Chiffchaff	-	-	-	-	-	2	2
Coal tit	-	-	-	-	-	14	19
Collared dove	-	-	-	-	-	3	5
Cormorant	-	-	-	-	-	2	2
Garden warbler	-	-	-	-	-	6	6
Goldfinch	-	-	-	-	-	37	65
Goosander	-	-	-	-	-	1	1
Great spotted woodpecker	-	-	-	-	-	1	1
Great tit	-	-	-	-	-	29	35
Greenfinch	-	-	-	-	-	10	12
Heron	-	-	-	-	-	7	9
Hooded crow	-	-	-	-	✓	1	1
Jackdaw	-	-	-	-	-	153	585
Jay	-	-	-	-	-	2	2
Long-tailed tit	-	-	-	-	-	2	3
Magpie	-	-	-	-	-	23	28
Moorhen	-	-	-	-	-	3	5
Mute swan	-	-	-	-	-	6	18
Pheasant	-	-	-	-	-	9	9
Pied wagtail	-	-	-	-	-	56	76
Red-legged partridge	-	-	-	-	-	2	2
Robin	-	-	-	-	✓	30	30
Rock dove	-	-	-	-	-	12	28
Rook	-	-	-	-	-	182	1636
Sedge warbler	-	-	-	-	-	182	182
Siskin	-	-	-	-	✓	3	3
Sparrowhawk	-	-	-	-	-	2	2
Wood pigeon	-	-	-	-	-	202	481
Wren	-	-	-	-	-	38	38

Table 15. Breeding bird survey results: red and amber-listed BoCCs taken forward for territory analysis

Bird species (alphabetical order)	Conservation designation						No. territories
	Annex I of Birds Directive (European protected)	Schedule 1 of Wildlife & Countryside Act 1981 (UK-protected)	BoCC	UKBAP priority species	NE LBAP priority species	SBL	
Black-headed gull	-	-	Amber	-	-	✓	2 (colonies)
Corn bunting	-	-	Red	✓	✓	✓	30
Curlew	-	-	Amber	✓	✓	✓	6
Dunnock	-	-	Amber	-	-	-	22
Grasshopper warbler	-	-	Red	✓	✓	-	3
Grey partridge	-	-	Red	✓	✓	✓	1
Greylag goose	-	✓	Amber	-	-	-	1 (probably a feral pair)
House sparrow	-	-	Red	✓	-	-	65 (colonies)
Lapwing	-	-	Red	✓	✓	✓	16
Lesser redpoll	-	-	Red	✓	✓	✓	1
Linnet	-	-	Red	✓	✓	✓	38
Mallard	-	-	Amber	-	-	-	1
Mistle thrush	-	-	Amber	-	-	-	6
Oystercatcher	-	-	Amber	-	-	-	21
Quail	-	✓	Amber	-	-	-	2
Reed bunting	-	-	Amber	✓	✓	✓	16
Ringed plover	-	-	Amber	-	-	-	3
Sand martin	-	-	Amber	-	-	-	1 (colony)
Skylark	-	-	Red	-	✓	✓	370
Song thrush	-	-	Red	✓	✓	✓	18
Starling	-	-	Red	✓	-	-	56 (colonies)
Stock dove	-	-	Amber	-	-	-	4
Swallow	-	-	Amber	-	-	-	22 (colonies)
Tree sparrow	-	-	Red	✓	✓	✓	11 (colonies)
Tufted duck	-	-	Amber	-	-	-	2
Wheatear	-	-	Amber	-	-	-	2
Whitethroat	-	-	Amber	-	-	-	66
Willow warbler	-	-	Amber	-	-	-	140
Yellowhammer	-	-	Red	✓	✓	-	228

Table 16. Breeding bird survey results: red and amber-listed BoCCs not taken forward for territory analysis

Bird species (alphabetical order)	Conservation designation						No. of records	No. of birds per record	Reason why territory analysis not carried out
	Annex I of Birds Directive (European protected)	Schedule 1 of Wildlife & Countryside Act 1981 (UK- protected)	BoCC	UKBAP priority species	NE LBAP priority species	SBL			
Brent goose	-	-	Amber	✓	-	-	1	3	Only 1 record of 3 birds flying, migrant species
Bullfinch	-	-	Amber	✓	✓	✓	1	1	Only 1 record of single bird
Common gull	-	-	Amber	-	-	-	19	100	Breeding behaviour not observed
Great black- backed gull	-	-	Amber	-	-	-	8	82	Breeding behaviour not observed
Grey wagtail	-	-	Amber	-	-	-	2	4	Only 2 records of 2 birds each, flying
Herring gull	-	-	Red	✓	-	✓	110	670	Breeding behaviour not observed
House martin	-	-	Amber	-	-	-	19	33	Breeding behaviour not observed
Kestrel	-	-	Amber	-	✓	✓	4	4	Breeding behaviour not observed
Kittiwake	-	-	Amber	-	-	-	1	3	Breeding behaviour not observed
Lesser black- backed gull	-	-	Amber	-	-	-	10	98	Breeding behaviour not observed
Meadow pipit	-	-	Amber	-	-	-	0.9 pairs per km ²		Density of pairs recorded during round 1 calculated = 80 birds / 2 / 44.5 km ²
Redshank	-	-	Amber	-	✓	-	1	15	Breeding behaviour not observed
Swift	-	-	Amber	-	-	✓	12	24	Breeding behaviour not observed
Twite	-	-	Red	✓	-	-	1	4	Only 1 record of 4 birds
Wood warbler	-	-	Red	✓	-	✓	1	1	Only 1 record of 1 singing bird, not in suitable habitat, presumably migrant

Methods for two species require further explanation. For skylark, the round with the highest number of singing males was used to define the number of territories; thus, round 2 was used, together with records from rounds 1 and 3 separated by more than 200 m (Table 15). For meadow pipit, round 1 was used to calculate density of pairs per km² (Table 16).

Additional survey areas were only surveyed during round 3 of the breeding bird survey, they therefore contain territories only analysed from data from one visit, and hence represent a minimum number of territories.

5.2 Phase 1 Habitat Survey Results

Baseline field survey results show that the habitat within the onshore cable route comprises an intensively managed, open landscape of predominantly arable land and improved grassland, with a small number of built-up areas (Tables 17-32, Photos 1-12 and Figures 21-39). A total of 35 phase 1 habitat types and eight NVC communities were recorded within the 44.5 km² of the onshore cable route, phase 1 habitat results are presented alongside three conservation designations and NVC results are presented alongside two conservation designations.

Table 17. Phase 1 habitat survey results: total areas and percentages of phase 1 habitats

Phase 1 habitat	Potentially overlaps with Annex I of Habitats Directive (European protected)	Potentially overlaps with UK BAP priority habitat	Potentially overlaps with NE LBAP priority habitat	Total area within onshore cable route km ²	Total % of onshore cable route (descending order)
Arable land	-	Arable field margins	Farmland Field margins and boundary habitats	31.0	69.9
Improved grassland	-	Coastal and floodplain grazing marsh	Farmland Field margins and boundary habitats	2.9	6.5
Buildings	-	-	Urban areas	1.3	3.0
Road	-	-	-	1.3	3.0
Plantation mixed woodland	-	Lowland beech and yew woodland Lowland mixed deciduous woodland Lowland wood-pastures and parkland Upland birchwoods Upland mixed ashwoods Upland oakwood Wet woodland	Wood pasture, parkland and wayside trees	1.0	2.3
Amenity grassland	-	-	Urban areas	0.9	1.9

Phase 1 habitat	Potentially overlaps with Annex I of Habitats Directive (European protected)	Potentially overlaps with UK BAP priority habitat	Potentially overlaps with NE LBAP priority habitat	Total area within onshore cable route km ²	Total % of onshore cable route (descending order)
Dune grassland coastland	Embryonic shifting dunes				
	Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ('white dunes')				
	Fixed dunes with herbaceous vegetation ('grey dunes')	Coastal sand dunes	Coastal habitats and shingle	0.8	1.9
	Atlantic decalcified fixed dunes (<i>Calluno-Ullicetea</i>)	Lowland dry acid grassland	Moray Coast		
Tall ruderal herb and fern	Humid dune slacks	-	Field margins and boundary habitats	0.7	1.5
Plantation broadleaved woodland	-	Lowland beech and yew woodland			
	-	Lowland mixed deciduous woodland			
	-	Lowland wood-pastures and parkland	Wood pasture, parkland and wayside trees	0.5	1.2
	-	Upland mixed ashwoods			
		Upland oakwood			
		Wet woodland			

Phase 1 habitat	Potentially overlaps with Annex I of Habitats Directive (European protected)	Potentially overlaps with UK BAP priority habitat	Potentially overlaps with NE LBAP priority habitat	Total area within onshore cable route km ²	Total % of onshore cable route (descending order)
Semi-improved neutral grassland	-	Upland hay meadows	Farmland Field margins and boundary habitats	0.4	0.9
Plantation coniferous woodland	-	-	-	0.4	0.8
Poor semi-improved grassland	-	-	Farmland Field margins and boundary habitats	0.3	0.7
Dry modified bog	Degraded raised bogs still capable of natural regeneration	Blanket bog Lowland raised bog	Lowland raised bog	0.3	0.6
Scattered scrub	-	Aquifer-fed naturally fluctuating water bodies	-	0.3	0.6
Quarry	-	-	-	0.3	0.6
Blanket bog	Blanket bog	Blanket bog	Lowland raised bog	0.3	0.6
Running water	Water courses of plain to montane levels with <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	Maritime cliff and slopes	Rivers and burns	0.2	0.5
Acid/neutral flush and spring	Depressions on peat substrates of the <i>Rhynchosporion</i>	Fens Maritime cliff and slopes	Wetland	0.2	0.5
Ephemeral/short perennial	-	Maritime cliff and slopes	-	0.2	0.5

Phase 1 habitat	Potentially overlaps with Annex I of Habitats Directive (European protected)	Potentially overlaps with UK BAP priority habitat	Potentially overlaps with NE LBAP priority habitat	Total area within onshore cable route km ²	Total % of onshore cable route (descending order)
Marginal vegetation	-	Aquifer-fed naturally fluctuating water bodies	Rivers and burns	0.2	0.4
No access	-	-	Wetland	0.1	0.3
Bare ground	-	-	-	0.1	0.3
Unimproved neutral grassland	-	Lowland meadows Upland hay meadows	Farmland	0.1	0.3
			Field margins and boundary habitats		
			Species-rich grassland		

Phase 1 habitat	Potentially overlaps with Annex I of Habitats Directive (European protected)	Potentially overlaps with UK BAP priority habitat	Potentially overlaps with NE LBAP priority habitat	Total area within onshore cable route km ²	Total % of onshore cable route (descending order)
Semi-natural broadleaved woodland	-	Aquifer-fed naturally fluctuating water bodies	Wet and riparian woodland Wood pasture, parkland and wayside trees	0.1	0.2
		Lowland beech and yew woodland			
		Lowland mixed deciduous woodland			
		Lowland wood-pastures and parkland			
		Maritime cliff and slopes			
		Upland birchwoods			
		Upland mixed ashwoods			
Standing water	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the <i>Isoëto-Nanojuncetea</i> Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp.	Upland oakwood	Wetland	0.1	0.2
		Wet woodland			

Phase 1 habitat	Potentially overlaps with Annex I of Habitats Directive (European protected)	Potentially overlaps with UK BAP priority habitat	Potentially overlaps with NE LBAP priority habitat	Total area within onshore cable route km ²	Total % of onshore cable route (descending order)
Dense/continuous scrub	-	Lowland beech and yew woodland Lowland mixed deciduous woodland Lowland wood-pastures and parkland Native pinewoods Upland birchwoods Upland mixed ashwoods Upland oakwood Wet woodland	-	0.1	0.2

Phase 1 habitat	Potentially overlaps with Annex I of Habitats Directive (European protected)	Potentially overlaps with UK BAP priority habitat	Potentially overlaps with NE LBAP priority habitat	Total area within onshore cable route km ²	Total % of onshore cable route (descending order)
Semi-natural mixed woodland	-	Lowland beech and yew woodland	Wood pasture, parkland and wayside trees	0.1	0.2
		Lowland mixed deciduous woodland			
		Lowland wood-pastures and parkland			
		Native pinewoods			
		Upland birchwoods			
		Upland mixed ashwoods			
		Upland oakwood			
Swamp	-	Wet woodland	Wetland	0.1	0.2
		Fens			
		Maritime cliff and slopes			
		Purple moor grass and rush pastures			
Inundation vegetation	-	Reedbeds	Field margins and boundary habitats	0.04	0.1
		Aquifer-fed naturally fluctuating water bodies			

Phase 1 habitat	Potentially overlaps with Annex I of Habitats Directive (European protected)	Potentially overlaps with UK BAP priority habitat	Potentially overlaps with NE LBAP priority habitat	Total area within onshore cable route km ²	Total % of onshore cable route (descending order)
Acid/neutral exposure	-	-	-	0.04	0.1
Marshy grassland	-	Coastal and floodplain grazing marsh	-	0.02	0.04
		Lowland meadows			
		Maritime cliff and slopes			
		Purple moor grass and rush pastures			
Continuous bracken	-	Upland hay meadows	-	0.01	0.03
		Lowland dry acid grassland			
Scattered bracken	-	Maritime cliff and slopes	-	0.004	0.01
		Lowland dry acid grassland			
Semi-natural coniferous woodland	-	-	Wood pasture, parkland and wayside trees	0.001	0.002
Basic scree	-	-	-	0.001	0.001

Table 18. NVC survey results

NVC code (alphabetical order)	NVC community	Annex I of Habitats Directive (European protected)	UK BAP priority habitat
M2b	<i>Sphagnum cuspidatum/fallax</i> bog pool community: <i>Sphagnum fallax</i> sub-community	H7150 Depressions on peat substrates of the <i>Rhynchosporion</i>	Blanket bog
M4	<i>Carex rostrata-Sphagnum fallax</i> mire	H7140 Transition mires and quaking bogs	Lowland flush, fen and swamp
M5	<i>Carex rostrata-Sphagnum squarrosum</i> mire	H7140 Transition mires and quaking bogs	Lowland flush, fen and swamp
M6c	<i>Carex echinata-Sphagnum fallax/denticulatum</i> mire: <i>Juncus effusus</i> sub-community	-	Lowland flush, fen and swamp
M17a	Blanket mire <i>Drosera rotundifolia-Sphagnum</i> spp. sub-community	H7130 Blanket bogs	Blanket bog
M19a	<i>Calluna vulgaris-Eriophorum vaginatum</i> blanket mire: <i>Erica tetralix</i> sub-community	H7130 Blanket bogs	Blanket bog
M23	<i>Juncus effusus-Galium palustre</i> rush pasture	-	Lowland flush, fen and swamp
MG10	<i>Holcus lanatus-Juncus effusus</i> rush pasture	-	-

Four stands of the invasive species Japanese knotweed (*Fallopia japonica*) were found, these were recorded as target notes (NK036494, TNE19, Photo 1; TNE20; TNE21 and TNE46).

Field boundaries and woodland edges form important linear features in otherwise open, homogenous landscapes such as the arable land and improved grassland within the onshore cable route. Native, species-rich hedgerows were widespread, comprising rowan (*Sorbus aucuparia*), silver birch (*Betula pendula*), hawthorn (*Crataegus monogyna*), hazel (*Corylus avellana*) and elder (*Sambucus nigra*). Fences, with or without hedgerows, were common, and small number of dry stone walls existed.

Phase 1 habitats within the onshore cable route were summarised into the following habitat categories (0.3 % of land could not be accessed):

- Arable land and grassland, 78.3 %;
- Built-up areas, 8.7 %;
- Woodland, 4.7 %;
- Scrub, tall herb and fern, 2.4 %;
- Coastland, 1.9 %;
- Mire, 1.7 %;
- Water and wetland features, 1.3 %; and
- Rock and quarry, 0.7 %.

Key phase 1 habitats within these categories are summarised below.

5.2.1 Arable Land and Grassland

The prevalence of this habitat category (78.3 %) underscores the predominance of agriculture within the landscape along the onshore cable route. Arable land (69.9 %) was the most widespread phase 1 habitat, comprising mostly barley, wheat, oilseed rape, oats, silage, potatoes and short-term grazing. Improved grassland (6.5 %) was the second most widespread habitat. Semi-improved neutral grassland (0.9 %), poor semi-improved grassland (0.7 %), unimproved neutral grassland (0.3 %) and marshy grassland (0.04 %) comprised the remaining phase 1 habitats within this category.

Arable land and grassland within the onshore cable route potentially overlaps with six UK BAP priority habitats (arable field margins; coastal and floodplain grazing marsh; lowland meadows; upland hay meadows; maritime cliff and slopes; and purple moor grass and rush pastures) and three NE LBAP priority habitats (farmland; and field margins and boundary habitats).

5.2.2 Built-up Areas

The low occurrence of this habitat category (8.7 %) highlights the largely rural nature of the landscape within the onshore cable route. Buildings and road (each 3.0 %) were jointly the third most widespread phase 1 habitats within the onshore cable route, with a small concentration at Fraserburgh. Amenity grassland (1.9 %), ephemeral short perennial (0.5 %) and bare ground (0.3 %) comprised the remaining phase 1 habitats within this category.

Built-up areas within the onshore cable route potentially overlap with one NE LBAP priority habitat (urban areas).

5.2.3 Woodland

The scarcity of this habitat category (4.7 %) reflects the openness of the landscape within the onshore cable route. Plantation woodland (4.3 %) was more common than semi-natural woodland (0.4 %), consistent with the managed nature of habitats within the onshore cable route. Plantation mixed (2.3 %), broadleaved (1.2 %) and coniferous (0.8 %) woodland mainly occurred as commercial forestry blocks or shelter belts, or along roadsides and around farm buildings. Semi-natural broadleaved (0.2 %), semi-natural mixed (0.2 %) and semi-natural coniferous (0.002 %) woodland mostly occurred as small, disconnected linear features. Woodlands were usually mature and comprised the following species: Sitka spruce (*Picea sitchensis*), lodgepole pine (*Pinus contorta*), Scots pine (*Pinus sylvestris*), silver birch, sycamore (*Acer pseudoplatanus*), pedunculate oak (*Quercus robur*), rowan, goat willow (*Salix caprea*) and wych elm (*Ulmus glabra*).

Woodland within the onshore cable route potentially overlaps with ten UK BAP priority habitats (lowland beech and yew woodland; lowland mixed deciduous woodland; lowland wood-pastures and parkland; upland birchwoods; upland mixed ashwoods; upland oakwood; wet woodland; aquifer-fed naturally fluctuating water bodies; maritime cliff and slopes; and native pinewoods) and two NE LBAP priority habitats (wood pasture, parkland and wayside trees; and wet and riparian woodland).

5.2.4 Scrub, Tall Herb and Fern

Tall ruderal herb and fern (1.5 %) was the most common phase 1 habitat within this category, mostly bordering linear features such as railway lines, field boundaries and watercourses. Rosebay willowherb (*Epilobium angustifolium*) was the most widespread species, alongside common nettle (*Urtica dioica*) and broadleaved dock (*Rumex obtusifolius*). Scattered (0.6 %) and dense/continuous (0.2 %) scrub occurred on many field verges, along drainage ditches and among grazed fields. Common gorse (*Ulex europaeus*) was the most frequent species, with occasional rowan, goat willow and silver birch seedlings interspersed.

Scrub, tall herb and fern within the onshore cable route potentially overlaps with nine UK BAP priority habitats (aquifer-fed naturally fluctuating water bodies; lowland beech and yew woodland; lowland mixed deciduous woodland; lowland wood-pastures and parkland; native pinewoods; upland birchwoods; upland mixed ashwoods; upland oakwood; and wet woodland) and one NE LBAP priority habitat (field margins and boundary habitats).

5.2.5 Coastland

This habitat category comprised only dune grassland (1.9 %) (Photo 2), where marram (*Ammophila arenaria*) was dominant alongside lady's bedstraw (*Galium verum*), dogwood (*Cornus* spp.) and cowslip (*Primula verus*). This habitat has been much reduced by development of the Fraserburgh Golf Club (phase 1 habitat amenity grassland) at the north end of the onshore cable route.

Coastland within the onshore cable route potentially overlaps with five Annex I habitats (shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes'); fixed dunes with herbaceous vegetation ('grey dunes'); Atlantic decalcified fixed dunes (*Calluno-Ulicetea*); humid dune slacks; and embryonic shifting dunes), two UK BAP priority habitats (coastal sand dunes; and lowland dry acid grassland) and three NE LBAP priority habitats (coastal habitats and shingle; Moray Coast; and estuarine and intertidal habitats).

5.2.6 Mire

Mire accounted for 1.7 % of phase 1 habitats within the onshore cable route.

Mire within the onshore cable route potentially overlaps with three Annex I habitats (degraded raised bogs still capable of natural regeneration; blanket bog; and depressions on peat substrates of the *Rhynchosporion*), four UK BAP priority habitats (blanket bog; lowland raised bog; fens; and maritime cliff and slopes) and two NE LBAP priority habitats (lowland raised bog; and wetland).

Peat in the superficial geology occurs in 3 areas within the onshore cable route: one wide swathe and two small areas at NK014546 and NK043499. For detail on peat, refer to Chapter 3.7 – Hydrology, Geology and Hydrogeology of the ES.

Dry Modified Bog

The phase 1 habitat dry modified bog (0.6 %) was recorded in four areas within the onshore cable route (from north to south):

- In the centre of the wide swathe of peat in the superficial geology, blanket bog had been damaged by heather beetle and/or burning. With the heather dead/dying and increased coverage of wavy hair-grass (*Deschampsia flexuosa*), the habitat had become dry modified bog (NK005549, TNE41). This bog likely derived from NVC habitat M19 *Calluna vulgaris-Eriophorum vaginatum*; M19a *Erica tetralix* sub-community;
- Between the wide swathe of peat in the superficial geology and the small area of peat at NK014546, dry modified bog (NK010543, TNE39, Photo 3) occurred again where blanket bog had been damaged, in this case by drainage, regeneration of trees and other works possibly related to the adjacent decommissioned refuse tip. The area closely resembled NVC habitat M17a, but due to lack of *Sphagnum* mosses and damage from the above sources, it was classed as dry modified bog. The moss *Sphagnum fallax* was only recorded in ditches, with occasional patches of the moss *Sphagnum capillifolium* among haretail cottongrass (*Eriophorum vaginatum*). In wet depressions, haretail cottongrass was more prevalent than ling heather (*Calluna vulgaris*); however on dry hummocks the reverse was true. As with the bog previously described (NK005549, TNE41), this bog likely derived from NVC habitat M19a *Calluna vulgaris-Eriophorum vaginatum*;
- On the southern edge of the wide swathe of peat in the superficial geology, dry modified bog (NK011531, TNE33, Photo 4) occurred with a small section of *Sphagnum* mosses; and
- Approximately 1.5 km south of the wide swathe of peat in the superficial geology, dry modified bog (NK011515, TNE27, Table 22) occurred at an area

of deep peat and convergence of the phase 1 habitats acid/neutral flush and spring, tall ruderal herb and fern, swamp and scattered trees. The bog was classified as NVC habitat M19 *Calluna vulgaris-Eriophorum vaginatum*: M19a *Erica tetralix* sub-community.

Blanket Bog

The phase 1 habitat blanket bog (0.6 %) was also recorded in four areas within the onshore cable route (from north to south):

- On the northern edge of the wide swathe of peat in the superficial geology, blanket bog (NK004551) bordered a large area of the phase 1 habitat acid/neutral flush and spring;
- On the northern edge of the wide swathe of peat in the superficial geology, blanket bog (NK007551, TNE42, Tables 28 and 29) closely resembled NVC habitat M19 *Calluna vulgaris-Eriophorum vaginatum*: M19a *Erica tetralix* sub-community;
- Just outside the southeast corner of the wide swathe of peat in the superficial geology, blanket bog (NK005535, TNE34, Tables 24 and 25 and Photo 5) was grazed by livestock, had no trees, and yet was still active with some patches of bare peat. The area closely resembled NVC habitat M19 *Calluna vulgaris-Eriophorum vaginatum*: M19a *Erica tetralix* sub-community. Harestail cottongrass was most common, with varying cover of ling heather and *Sphagnum* mosses. Species favouring drier conditions occurred on hummocks and drier areas of bog, specifically the moss *Hypnum jutlandicum*, heath bedstraw (*Galium saxatile*) and tormentil (*Potentilla erecta*). While *Sphagnum* mosses occurred in the depressions and wetter areas of bog; and
- In the southeast corner of the wide swathe of peat in the superficial geology, an area of blanket bog (NK014536, TNE36, Tables 26 and 27 and Photo 6) closely resembled NVC habitat M17a *Drosera rotundifolia-Sphagnum* spp. sub-community. This bog was drier than that previously described (NK005535, TNE34), with *Sphagnum* mosses only occurring in isolated pools. The moss *Hypnum jutlandicum* was more common here, with the moss *Pleurozium schreberi* and a greater coverage of way hair-grass, indicating drier conditions. Scattered trees, specifically silver birch and goat willow, will dry the peat to some extent. Drainage channels cut across the bog will also have a drying effect.

Acid/Neutral Flush and Spring

Unlike dry modified and blanket bog, acid/neutral flush and spring was less closely associated with peat in the superficial geology. This phase 1 habitat (0.5 %) was recorded in several areas within the onshore cable route (from north to south):

- Two areas of acid/neutral flush and spring (NK014632 and NK013631) were recorded adjacent to the phase 1 habitats marginal vegetation and inundation vegetation;
- An area of acid/neutral flush and spring (NK007626, TNE53) closely resembled the NVC habitats M23 *Juncus effusus-Galium palustre* and MG10 *Holcus lanatus-Juncus effusus* on the outer, drier edges, and M4 *Carex rostrata-Sphagnum fallax* in the wetter centre;
- Areas of acid/neutral flush and spring (NK015614, NK017609 and NK019610) occurring among woodlands were classified as NVC habitats M23 *Juncus effusus-Galium palustre*, M4 *Carex rostrata-Sphagnum fallax*, M5 *Carex rostrata-Sphagnum squarrosum* and M6 *Carex echinata-Sphagnum fallax/denticulatum*;
- An area of acid/neutral flush and spring (NK005550, TNE43, Table 30) was recorded next to a pond. This area was classified as NVC habitat M4 *Carex rostrata-Sphagnum fallax*. The following typical species were recorded: the *Sphagnum* mosses *Sphagnum fallax* and *Sphagnum palustre*, the moss *Polytrichum commune*, bottle sedge (*Carex rostrata*), soft rush (*Juncus effusus*) and haretail cottongrass;
- A nearby area of acid/neutral flush and spring (NK005550, TNE43) was classified as NVC habitat M6 *Carex echinata-Sphagnum fallax/denticulatum*: M6c *Juncus effusus* sub-community. Soft rush in this area was dense and tall (approximately 160 cm) with a species-poor understory. The mosses *Sphagnum fallax* and *Polytrichum commune*, Yorkshire fog (*Holcus lanatus*) and sheep's sorrel (*Rumex acetosella*) were present. This area was drier than the flush previously described (NK005550, TN43);
- A nearby bog pool community comprised areas of NVC habitats MG10 *Holcus lanatus-Juncus effusus* sub-community (NK004547, TNE44, Table 31) and M2 *Sphagnum cuspidatum/fallax*: M2b *Sphagnum fallax* sub-community (NK004550, TNE44A, Table 32 and Photo 7). Both *Sphagnum* species were present in the pools with ling heather, haretail cottongrass and common bog cotton (*Eriophorum angustifolium*), while wavy hair-grass occurred on the edges;
- An area of acid/neutral flush and spring (NK008552, TNE45) occurring around a new pond was classified as NVC habitat M23 *Juncus effusus-Galium palustre*;
- An area of acid/neutral flush and spring (NK004536, TNE35) was classified as NVC habitat M23 *Juncus effusus-Galium palustre*;
- An area of acid/neutral flush and spring (NK012515, TNE27, Table 23) occurred at an area of deep peat and convergence of the phase 1 habitats dry modified bog, tall ruderal herb and fern, swamp and scattered trees. The flush was classified as NVC habitat M23 *Juncus effusus-Galium palustre*;
- An area of acid/neutral flush and spring near the River Ugie (NK028504, TNE25, Tables 20 and 21) was classified as NVC habitat M5 *Carex rostrata-Sphagnum*

squarrosus. This flush was species-rich, with the following tall forbs recorded: meadowsweet (*Filipendula ulmaria*), marsh bedstraw (*Galium palustre*), water horsetail (*Equisetum fluviatile*), two-rowed watercress (*Nasturtium officinale*), water forget-me-not (*Myosotis scorpioides*) and bottle sedge;

- An area of acid/neutral flush and spring (NK038495, TNE11, Photo 8) occurred around a small pond with species-rich vegetation; and
- One area of acid/neutral flush and spring (NK044485, TNE9) was difficult to classify. This area was wet over peat depth of >50 cm and although some soft rush and wavy hair-grass were recorded, large patches of marsh cinquefoil (*Potentilla palustris*) were also present.

5.2.7 Water and Wetland Features

Due to issues surrounding lone working near water and also unstable, soft ground, survey of water and wetland features was restricted to areas considered safe for lone access. Running water (0.5 %) was common within the onshore cable route. Marginal vegetation (0.4 %) was largely associated with the River Ugie. Common reed (*Phragmites australis*) was often dominant, with occasional meadowsweet and rosebay willowherb. Standing water (0.2 %) occurred as ponds, species included common clubrush (*Scirpus lacustris*), pondweed (*Potamogeton* spp.), duckweed (*Lemna minor*), branched bur-reed (*Sparganium erectum*) and bulrush (*Typha latifolia*). Swamp (0.2 %) occurred in five areas: next to an old railway (NK018606); in a wet area (NK013514) associated with tall ruderal herb and fern, acid neutral flush and spring and dry modified bog; a wet corner (NK015508, TNE26B) of arable land; adjacent to the River Ugie (NK038497, TNE23, Photo 10) with dominant common reed, some meadowsweet and other tall forbs; and in a woodland (NK046482, TNE6C, Photo 9) alongside common reed and occasional soft rush. Inundation vegetation (0.1 %) occurred in two areas (NK013631, TNE54 and NK000620). This phase 1 habitat was not associated with watercourses, but rather with wet edges of arable land, often merging with tall ruderal herb and fern.

Water and wetland features within the onshore cable route potentially overlap with three Annex I habitats (hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.; water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation; and oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea*), five UK BAP priority habitats (maritime cliff and slopes; aquifer-fed naturally fluctuating water bodies; fens; purple moor grass and rush pastures; and reedbeds) and three NE LBAP priority habitats (rivers and burns; wetland; and field margins and boundary habitats).

5.2.8 Rock and Quarry

Seven areas of quarry habitat (0.4 %) occurred within the onshore cable route: (NK012616, TNE51; NK011607, TNE50; NK010509, TNE26A, Photo 11; NK035494; NK034490; NK037489, TNE13, Photo 12; NK054487, TNE10A). Three sand quarries were active, while the four inactive quarries were largely overgrown with common gorse and other scrub species, or exhibited short growth on areas of sand where succession can be slow.

Table 19. Phase 1 habitat survey target notes

Target note no.	Easting	Northing	Details
E1	405282	847140	Previous quarry now used for shooting practice. Common gorse and rosebay willowherb common on slopes, some elder and rowan also.
E6B	404558	848255	Pond used for shooting, only apparent vegetation is soft rush.
E6C	404682	848240	Swamp in a woodland, supporting common reed and occasional soft rush (Photo 9).
E7	404785	848272	Pond used for shooting. More vegetation than TNE6B, common reed dominant.
E8	404454	848520	Pond surrounded by trees/scrub and common reed.
E9	404396	848560	Acid/neutral flush and spring, difficult to classify, some soft rush and wavy hair-grass, also large patches of marsh cinquefoil.
E10A	405421	848710	Active sand quarry with small sand martin colony on eastern bank.
E10C	404241	849386	Pond with recent works.
E11	403875	849515	Acid/neutral flush and spring around small pond, species-rich vegetation (Photo 8).
E12	404091	848696	Newly formed/reinstated pond.
E13	403779	848988	Inactive sand quarry, some ponds still present, some regeneration of vegetation occurring (Photo 12).
E14	403917	849053	Inactive sand quarry, pond has dried out, some goat willow.
E17	403577	849288	Ponds in inactive sand quarry, some drying out.
E18	403515	849434	Pond in inactive sand quarry, drying out.
E19	403687	849426	Stand of Japanese knotweed (Photo 1).
E20	403648	849336	Stand of Japanese knotweed.
E21	403499	849544	Stand of Japanese knotweed.
E23	403880	849741	Swamp adjacent to River Ugie, associated with common reed, meadowsweet and other tall forbs (Photo 10)
E25	402825	850453	Acid/neutral flush and spring, M5 <i>Carex rostrata</i> - <i>Sphagnum squarrosum</i> (NVC quadrats carried out, Tables 20 and 21).
E26A	401001	850900	Inactive quarry, common gorse dominant, bramble (<i>Rubus fruticosus</i>) and nettle (Photo 11).
E26B	401495	850818	Swamp and small pond.
E27	401195	851581	Dry modified bog, M19 <i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> : M19a <i>Erica tetralix</i> sub-community (NVC quadrat carried out, Table 22); and acid/neutral flush and spring, M23 <i>Juncus effusus</i> - <i>Galium palustre</i> (NVC quadrat carried out, Table 23).
E29	400411	852499	Reclaimed quarry.
E30	400488	852389	Sand martin colony around edge of pond.
E31	401169	852854	Biogas plant with recovering vegetation.
E32	401161	852998	Settlement ponds for biogas plant.
E33	401193	853179	Dry modified bog, with a small section of <i>Sphagnum</i> mosses (Photo 4).

Target note no.	Easting	Northing	Details
E34	400536	853503	Blanket bog, M19 <i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> : M19a <i>Erica tetralix</i> sub-community (NVC quadrats carried out, Tables 24 and 25 and Photo 5).
E35	400454	853619	Acid/neutral flush and spring, M23 <i>Juncus effusus</i> - <i>Galium palustre</i> .
E36	401493	853626	Blanket bog, M17a <i>Drosera rotundifolia</i> - <i>Sphagnum</i> spp. sub-community (NVC quadrats carried out, Tables 26 and 27 and Photo 6).
E37	401053	854067	Reclaimed refuse tip.
E38	400947	854149	Pond in reclaimed refuse tip.
E39	401036	854382	Dry modified bog, likely derived from M19a <i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> (Photo 3).
E40A	401105	854200	Possible signs of water vole.
E40B	400583	855166	Pond used for raising ducks for shooting.
E41	400508	854925	Dry modified bog, likely derived from M19 <i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> : M19a <i>Erica tetralix</i> sub-community.
E42	400706	855166	Blanket bog, M19 <i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> : M19a <i>Erica tetralix</i> sub-community (NVC quadrats carried out, Tables 28 and 29).
E43	400544	855054	Acid/neutral flush and spring, M4 <i>Carex rostrata</i> - <i>Sphagnum fallax</i> (NVC quadrat carried out, Table 30).
E44	400426	854793	Bog pool community, MG10 <i>Holcus lanatus</i> - <i>Juncus effusus</i> sub-community (NVC quadrat carried out, Table 31).
E44A	400467	855024	Bog pool community, M2 <i>Sphagnum cuspidatum/fallax</i> : M2b <i>Sphagnum fallax</i> sub-community (NVC quadrat carried out, Table 32 and Photo 7).
E45	400889	855255	Acid/neutral flush and spring around a new pond, M23 <i>Juncus effusus</i> - <i>Galium palustre</i> .
E46	401402	858689	Stand of Japanese knotweed.
E49	400118	861346	Fishing loch.
E50	401107	860778	Partially active sand quarry.
E51	401292	861607	Partially active quarry.
E53	400784	862663	Acid/neutral flush and spring, M23 <i>Juncus effusus</i> - <i>Galium palustre</i> and MG10 <i>Holcus lanatus</i> - <i>Juncus effusus</i> on the outer, drier edges, and M4 <i>Carex rostrata</i> - <i>Sphagnum fallax</i> in the wetter centre.
E54	401389	863167	Inundation vegetation surrounded by acid/neutral flush and spring and swamp.
E55	399560	862751	New pond near houses.
E56	400898	865478	Dune grassland, marram dominant (Photo 2).
T78	407577	845646	Derelict stone cottage in moderate condition. Good barn owl nesting/roosting potential with pellets found inside.
T79	407310	845803	Corn bunting singing on wire.
T82	407759	845496	Dense neutral grassland, semi-natural and plantation broadleaved woodland surrounding pond. Good barn owl foraging habitat.
T83	407728	845737	Minor watercourse with dense neutral grassland margins.
T87	407369	847023	Concrete tracks and runway of former Longside Airfield, now grazed by sheep and overgrown with improved grasses and ephemeral weeds including pineapple weed (<i>Matricaria matricioides</i>). Occasional small humps overgrown with grass and tall ruderal vegetation concealing former brick airfield bunkers.
T89	406852	847403	Plantation broadleaved woodland surrounding West Longhill and Richmond properties comprising sycamore, wych elm, Sitka spruce, wild cherry (<i>Prunus avium</i>), crack willow (<i>Salix fragilis</i>), alder (<i>Alnus glutinosa</i>) and field maple (<i>Acer campestre</i>).
T90	406301	847572	Corn bunting singing.
T94	406105	848177	Quail calling in field.

Target note no.	Easting	Northing	Details
T95	406988	845978	Tall ruderal dominated by broadleaved dock, scentless mayweed (<i>Tripleurospermum inodorum</i>), groundsel (<i>Senecio vulgaris</i>), white clover (<i>Trifolium repens</i>), creeping buttercup (<i>Ranunculus repens</i>) and American willowherb (<i>Epilobium ciliatum</i>).
T96	407035	846071	Pond surrounded by reed canary grass (<i>Phalaris arundinacea</i>) with occasional branched bur-reed (<i>Sparganium erectum</i>) but few if any other aquatic species. Central island with reed canary grass.
T97	406481	846568	Plantation broadleaved woodland associated with Faichfield House: mature sycamore, ash (<i>Fraxinus excelsior</i>) and beech (<i>Fagus sylvatica</i>) with occasional Sitka spruce.
T98	406548	846925	Two brown hares in field.
T99	407709	845374	Plantation broadleaved woodland dominated by silver birch.
T100	407809	845309	Pond within plantation broadleaved woodland surrounded by willow spp. scrub, not visited only view from nearby roadsides.
T102	410922	843153	Dense scrub/plantation on bund embankments surrounding and screening facility/works behind, comprising blackthorn (<i>Prunus spinosa</i>), hawthorn, hazel, elder, alder and buckthorn (<i>Rhamnus</i> spp.).
T104	409674	845765	Plantation mixed woodland (too difficult to compartmentalise) comprising Sitka spruce, alder, sycamore, ash, silver birch and hazel.
T108	412228	842872	Small roadside pond, covered with 50 % duckweed and 50 % spike rush, with lesser spearwort (<i>Ranunculus flammula</i>) and soft rush on margins.

Table 20. Domin scale for NVC quadrats carried out at TNE25, acid/neutral flush and spring, M5 *Carex rostrata*-*Sphagnum squarrosum*

Species	Domin scale			Domin range	Frequency (in descending order)
	Quadrat 1	Quadrat 2	Quadrat 3		
<i>Epilobium palustre</i>	4	4	2	2-4	V
<i>Viola palustris</i>	2	5	2	2-5	V
<i>Deschampsia flexuosa</i>	5	-	4	0-5	III
<i>Filipendula ulmaria</i>	8	8	-	0-8	III
<i>Galium palustre</i>	-	3	2	0-3	III
<i>Juncus acutiflorus</i>	-	8	6	0-8	III
<i>Equisetum palustre</i>	-	1	-	0-1	I
<i>Carex rostrata</i>	-	-	9	0-9	I
<i>Juncus effusus</i>	7	-	-	0-7	I
<i>Nasturtium officinale</i>	-	-	4	0-4	I
Open water	-	-	5	0-5	I

Table 21. Physical and biological conditions of NVC quadrats carried out at TNE25, acid/neutral flush and spring, M5 *Carex rostrata*-*Sphagnum squarrosum*

Quadrat	Slope	Facing	Soil depth cm	Vegetation height cm
1	1	S	>50	5-170
2	Flat	-	>50	20-150
3	Flat	-	>50	5-60

Table 22. Domin scale for NVC quadrat carried out at TNE27, dry modified bog, M19 *Calluna vulgaris*-*Eriophorum vaginatum*: M19a *Erica tetralix* sub-community (flat slope, peat depth >50 cm, vegetation height 5-50 cm)

Species	Domin scale
<i>Carex nigra</i>	3
<i>Deschampsia flexuosa</i>	8
<i>Galium saxatile</i>	7
<i>Gymnocarpium dryopteris</i>	3
<i>Holcus lanatus</i>	3
<i>Hypnum jutlandicum</i>	7
<i>Rhytiadelphus loreus</i>	6

Table 23. Domin scale for NVC quadrat carried out at TNE27, acid/neutral flush and spring, M23 *Juncus effusus*-*Galium palustre* (flat slope, peat depth >50 cm, vegetation height 10-140 cm)

Species	Domin scale
<i>Chamaenerion angustifolium</i>	4
<i>Cirsium palustre</i>	3
<i>Deschampsia cespitosa</i>	3
<i>Deschampsia flexuosa</i>	3
<i>Filipendula ulmaria</i>	8
<i>Holcus lanatus</i>	3
<i>Juncus effusus</i>	7
<i>Rumex acetosella</i>	5
<i>Viola palustre</i>	5

Table 24. Domin scale for NVC quadrats carried out at TNE34, blanket bog, M19 *Calluna vulgaris*-*Eriophorum vaginatum*: M19a *Erica tetralix* sub-community

Species	Domin scale			Domin range	Frequency (in descending order)
	Quadrat 1	Quadrat 2	Quadrat 3		
<i>Calluna vulgaris</i>	5	6	5	5-6	V
<i>Eriophorum vaginatum</i>	8	8	7	7-8	V
<i>Deschampsia flexuosa</i>	4	6	-	0-6	III
<i>Hypnum jutlandicum</i>	7	6	-	0-7	III
<i>Potentilla erecta</i>	-	4	1	0-4	III
<i>Sphagnum fallax</i>	-	5	8	0-8	III
Bare peat	2	-	-	0-2	I
<i>Cladonia diversa</i>	2	-	-	0-2	I
<i>Galium saxatile</i>	-	4	-	0-4	I
<i>Gymnocarpium dryopteris</i>	-	3	-	0-3	I
<i>Polytrichum commune</i>	5	-	-	0-5	I

Table 25. Physical and biological conditions of NVC quadrats carried out at TNE34, blanket bog, M19 *Calluna vulgaris*-*Eriophorum vaginatum*: M19a *Erica tetralix* sub-community

Quadrat	Slope	Facing	Soil depth cm	Vegetation height cm
1	Flat	-	>50	2-35
2	1	NW	>50	5-55
3	1	W	>50	15-55

Table 26. Domin scale for NVC quadrats carried out at TNE36, blanket bog, M17a *Drosera rotundifolia*-*Sphagnum* spp. sub-community

Species	Domin scale			Domin range	Frequency (in descending order)
	Quadrat 1	Quadrat 2	Quadrat 3		
<i>Calluna vulgaris</i>	5	7	7	5-7	V
<i>Deschampsia flexuosa</i>	5	7	7	5-7	V
<i>Hypnum jutlandicum</i>	7	8	5	5-8	V
<i>Polytrichum commune</i>	6	-	-	0-6	V
<i>Eriophorum vaginatum</i>	7	7	-	0-7	III
<i>Galium saxatile</i>	-	3	5	0-5	III
<i>Gymnocarpium dryopteris</i>	4	3	-	0-4	III
<i>Pleurozium schreberi</i>	5	-	-	0-5	I
<i>Epilobium palustre</i>	3	-	-	0-3	I
<i>Carex nigra</i>	-	-	1	0-1	I
<i>Sphagnum capillifolium</i>	5	-	-	0-5	I

Table 27. Physical and biological conditions of NVC quadrats carried out at TNE36, blanket bog, M17a *Drosera rotundifolia*-*Sphagnum* spp. sub-community

Quadrat	Slope	Facing	Soil depth cm	Vegetation height cm
1	Flat	-	>50	5-60
2	Flat	-	>50	5-50
3	Flat	-	>50	5-50

Table 28. Domin scale for NVC quadrats carried out at TNE42, blanket bog, M19 *Calluna vulgaris*-*Eriophorum vaginatum*: M19a *Erica tetralix* sub-community

Species	Domin scale				Domin range	Frequency (in descending order)
	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4		
<i>Eriophorum vaginatum</i>	8	8	3	6	3-8	V
<i>Polytrichum commune</i>	6	4	3	-	0-6	IV
<i>Calluna vulgaris</i>	-	-	8	8	0-8	III
<i>Cladonia portentosa</i>	-	-	5	6	0-6	III
<i>Deschampsia flexuosa</i>	5	4	-	-	0-5	III
<i>Hypnum jutlandicum</i>	-	-	8	8	0-8	III
<i>Sphagnum fallax</i>	6	6	-	-	0-6	III
<i>Sphagnum palustre</i>	5	6	-	-	0-6	III
<i>Gymnocarpium dryopteris</i>	-	2	-	-	0-2	I
<i>Rumex acetosella</i>	2	-	-	-	0-2	I

Table 29. Physical and biological conditions of NVC quadrats carried out at TNE42, blanket bog, M19 *Calluna vulgaris*-*Eriophorum vaginatum*: M19a *Erica tetralix* sub-community

Quadrat	Slope	Facing	Soil depth cm	Vegetation height cm
1	Flat	-	>50	5-50
2	Flat	-	>50	15-60
3	1	NE	>50	5-65
4	1	SW	>50	3-40

Table 30. Domin scale for NVC quadrat carried out at TNE43, acid/neutral flush and spring, M4 *Carex rostrata*-*Sphagnum fallax* (flat slope, peat depth >50 cm, vegetation height 15-110 cm)

Species	Domin scale
<i>Aulacomnium palustre</i>	5
<i>Carex rostrata</i>	5
<i>Juncus effusus</i>	7
<i>Sphagnum fallax</i>	6
<i>Sphagnum palustre</i>	5

Table 31. Domin scale for NVC quadrat carried out at TNE44, acid/neutral flush and spring, MG10 *Holcus lanatus*-*Juncus effusus* sub-community (flat slope, peat depth >50 cm, vegetation height 15-160 cm)

Species	Domin scale
<i>Galium palustre</i>	3
<i>Holcus lanatus</i>	7
<i>Juncus effusus</i>	8

Table 32. Domin scale for NVC quadrat carried out at TNE44A, acid/neutral flush and spring, M2 *Sphagnum cuspidatum*/fallax: M2b *Sphagnum fallax* sub-community (flat slope, peat depth >50 cm, vegetation height 15-160 cm)

Species	Domin scale
<i>Deschampsia flexuosa</i>	5
<i>Eriophorum angustifolium</i>	5
<i>Eriophorum vaginatum</i>	5
<i>Sphagnum cuspidatum</i>	9



Photo 1. Japanese knotweed (NK036494, TNE19)



Photo 2. Dune grassland dominated by marram (NK008654, TNE56)



Photo 3. Dry modified bog (NK010543, TNE39)



Photo 4. Dry modified bog (NK011531, TNE33)

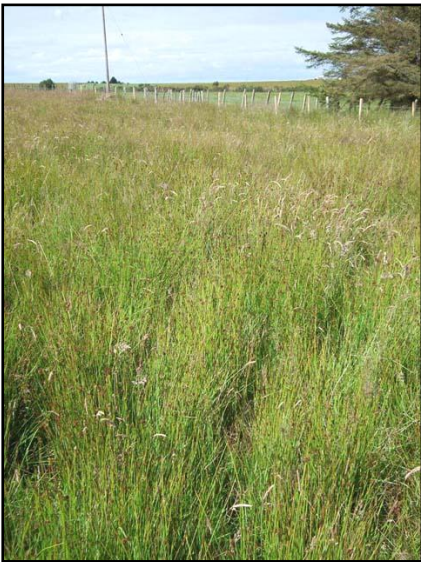


Photo 5. Blanket bog (NK005535, TNE34)



Photo 6. Blanket bog (NK014536, TNE36)



Photo 7. Acid/neutral flush and spring (NK004550, TNE44A)



Photo 8. Acid/neutral flush and spring (NK038495, TNE11)



Photo 9. Swamp within woodland (NK046482, TNE6C)



Photo 10. Swamp adjacent to River Ugie (NK038497, TNE23)



Photo 11. Inactive quarry (NK010509, TNE26A)



Photo 12. Inactive sand quarry (NK037489, TNE13)

5.3 Protected Species Survey Results

Baseline field survey results show that the habitats within the onshore cable route supports a typical assemblage of farmland and freshwater protected species; specifically, otter, a UK-protected species, and badger, protected under the Protection of Badgers Act 1992. Twenty-four records of otter field evidence and 53 records of badger field evidence were made within the 44.5 km² of the onshore cable route (Table 33, Photos 13-19 and Figures 40-54). No field evidence of other protected species was found. For badger sett records, refer to Confidential Appendix 4.7 B of the ES.

Table 33. Protected species survey results: field evidence records (for badger sett records refer to Confidential Appendix 4.7 B of the Telford, Stevenson and MacColl Wind Farms Environmental Statement)

Species	Easting	Northing	Field evidence	Details
Otter	400061	864199	Spraint	Fresh spraint.
Otter	400118	861382	Spraint	Spraint.
Otter	400300	862382	Print	8 otter prints.
Otter	400593	855135	Spraint	Spraint and remains of fish bones and scales next to fishing pond.
Otter	400599	855189	Spraint	Latrine.
Otter	400602	855136	Couch	Fish bones and beetles in spraint. Wooden enclosure - no roof (hide?) seems to have been used by otter as a resting place.
Otter	400603	855136	Spraint	Spraint and possible couch. Fish bones and beetles in spraint. Rabbit hole enlarged in warren, no spraint or latrine.
Otter	401263	863550	Spraint and prints	Fresh otter spraint and 10 prints.
Otter	402208	850191	Spraint	Old, located on rock in river. Large spraint pile.
Otter	402285	850341	Spraint	Old, located on rock in river. At least 3.
Otter	402318	850389	Spraint	Large pile of spraint under bridge.
Otter	402327	850378	Spraint	Old, under bridge.
Otter	403606	849891	Couch	Likely couch area and slide. Flattened dried grass.
Otter	404101	847695	Spraint	Under bridge on rock, old.
Otter	404101	847727	Print	Under bridge in sand banks, steep and water too deep to get close but potential for resting site in cavities below bridge.
Otter	404111	849032	Couch	Bank overhang, no signs found though.
Otter	404125	849204	Spraint	Several (3) old spraints on group of rocks.
Otter	404196	849285	Couch	Rest-up area under bridge and spraint.
Otter	405212	848586	Spraint	Dropping observed using bins on shingle on river.
Otter	405701	847152	Spraint	Under bridge. Both sides are good rest-up/shelter areas.
Otter	405834	847338	Spraint	On metal drain pipe.
Otter	405950	847720	Spraint	Fresh spraint on rock under trees. Scramble marks up bank under tree. Good rest-up potential.
Otter	405950	847726	Spraint	Fresh.
Otter	407939	846084	Spraint	On rock under bridge, tarry and very old. Too steep for close inspection.
Badger	400421	854674	Latrine	In treeline.
Badger	400512	860854	Latrine	Latrine.
Badger	400547	860284	Foraging sign	Connected by runs and snuffle holes.
Badger	400591	860322	Foraging sign	Connected by runs and snuffle holes.

Species	Easting	Northing	Field evidence	Details
Badger	400592	860322	Scratching post	On young sycamore.
Badger	400594	860322	Latrine	Latrine.
Badger	400631	855543	Hair	Hair stuck in barbed wire. Heading into wood toward west Cairnchina.
Badger	400833	860669	Print	3 badger prints.
Badger	400929	856603	Latrine	Old latrine in path of conifer plantation.
Badger	401195	859981	Hair	Badger hairs on wire at fence crossing.
Badger	401232	860062	Foraging sign	Snuffle holes.
Badger	401257	860167	Latrine	Badger latrine.
Badger	401381	860336	Foraging sign	Evidence of badger foraging.
Badger	401454	853873	Hair	Badger hair on wire fence between arable field and gorse.
Badger	401458	853861	Latrine	Latrine found under fence, next to well worn path that runs into area of gorse.
Badger	401670	861039	Foraging sign	Evidence of badger foraging in woodland.
Badger	401767	860974	Foraging sign	Evidence of badger foraging in woodland.
Badger	401955	850549	Hair	Path and badger hairs found.
Badger	402301	850382	Foraging sign	Path led to hole and eaten wasp nest.
Badger	402750	851039	Foraging sign	Foraging.
Badger	402790	851014	Foraging sign	Roots and herbs dug up, area of digging.
Badger	402810	851024	Latrine	Fresh latrine. Badger dropping on path.
Badger	403695	849022	Foraging sign	Claw marks and snuffle holes in sand/gravel.
Badger	406100	846898	Latrine	Fresh droppings.
Badger	406376	846885	Latrine	8 latrines, only 1 fresh.
Badger	409528	845084	Hair	On barbed wire fence.
Badger	409744	845909	Foraging sign	Connected by runs and snuffle holes.



Photo 13. Badger foraging sign – snuffle hole



Photo 14. Badger latrine



Photo 15. Badger hair



Photo 16. Badger prints



Photo 17. Badger scratching post



Photo 18. Badger run



Photo 19. Otter spraint

5.4 Bat Roost and Habitat Suitability Survey Results

Baseline field survey results show that the habitat within the 44.5 km² of the onshore cable route has limited potential to support roosting, foraging or commuting bats (Tables 34 and 35, Photos 20-31 and Figures 55-69). Results reveal only small areas of highly suitable bat habitat: mature deciduous woodland near water set in a well-connected landscape with buildings. Limited potential is compounded by a lack of suitable linear features to connect the few areas of high suitability.

Table 34. Bat roost and habitat suitability survey target notes

Target note no.	Easting	Northing	Details
E2	405736	847164	Bridge with some gaps in stone, potentially suitable for roosting bats.
E3	405757	847242	Small brick building, potentially suitable for roosting bats.
E4	405783	848167	Bridge across old railway line, potentially suitable for roosting bats.
E5	405237	848105	Old railway bridge across South Ugie Water, potentially suitable for roosting bats (photo 24).
E6A	404613	847936	Bridge across old railway line, potentially suitable for roosting bats (photo 30).
E10B	404192	849296	Bridge, potentially suitable for roosting bats (photo 25).
E15	403043	849176	Old building, potentially suitable for roosting bats (photo 22).
E22	403558	848636	Old tree, potentially suitable for roosting bats.
E24	402313	850396	Bridge, potentially suitable for roosting bats (photo 31).
E26	402777	851061	Old buildings and trees, potentially suitable for roosting bats.
E28A	401545	851185	Old building surrounded by mature trees, potentially suitable for roosting bats.
E28B	400280	851755	Abandoned quarry and building, potentially suitable for roosting bats.
E28C	401490	851725	Old buildings and trees, potentially suitable for roosting bats (photo 23).
E47	401732	860258	Old railway bridge, potentially suitable for roosting bats.
E48	400264	861049	Old tree, potentially suitable for roosting bats (photo 21).
E51A	400264	862414	Bridge, potentially suitable for roosting bats.
E52	401057	863122	Bridge, potentially suitable for roosting bats.
E57	401499	862915	Old railway bridge, potentially suitable for roosting bats.

Target note no.	Easting	Northing	Details
E58	401231	863560	Old railway bridge, potentially suitable for roosting bats.
E59	401314	863402	Old railway bridge, potentially suitable for roosting bats.
T75	407864	846277	Derelict brick barn east of East Thunderton: low suitability for roosting.
T76	407467	846234	East Thunderton Farm: old barn potentially suitable for roosting bats, however all other buildings of low suitability.
T80	407295	845667	Stockbridge Farm: poor condition stone building, potentially suitable for roosting bats, also adjacent woodland potentially suitable for foraging.
T81	407573	845514	Derelict cottage in moderate-poor condition, potentially suitable for roosting bats.
T84	408129	845541	Craigievar/Denholm properties: relatively new/well maintained buildings, potentially of low suitability for roosting bats.
T85	408310	845337	Clubscross Farm: old farm buildings, medium suitability habitat for roosting bats.
T86	407543	846662	Corrugated building, potentially of low suitability for roosting bats.
T88	407144	847168	East Longhill Farm: stone farmhouse and associated farm buildings, medium suitability habitat for roosting bats.
T91	406921	847270	West Longhill: old buildings partially surrounded by small woodland, medium suitability habitat for roosting and foraging bats.
T92	406142	847891	Bridge of Buthlow: old building potentially suitable for roosting bats.
T93	406057	848147	Bridge over Burn of Faichfield: wrought iron soffit over brick/stone piers, potentially of low suitability for roosting bats.
T101	410554	844092	Wellington farm: dilapidated buildings potentially suitable for roosting bats, also adjacent woodland potentially suitable for foraging bats.
T103	409887	845667	Lochside Farm: dilapidated buildings potentially suitable for roosting bats.
T105	410233	845301	Cocklaw Mains and Cottages: farm buildings potentially of low suitability for roosting bats (corrugated iron), however one or two stone barns with potential suitability. Farmhouse and cottages potentially of low suitability (negligible gaps/cavities).

Table 35. Bat roost and habitat suitability survey interpretation notes

Interpretation note no.	Easting	Northing	Details
1	400192	864242	This woodland is potentially highly suitable for foraging, and appears to be of sufficient maturity to offer potentially highly suitable roosting cavities. Connected to waterbodies and a range of buildings with further roosting potential.
2	400318	863903	Difficult to assess maturity of these trees, however such parkland is often potentially highly suitable for roosting and foraging, particularly within this landscape of woodland, waterbodies and grazed fields.
3	400267	863013	These trees appear to be of sufficient maturity to offer potentially highly suitable roosting cavities. Connected to good foraging and roosting habitat.
4	401264	859653	Hedgerows with trees are favoured by foraging bats and mature trees may offer some roosting cavities. However given its broken connectivity this habitat is unlikely to be a good commuting route and is of potential medium suitability for foraging.
5	401168	858494	This old rail line offers potentially medium suitability habitat for commuting and foraging between woodland with buildings to the northwest and east.

Interpretation note no.	Easting	Northing	Details
6	400787	855211	These waterbodies may attract foraging bats, although rather exposed to the wind so potentially of low suitability. They may be used occasionally by soprano pipistrelle, common pipistrelle and Daubenton's bats. Connected to broken network of scrub and scrubby woodland of potential medium suitability for foraging and commuting.
7	400364	854707	This small group of mature trees may have cavities, there is a waterbody close by and the habitat is connected to other roosting and foraging habitat to the west by scrubby woodland, this habitat is therefore of potential medium suitability.
8	405182	848080	This small group of trees, connected to an old rail line, river and woodland is potentially highly suitable within this landscape.
9	405048	848599	This river and pond are rather exposed to wind and so offer potentially medium suitability habitat for foraging on calm nights.
10	406477	846843	These woodlands with buildings offer potentially medium suitability habitat for roosting and foraging, they are well-connected within the landscape.
12	410619	843945	This open area with minor treelines may be important to local bats, so these few trees which connect to the town and other buildings, and are close to some ponds and rough grassland, may be potentially highly suitable foraging and commuting habitat.
13	410077	845198	Same as interpretation note no. 12.
26	408513	845817	These isolated hedgerow/treelines are potentially of low suitability.
27	404555	848259	These ponds and young coniferous woodlands offer potentially medium suitability habitat for foraging.
28	403696	849878	This river is very open, so potentially of low suitability for foraging, although low disturbance.
29	401245	852104	These isolated trees may be felled, however potentially highly suitable foraging habitat.



Photo 20. Typical onshore cable route landscape of open arable land and improved grassland with little woodland, water, buildings or connectivity suitable for bats



Photo 21. Mature tree with good cavities, potentially highly suitable habitat for roosting bats (NK002610, TNE48)



Photo 22. Old building, potentially highly suitable habitat for roosting bats (NK030491, TNE15)



Photo 23. Old building, potentially highly suitable habitat for roosting bats (NK014517, TNE28C)



Photo 24. Bridge, potentially highly suitable habitat for roosting bats (NK052481, TNE5)



Photo 25. Bridge, potentially highly suitable habitat for roosting bats (NK041492, TNE10B)



Photo 26. Pond adjacent to woodland, potentially highly suitable habitat for foraging bats (NK047482)



Photo 27. Mature semi-natural woodland, potentially highly suitable habitat for foraging bats (NK044485)



Photo 28. Exposed pond, potentially of low suitability for foraging bats (NK011529)



Photo 29. Exposed pond, potentially of low suitability for foraging bats (NK008552)



Photo 30. Dismantled railway, potentially highly suitable habitat for commuting bats (NK046479, TNE6A)



Photo 31. Treeline, potentially highly suitable habitat for commuting bats (NK023504, TNE24)

Studies of bat habitat preferences show most species favour deciduous/mixed woodland and water for foraging. Bats favour landscapes with well-connected networks of different foraging habitats with abundant mature trees and buildings for roosting. They require a varied supply of insect prey throughout the year, thus intensive agricultural landscapes tend to be of low habitat suitability. Local climate is also important, with higher winds and lower night temperatures reducing bat activity. Consequently, the onshore cable route's northerly latitude and managed, open landscape of predominantly arable land and improved grassland, lacking well-connected networks of different foraging habitats, suggests low numbers and diversity of bats (Photo 20).

Grampian supports at least five resident bat species (Haddow and Herman, 2000):

- Soprano pipistrelle;
- Common pipistrelle;
- Brown long-eared bat;
- Daubenton's bat; and
- Natterer's bat.

Soprano pipistrelles use a wide range of habitats and roost in various buildings and trees, however they strongly favour foraging over water, especially rivers and lochs with marginal woodlands, yet few such waterbodies exist within the onshore cable route. However common pipistrelles are better adapted to agricultural landscapes with limited woodland and water, such as that within the onshore cable route. Daubenton's bat is a specialist of sheltered, calm water with a healthy chironomid midge population, yet few such waterbodies exist within the onshore cable route. Brown long-eared and Natterer's bats favour foraging habitat of mixed landscapes with mature woodland, and roosting habitat in old, large buildings, yet few such habitats exist within the onshore cable route. Thus, common pipistrelle is likely to be best adapted to the habitat within the onshore cable route.

5.5 Freshwater Pearl Mussel Survey Results

No freshwater pearl mussels were found within the onshore cable route.

6. References

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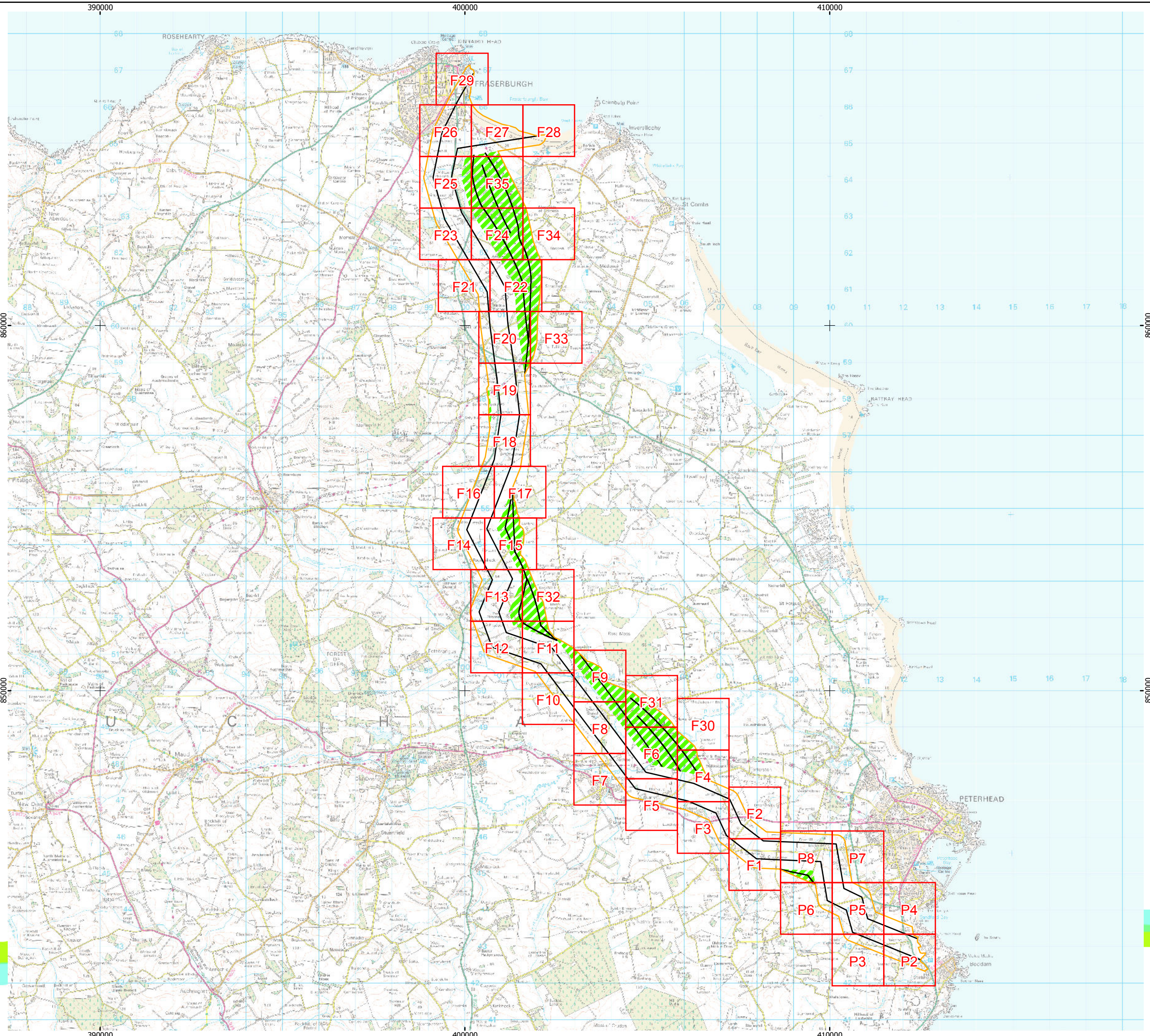
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Figures

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- Key**
- Fraserburgh cable route corridor
 - Ecology survey area (including 250m buffer)
 - Breeding bird survey additional survey areas
 - F1 Ecology 2km² survey tile
 - Breeding bird survey transect


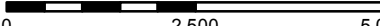
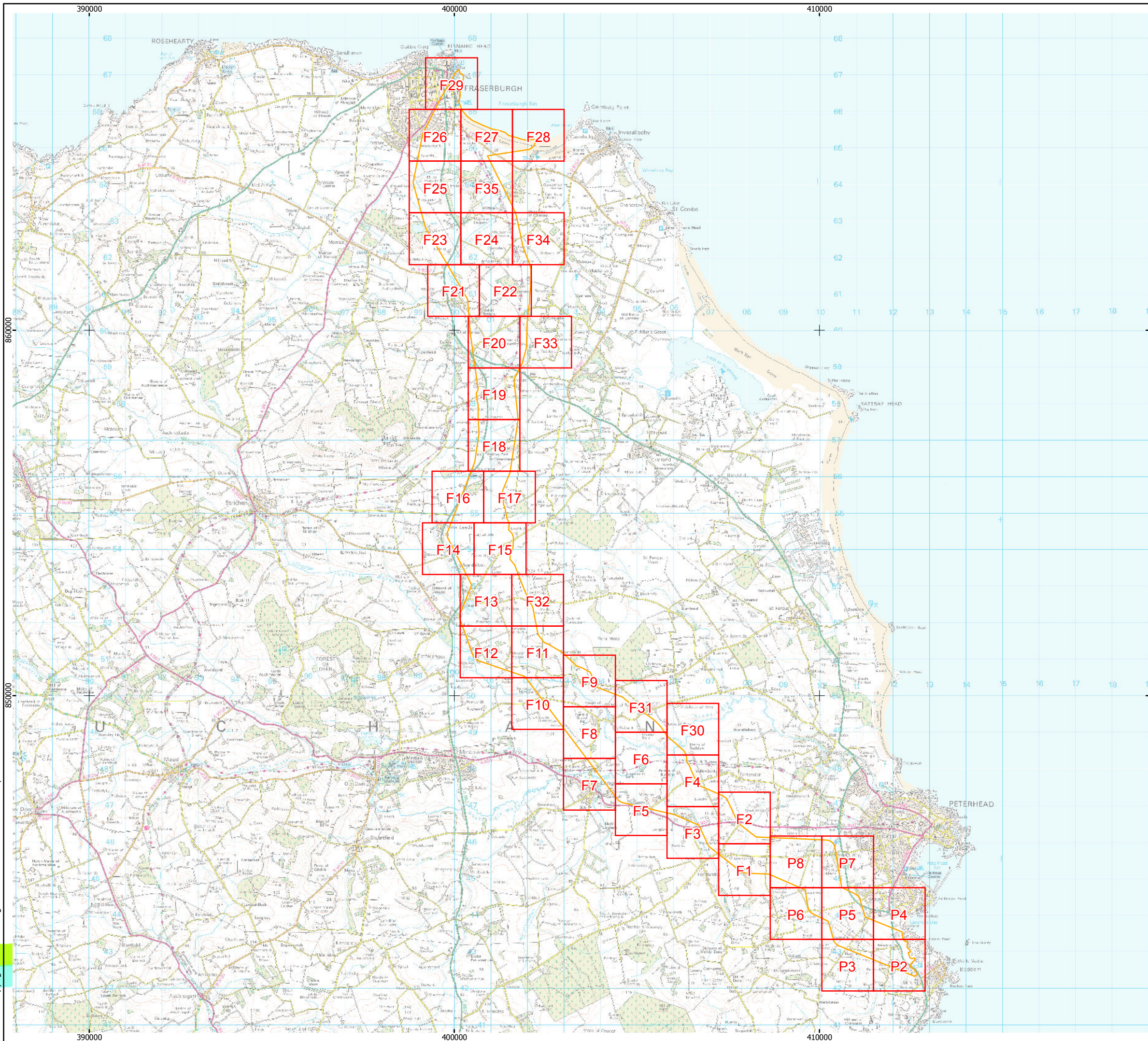
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Reviewed: JJL			
Approved: CR			
Date: 22/03/2012		Revision: C	
REF: 8460001-PPW0200-RPS-MAP-010			

Figure 1
Breeding Bird Survey Area

Moray Offshore
Renewables Ltd



Moray Offshore Renewables Ltd

Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- F1 Ecology 2km² survey tile

Horizontal Scale: 1:100,000 A3 Chart
0 2,500 5,000 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJJ
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-011

Figure 2
Phase 1 Habitat, Protected Species and
Bat Roost and Habitat Suitability Survey Areas

Moray Offshore
Renewables Ltd



Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Freshwater pearl mussel 500m downstream buffer
- Freshwater pearl mussel 100m upstream buffer
- Freshwater pearl mussel survey area

Horizontal Scale: 1:40,000 A3 Chart
0 1,000 2,000 Meters

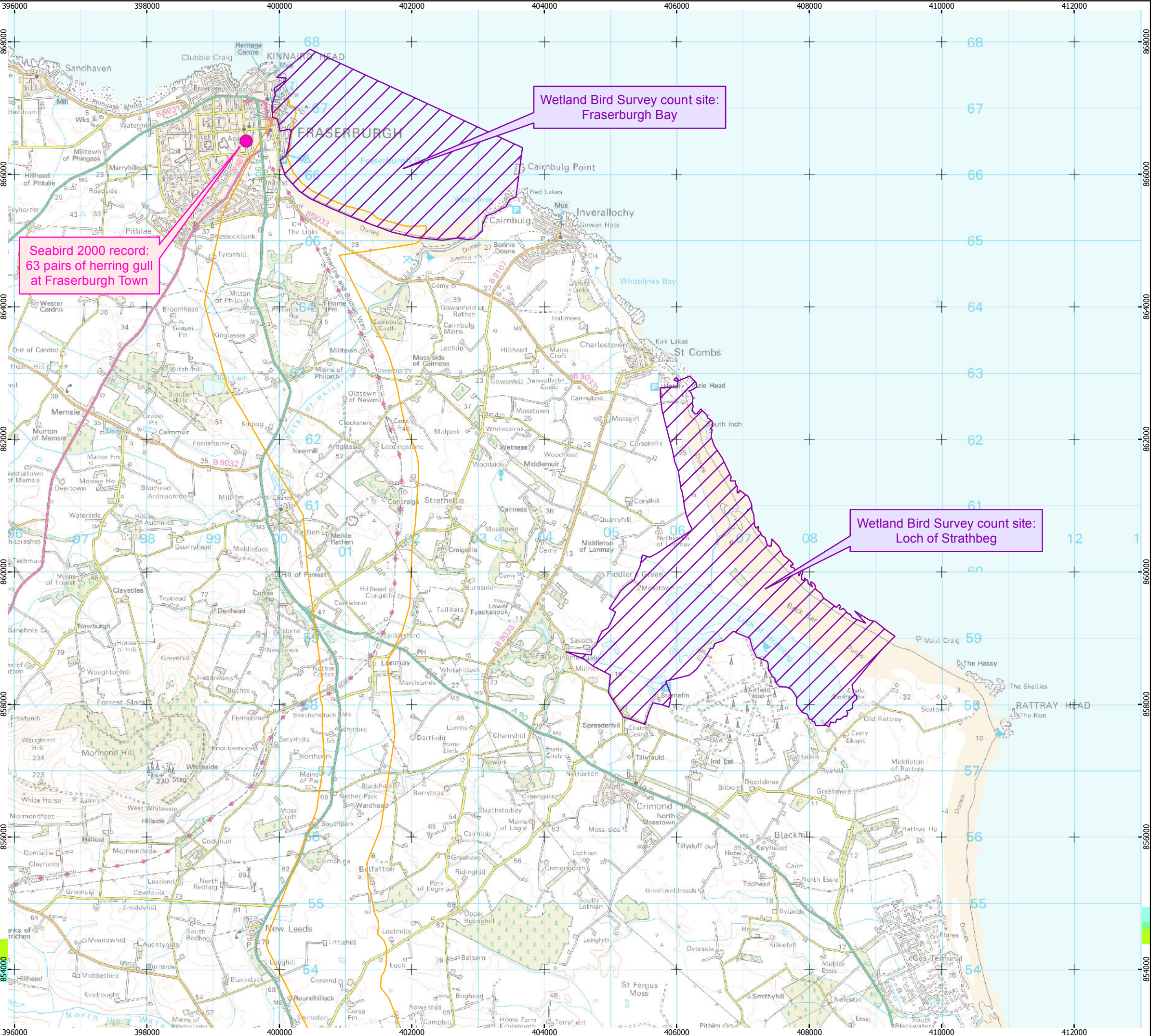
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Reviewed: JIL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-012

Figure 3
Freshwater Pearl Mussel
Survey Area

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Renewables Ltd



Moray Offshore Renewables Ltd

Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Wetland Bird Survey count site
- Seabird 2000 record

Horizontal Scale: 1:55,000 A3 Chart
0 1,000 2,000 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JLL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-013

Figure 4
Desk Study: Seabird 2000
Records and WeBS Count Sites

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Key

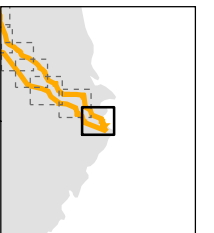
- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Breeding bird survey additional survey areas

Red-listed Birds of Conservation Concern

- CB - Corn bunting
- GH - Grasshopper warbler
- HS - House sparrow
- L. - Lapwing
- LI - Linnet
- LR - Lesser redpoll
- P. - Grey partridge
- S. - Skylark
- SG - Starling
- ST - Song thrush
- TS - Tree sparrow
- Y. - Yellowhammer

Amber-listed Birds of Conservation Concern

- BH - Black-headed gull
- CU - Curlew
- D. - Dunnock
- GJ - Greylag goose
- M. - Mistle thrush
- MA - Mallard
- OC - Oystercatcher
- Q. - Quail
- RB - Reed bunting
- RP - Ringed plover
- SD - Stock dove
- SL - Swallow
- SM - Sand martin
- TU - Tufted duck
- W. - Wheatear
- WH - Whitethroat
- WW - Willow warbler



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
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Date: 22/03/2012 Revision: C
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Figure 5
Breeding Bird Survey Results
Red and Amber Listed Bird Territories
(1 of 11)

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Key

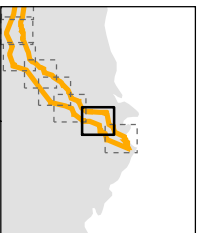
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- Ecology survey area (including 250m buffer)
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Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

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Figure 6
Breeding Bird Survey Results
Red and Amber Listed Bird Territories
(2 of 11)

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Key

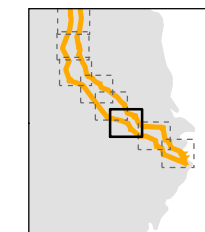
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- Ecology survey area (including 250m buffer)
- Breeding bird survey additional survey areas

Red-listed Birds of Conservation Concern

- CB - Corn bunting
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Amber-listed Birds of Conservation Concern

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- WH - Whitethroat
- WW - Willow warbler



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-017

Figure 7
Breeding Bird Survey Results
Red and Amber Listed Bird Territories
(3 of 11)

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Key

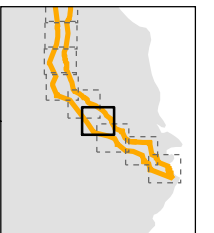
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- Ecology survey area (including 250m buffer)
- Breeding bird survey additional survey areas

Red-listed Birds of Conservation Concern

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- SM - Sand martin
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- W - Wheatear
- WH - Whitethroat
- WW - Willow warbler



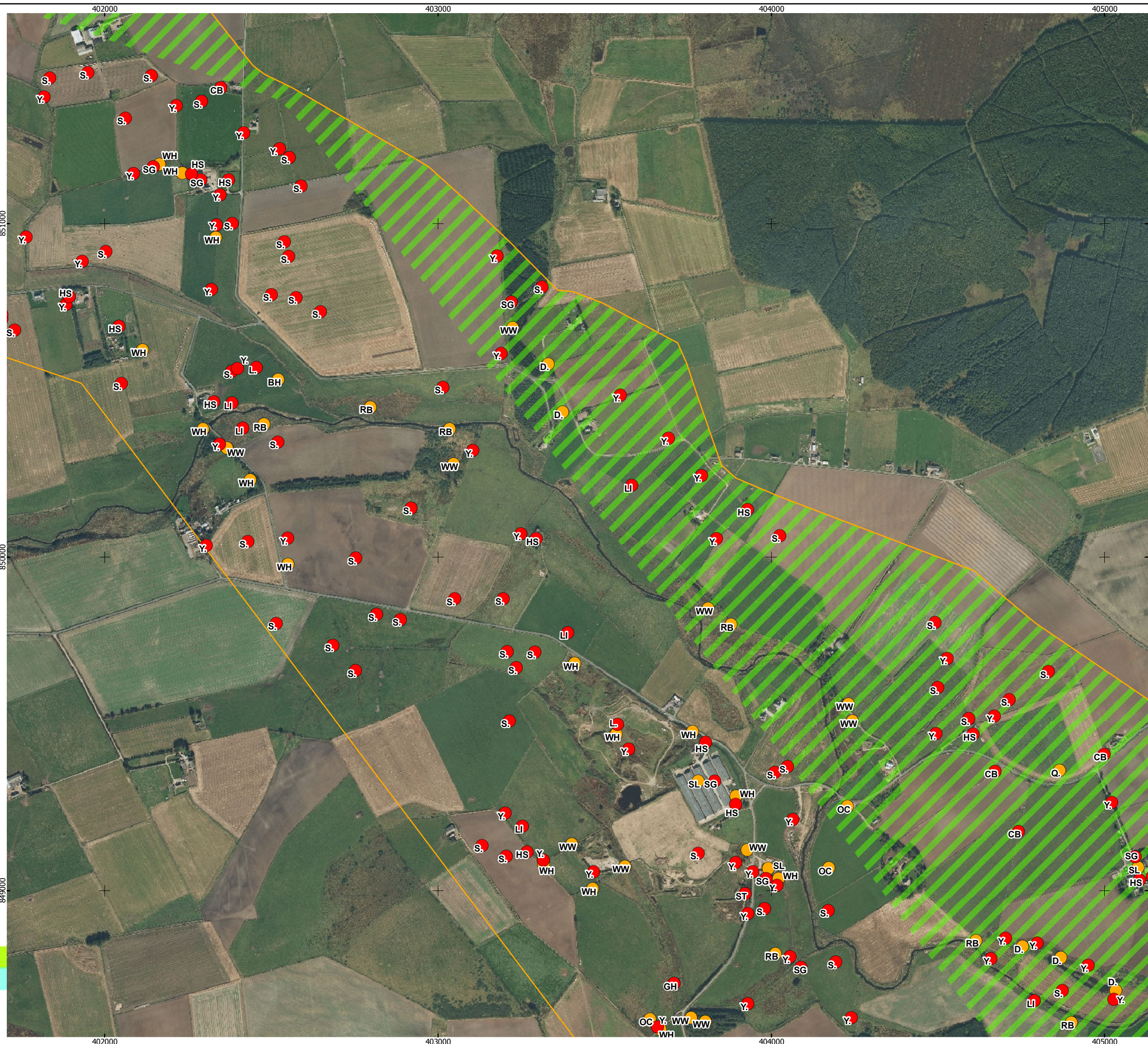
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Figure 8
Breeding Bird Survey Results
Red and Amber Listed Bird Territories
(4 of 11)



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Key

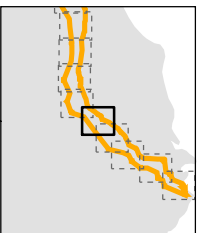
- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Breeding bird survey additional survey areas

Red-listed Birds of Conservation Concern

- CB - Corn bunting
- GH - Grasshopper warbler
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Amber-listed Birds of Conservation Concern

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- TU - Tufted duck
- W. - Wheatear
- WH - Whitethroat
- WW - Willow warbler



Horizontal Scale: 1:11,000 A3 Chart
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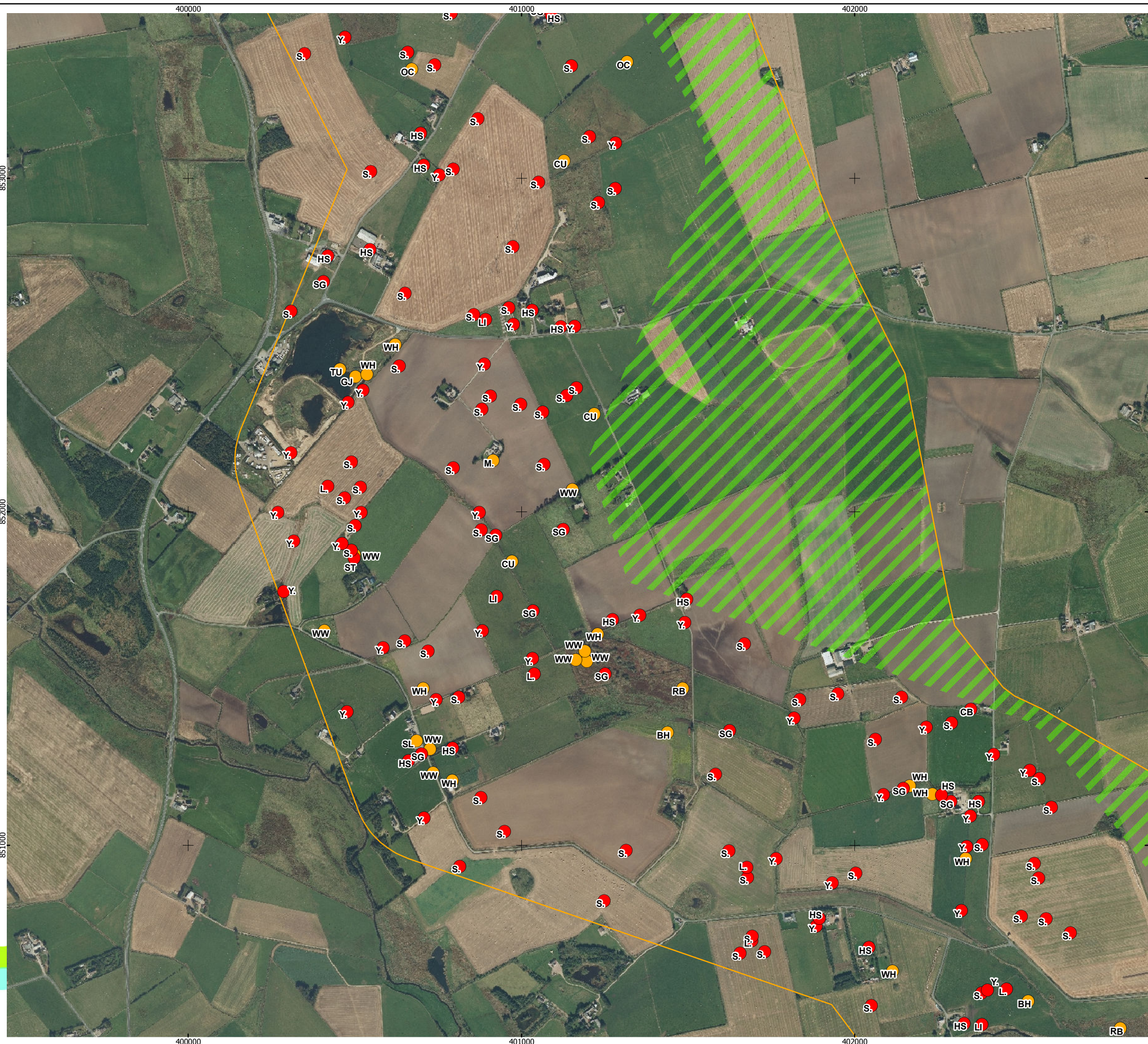
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Figure 9
Breeding Bird Survey Results
Red and Amber Listed Bird Territories
(5 of 11)

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Key

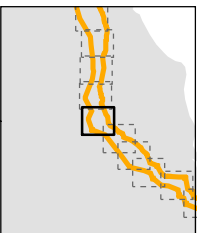
- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Breeding bird survey additional survey areas

Red-listed Birds of Conservation Concern

- CB - Corn bunting
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- TU - Tufted duck
- W - Wheatear
- WH - Whitethroat
- WW - Willow warbler



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

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Reviewed: JJL
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Date: 22/03/2012 Revision: C
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Figure 10
Breeding Bird Survey Results
Red and Amber Listed Bird Territories
(6 of 11)

Moray Offshore
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Key

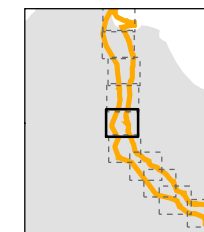
-  Fraserburgh cable route corridor
 Ecology survey area
 (including 250m buffer)
 Breeding bird survey additional survey areas

Red-listed Birds of Conservation Concern

- CB - Corn bunting
- GH - Grasshopper warbler
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- SL - Swallow
- SM - Sand martin
- TU - Tufted duck
- W. - Wheatear
- WH - Whitethroat
- WW - Willow warbler



Horizontal Scale: 1:11,000

A3 Chart

0 250 500 Meters

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Date: 22/03/2012	Revision: C
REF: 8460001-PPW0200-RPS-MAP-025	

Figure 11
Breeding Bird Survey Results
Red and Amber Listed Bird Territories
(7 of 11)

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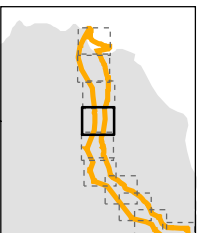
- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Breeding bird survey additional survey areas

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- CB - Corn bunting
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- TU - Tufted duck
- W - Wheatear
- WH - Whitethroat
- WW - Willow warbler



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-026

Figure 12
Breeding Bird Survey Results
Red and Amber Listed Bird Territories
(8 of 11)

Moray Offshore
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Moray Offshore Renewables Ltd

Key

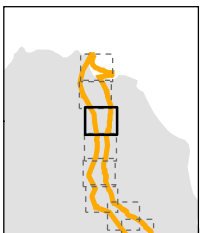
- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Breeding bird survey additional survey areas

Red-listed Birds of Conservation Concern

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Amber-listed Birds of Conservation Concern

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- W - Wheatear
- WH - Whitethroat
- WW - Willow warbler



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-027

Figure 13
Breeding Bird Survey Results
Red and Amber Listed Bird Territories
(9 of 11)

Moray Offshore
Renewables Ltd



Moray Offshore Renewables Ltd

Key

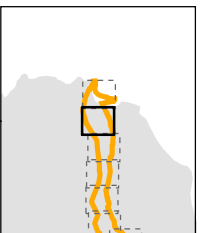
- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Breeding bird survey additional survey areas

Red-listed Birds of Conservation Concern

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Amber-listed Birds of Conservation Concern

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Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-028

Figure 14
Breeding Bird Survey Results
Red and Amber Listed Bird Territories
(10 of 11)

Moray Offshore
Renewables Ltd



Moray Offshore Renewables Ltd

Key

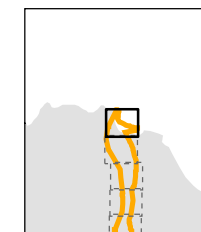
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- TS - Tree sparrow
- Y. - Yellowhammer

Amber-listed Birds of Conservation Concern

- BH - Black-headed gull
- CU - Curlew
- D. - Dunnock
- GJ - Greylag goose
- M. - Mistle thrush
- MA - Mallard
- OC - Oystercatcher
- Q. - Quail
- RB - Reed bunting
- RP - Ringed plover
- SD - Stock dove
- SL - Swallow
- SM - Sand martin
- TU - Tufted duck
- W. - Wheatear
- WH - Whitethroat
- WW - Willow warbler



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-029

Figure 15
Breeding Bird Survey Results
Red and Amber Listed Bird Territories
(11 of 11)

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Key

Fraserburgh cable route corridor
Ecology survey area
(including 250m buffer)

Arable land and grassland:

A Arable land
I Improved
SI Semi-improved neutral
SI Poor semi-improved
Unimproved neutral
Marshy

Woodland:

Plantation mixed
Plantation broadleaved
Plantation coniferous
Semi-natural broadleaved
Semi-natural mixed
Semi-natural coniferous

Scrub, tall herb and fern:

Tall ruderal herb and fern
Scattered scrub
Dense/continuous scrub
Continuous bracken
Scattered bracken

Coastland:

Dune grassland

Mire:

Dry modified bog
Blanket bog
Acid/neutral flush & spring

Water and wetland features:

Running water
Marginal vegetation
Standing water
Swamp
Inundation vegetation

Built-up areas:

Buildings
Road
Amenity grassland
Ephemeral short perennial
Bare ground

Rock and Quarry:

Quarry
Acid/neutral exposure
Basic scree
No access

Peat in superficial geology

Tall ruderal herb and fern

Running water

Fence

Wall

Dry ditch

Earth bank

Hedges:

Intact, native species-rich
Intact, native species-poor
Defunct, native species-rich
With trees, native species-rich

Scrub: scattered

Target note

Scattered trees:

Broadleaved
Mixed
Coniferous

Horizontal Scale: 1:11,000

A3 Chart

0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJJ
Approved: CR

Date: 22/03/2012 Revision: C

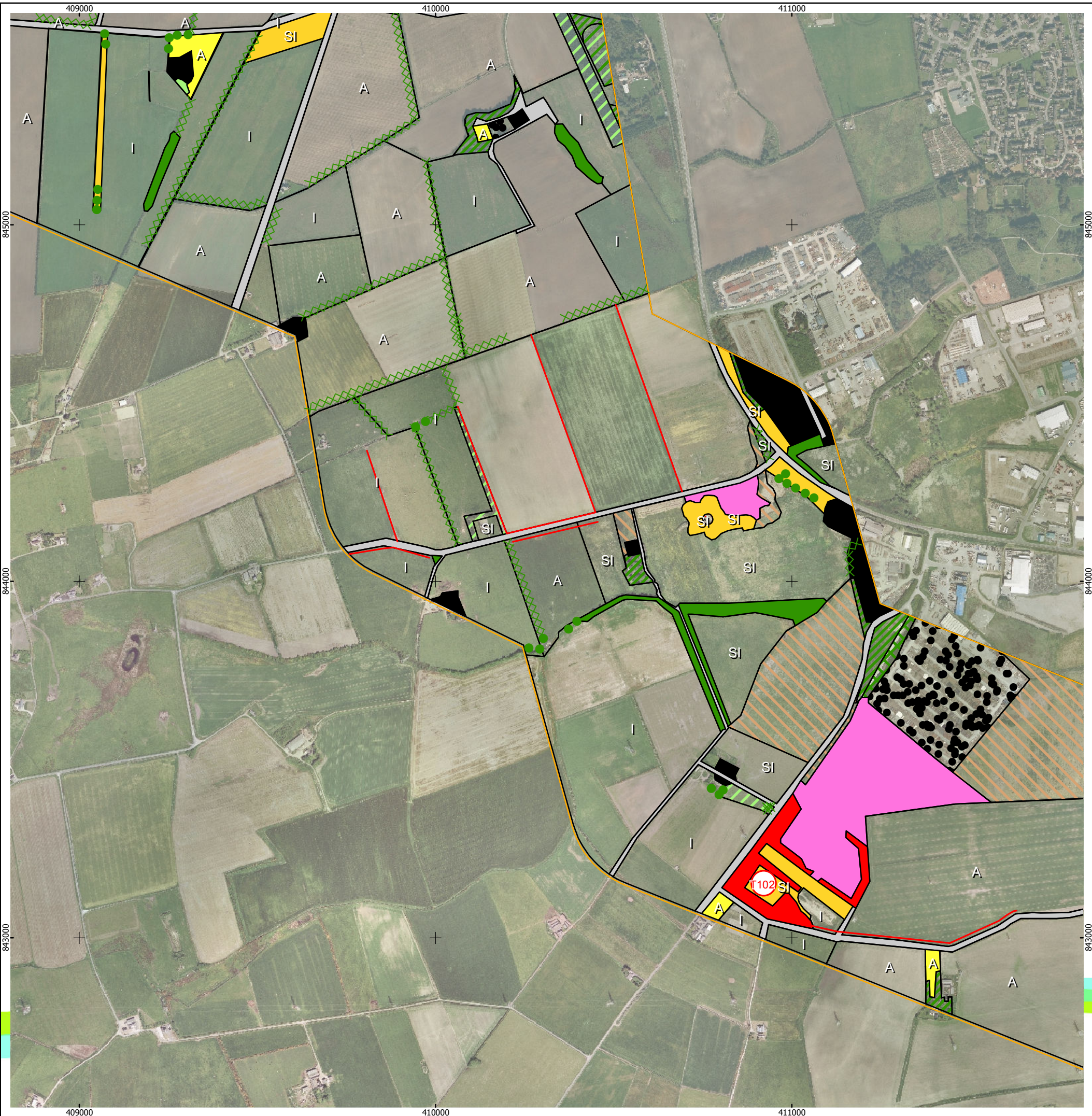
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Figure 16 / Phase 1 Habitat Survey Results
(1 of 15)

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Moray Offshore Renewables Ltd

Key

Fraserburgh cable route corridor
Ecology survey area
(including 250m buffer)

Arable land and grassland:

A Arable land
I Improved
SI Semi-improved neutral
SI Poor semi-improved
Unimproved neutral
Marshy

Woodland:

Plantation mixed
Plantation broadleaved
Plantation coniferous
Semi-natural broadleaved
Semi-natural mixed
Semi-natural coniferous

Scrub, tall herb and fern:

Tall ruderal herb and fern
Scattered scrub
Dense/continuous scrub
Continuous bracken
Scattered bracken

Coastland:

Dune grassland

Mire:

Dry modified bog
Blanket bog
Acid/neutral flush & spring

Water and wetland features:

Running water
Marginal vegetation
Standing water
Swamp
Inundation vegetation

Built-up areas:

Buildings
Road
Amenity grassland
Ephemeral short perennial
Bare ground

Rock and Quarry:

Quarry
Acid/neutral exposure
Basic scree
No access

Peat in superficial geology

Tall ruderal herb and fern

Running water

Fence

Wall

Dry ditch

Earth bank

Hedges:

Intact, native species-rich
Intact, native species-poor
Defunct, native species-rich
With trees, native species-rich

Scrub: scattered

Target note

Scattered trees:

Broadleaved
Mixed
Coniferous

Horizontal Scale: 1:11,000

A3 Chart

0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJJ
Approved: CR

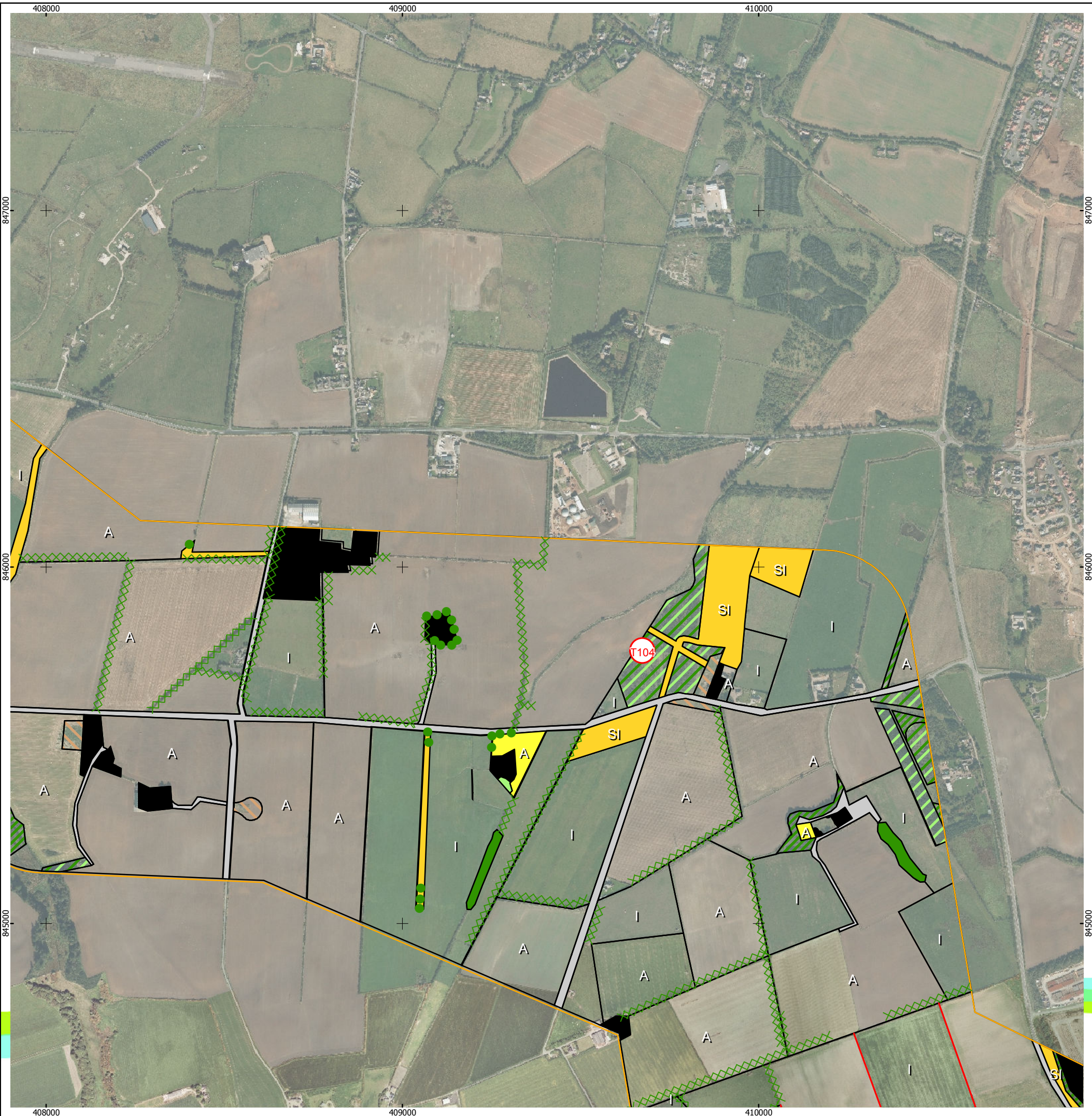
Date: 22/03/2012 Revision: C

REF: 8460001-PPW0200-RPS-MAP-031

Figure 17 / Phase 1 Habitat Survey Results
(2 of 15)

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Moray Offshore Renewables Ltd

Key

Fraserburgh cable route corridor
Ecology survey area
(including 250m buffer)

Arable land and grassland:

A Arable land
I Improved
SI Semi-improved neutral
SI Poor semi-improved
Unimproved neutral
Marshy

Woodland:

Plantation mixed
Plantation broadleaved
Plantation coniferous
Semi-natural broadleaved
Semi-natural mixed
Semi-natural coniferous

Scrub, tall herb and fern:

Tall ruderal herb and fern
Scattered scrub
Dense/continuous scrub
Continuous bracken
Scattered bracken

Coastland:

Dune grassland

Mire:

Dry modified bog
Blanket bog
Acid/neutral flush & spring

Water and wetland features:

Running water
Marginal vegetation
Standing water
Swamp
Inundation vegetation

Built-up areas:

Buildings
Road
Amenity grassland
Ephemeral short perennial
Bare ground

Rock and Quarry:

Quarry
Acid/neutral exposure
Basic scree
No access

Peat in superficial geology

Tall ruderal herb and fern

Running water

Fence

Wall

Dry ditch

Earth bank

Hedges:

Intact, native species-rich
Intact, native species-poor
Defunct, native species-rich
With trees, native species-rich

Scrub: scattered

Target note

Scattered trees:

Broadleaved
Mixed
Coniferous

Horizontal Scale: 1:11,000

A3 Chart

0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

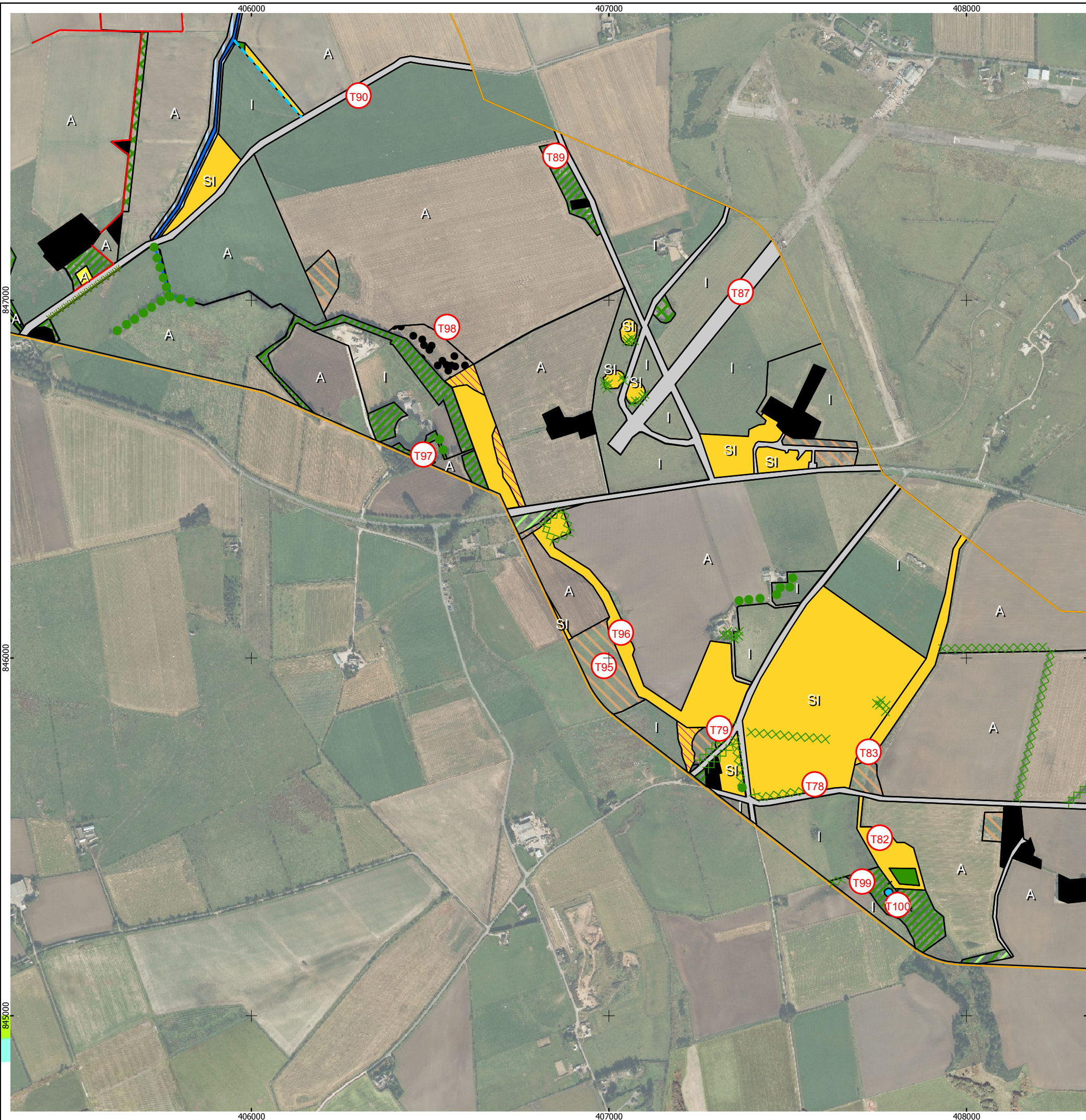
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Figure 18 / Phase 1 Habitat Survey Results
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Moray Offshore Renewables Ltd

Key

Fraserburgh cable route corridor
 Ecology survey area (including 250m buffer)

Arable land and grassland:
 Arable land
 Improved
 Semi-improved neutral
 Poor semi-improved
 Unimproved neutral
 Marshy

Woodland:
 Plantation mixed
 Plantation broadleaved
 Plantation coniferous
 Semi-natural broadleaved
 Semi-natural mixed
 Semi-natural coniferous

Scrub, tall herb and fern:
 Tall ruderal herb and fern
 Scattered scrub
 Dense/continuous scrub
 Continuous bracken
 Scattered bracken

Coastland:
 Dune grassland

Mire:
 Dry modified bog
 Blanket bog
 Acid/neutral flush & spring

Water and wetland features:
 Running water
 Marginal vegetation
 Standing water
 Swamp
 Inundation vegetation

Built-up areas:
 Buildings
 Road
 Amenity grassland
 Ephemeral short perennial
 Bare ground

Rock and Quarry:
 Quarry
 Acid/neutral exposure
 Basic scree
 No access
 Peat in superficial geology

Scrub, tall herb and fern:
 Tall ruderal herb and fern
 Running water
 Fence
 Wall
 Dry ditch
 Earth bank

Hedges:
 Intact, native species-rich
 Intact, native species-poor
 Defunct, native species-rich
 With trees, native species-rich
 Scrub: scattered
 Target note

Scattered trees:
 Broadleaved
 Mixed
 Coniferous

Horizontal Scale: 1:11,000
0 250 500 Meters

A3 Chart
N

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

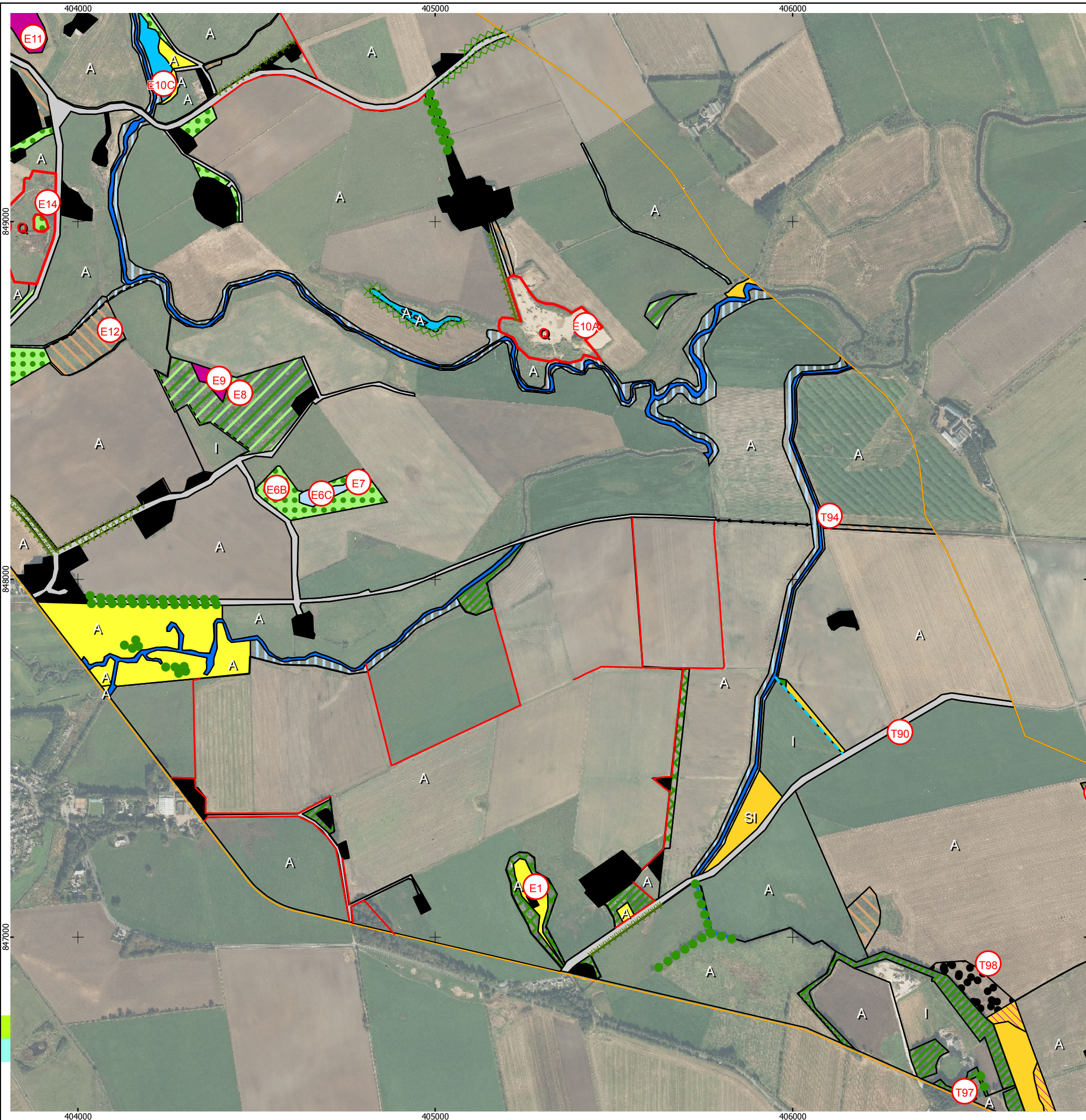
Date: 22/03/2012
Revision: C

REF: 8460001-PPW0200-RPS-MAP-033

Figure 19 / Phase 1 Habitat Survey Results
(4 of 15)

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Key

Fraserburgh cable route corridor
Ecology survey area (including 250m buffer)

Arable land and grassland:

A Arable land
I Improved
SI Semi-improved neutral
SI Poor semi-improved
Unimproved neutral
Marshy

Woodland:

Plantation mixed
Plantation broadleaved
Plantation coniferous
Semi-natural broadleaved
Semi-natural mixed
Semi-natural coniferous

Scrub, tall herb and fern:

Tall ruderal herb and fern
Scattered scrub
Dense/continuous scrub
Continuous bracken
Scattered bracken

Coastland:

Dune grassland

Mire:

Dry modified bog
Blanket bog
Acid/neutral flush & spring

Water and wetland features:

Running water
Marginal vegetation
Standing water
Swamp
Inundation vegetation

Built-up areas:

Buildings
Road
Amenity grassland
Ephemeral short perennial
Bare ground

Rock and Quarry:

Quarry
Acid/neutral exposure
Basic scree
No access

Peat in superficial geology

Tall ruderal herb and fern

Running water

Fence

Wall

Dry ditch

Earth bank

Hedges:

Intact, native species-rich
Intact, native species-poor
Defunct, native species-rich
With trees, native species-rich

Scrub: scattered

Target note

Scattered trees:

Broadleaved
Mixed
Coniferous

Horizontal Scale: 1:11,000

A3 Chart

0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJJ
Approved: CR

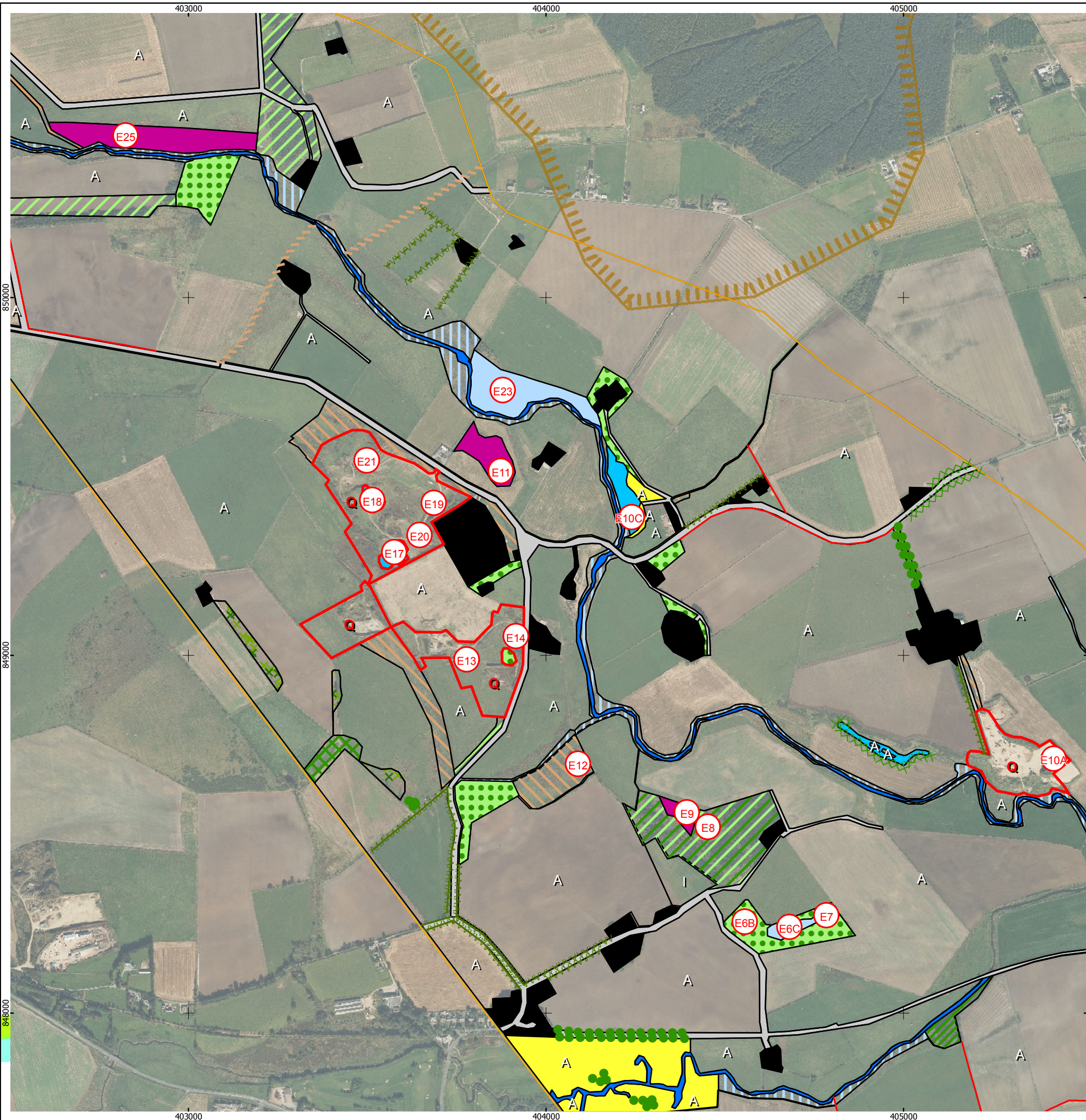
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REF: 8460001-PPW0200-RPS-MAP-035

Figure 20 / Phase 1 Habitat Survey Results
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Key

Fraserburgh cable route corridor
Ecology survey area (including 250m buffer)

Arable land and grassland:

A Arable land
I Improved
SI Semi-improved neutral
SI Poor semi-improved
Unimproved neutral
Marshy

Woodland:

Plantation mixed
Plantation broadleaved
Plantation coniferous
Semi-natural broadleaved
Semi-natural mixed
Semi-natural coniferous

Scrub, tall herb and fern:

Tall ruderal herb and fern
Scattered scrub
Dense/continuous scrub
Continuous bracken
Scattered bracken

Coastland:

Dune grassland

Mire:

Dry modified bog
Blanket bog
Acid/neutral flush & spring

Water and wetland features:

Running water
Marginal vegetation
Standing water
Swamp
Inundation vegetation

Built-up areas:

Buildings
Road
Amenity grassland
Ephemeral short perennial
Bare ground

Rock and Quarry:

Quarry
Acid/neutral exposure
Basic scree
No access

Peat in superficial geology

Tall ruderal herb and fern

Running water

Fence

Wall

Dry ditch

Earth bank

Hedges:

Intact, native species-rich
Intact, native species-poor
Defunct, native species-rich
With trees, native species-rich

Scrub: scattered

Target note

Scattered trees:

Broadleaved
Mixed
Coniferous

Horizontal Scale: 1:11,000

A3 Chart

0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

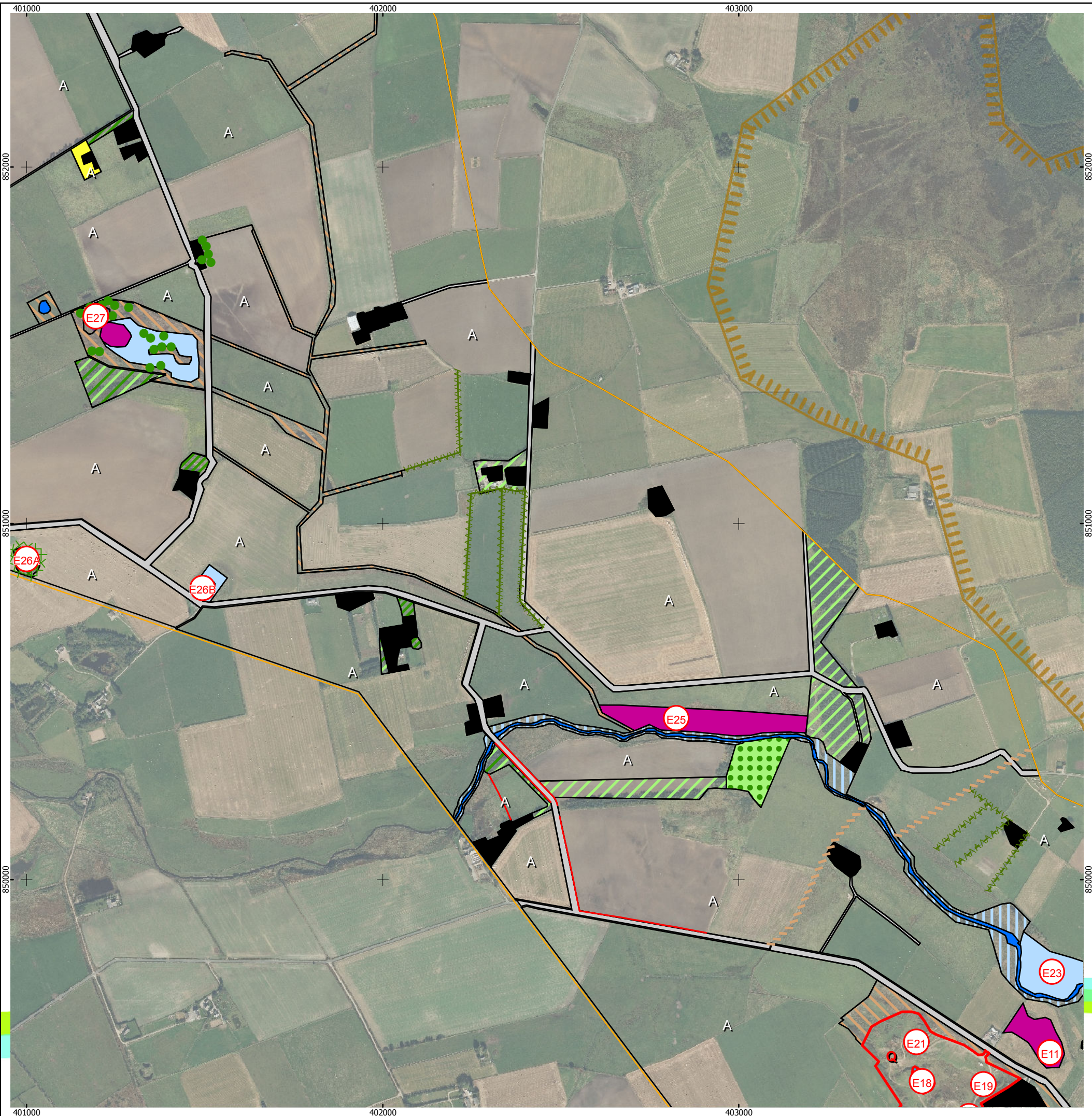
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REF: 8460001-PPW0200-RPS-MAP-039

Figure 21 / Phase 1 Habitat Survey Results
(6 of 15)

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Key

Fraserburgh cable route corridor
Ecology survey area (including 250m buffer)

Arable land and grassland:

A Arable land
I Improved
SI Semi-improved neutral
SI Poor semi-improved
Unimproved neutral
Marshy

Woodland:

Plantation mixed
Plantation broadleaved
Plantation coniferous
Semi-natural broadleaved
Semi-natural mixed
Semi-natural coniferous

Scrub, tall herb and fern:

Tall ruderal herb and fern
Scattered scrub
Dense/continuous scrub
Continuous bracken
Scattered bracken

Coastland:

Dune grassland

Mire:

Dry modified bog
Blanket bog
Acid/neutral flush & spring

Water and wetland features:

Running water
Marginal vegetation
Standing water
Swamp
Inundation vegetation

Built-up areas:

Buildings
Road
Amenity grassland
Ephemeral short perennial
Bare ground

Rock and Quarry:

Quarry
Acid/neutral exposure
Basic scree
No access

Peat in superficial geology

Tall ruderal herb and fern

Running water

Fence

Wall

Dry ditch

Earth bank

Hedges:

Intact, native species-rich
Intact, native species-poor
Defunct, native species-rich
With trees, native species-rich

Scrub: scattered

E1 Target note

Scattered trees:

Broadleaved
Mixed
Coniferous

Horizontal Scale: 1:11,000

A3 Chart

0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

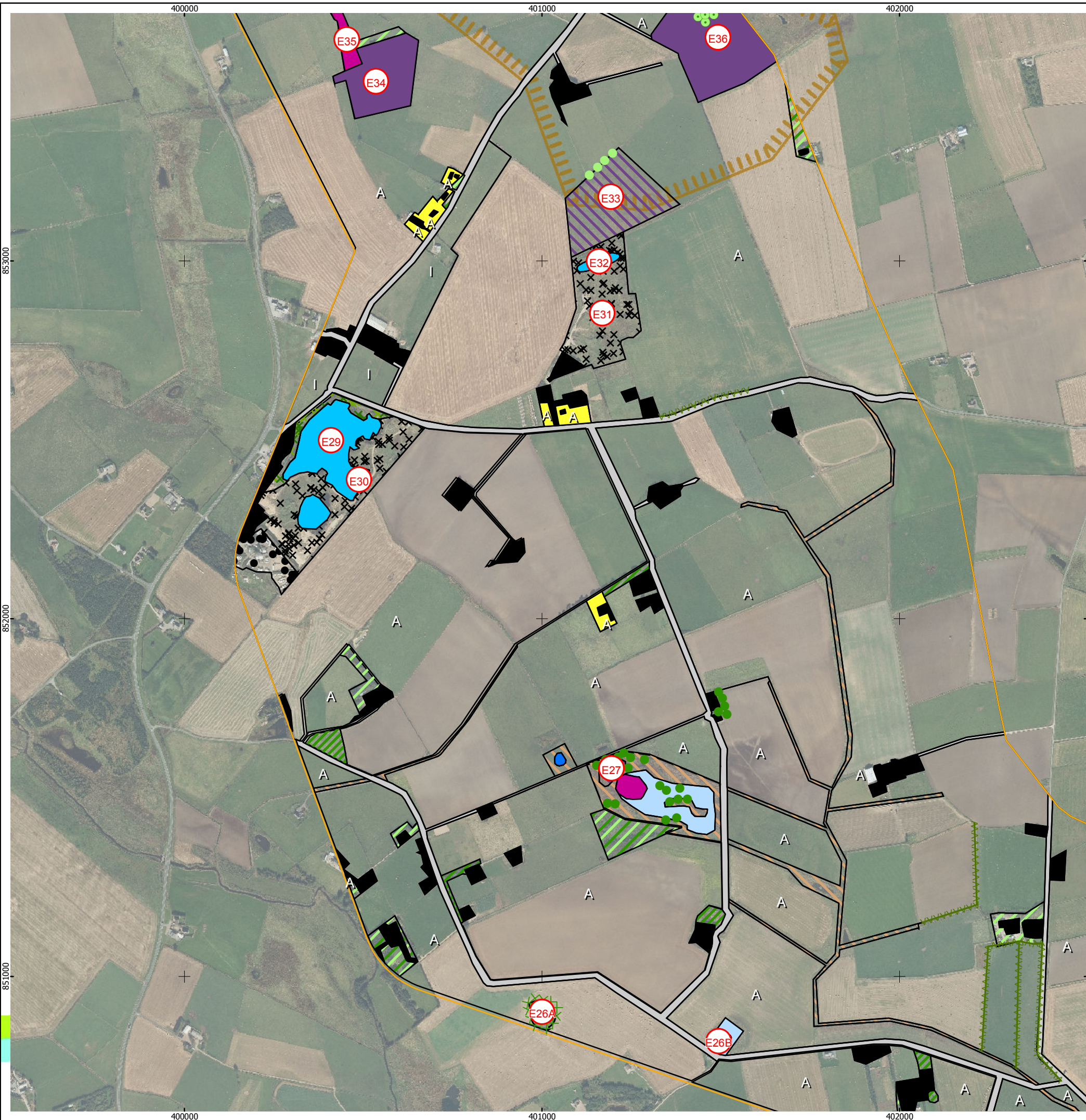
Date: 22/03/2012 Revision: C

REF: 8460001-PPW0200-RPS-MAP-040

Figure 22 / Phase 1 Habitat Survey Results
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Moray Offshore Renewables Ltd

Key

Fraserburgh cable route corridor
Ecology survey area
(including 250m buffer)

Arable land and grassland:

A Arable land
I Improved
SI Semi-improved neutral
SI Poor semi-improved
Unimproved neutral
Marshy

Woodland:

Plantation mixed
Plantation broadleaved
Plantation coniferous
Semi-natural broadleaved
Semi-natural mixed
Semi-natural coniferous

Scrub, tall herb and fern:

Tall ruderal herb and fern
Scattered scrub
Dense/continuous scrub
Continuous bracken
Scattered bracken

Coastland:

Dune grassland

Mire:

Dry modified bog
Blanket bog
Acid/neutral flush & spring

Water and wetland features:

Running water
Marginal vegetation
Standing water
Swamp
Inundation vegetation

Built-up areas:

Buildings
Road
Amenity grassland
Ephemeral short perennial
Bare ground

Rock and Quarry:

Quarry
Acid/neutral exposure
Basic scree
No access

Peat in superficial geology

Tall ruderal herb and fern

Running water

Fence

Wall

Dry ditch

Earth bank

Hedges:

Intact, native species-rich
Intact, native species-poor
Defunct, native species-rich
With trees, native species-rich

Scrub: scattered

Target note

Scattered trees:

Broadleaved
Mixed
Coniferous

Horizontal Scale: 1:11,000

A3 Chart

0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

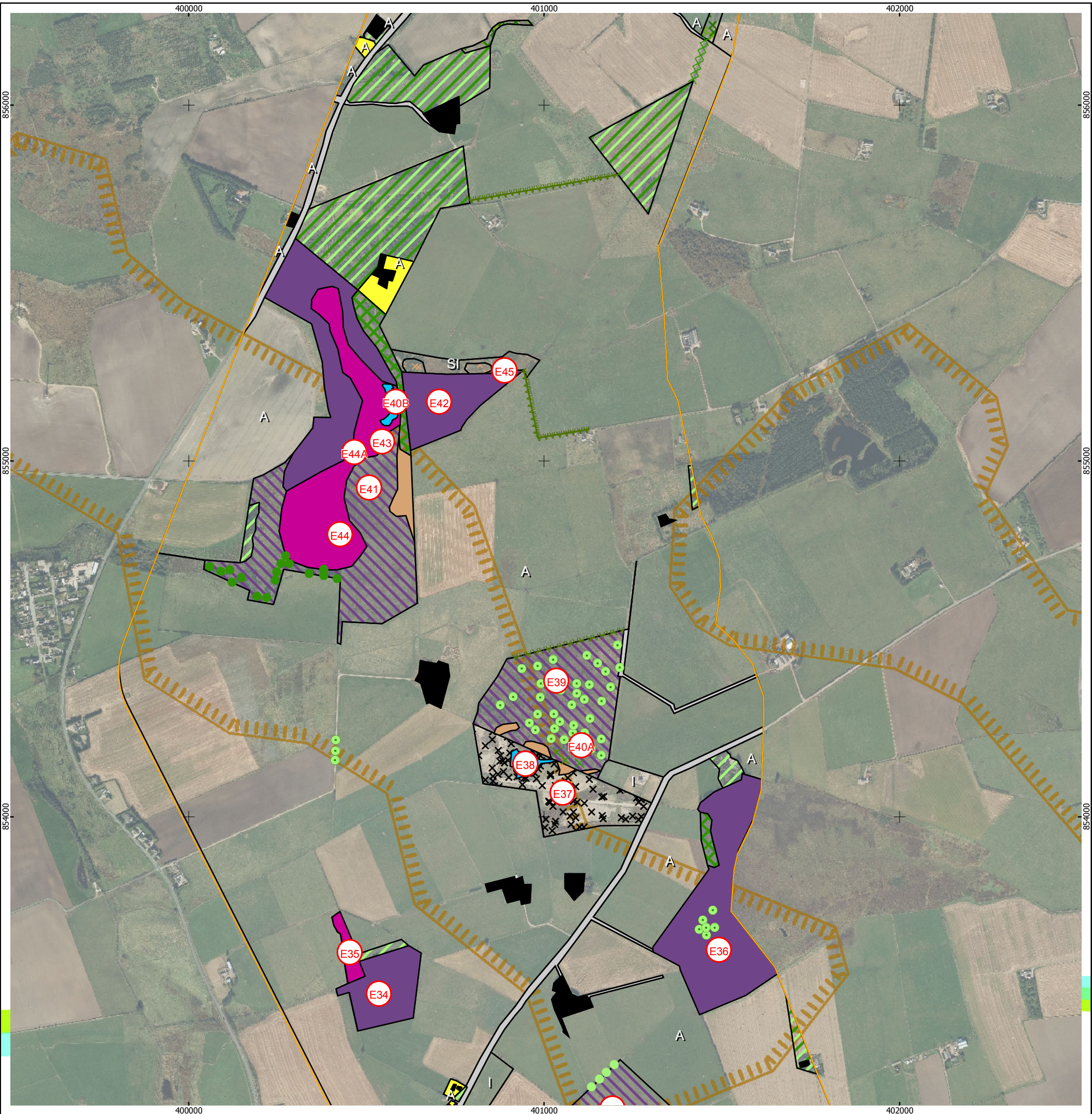
Date: 22/03/2012 Revision: C

REF: 8460001-PPW0200-RPS-MAP-041

Figure 23 / Phase 1 Habitat Survey Results
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Moray Offshore Renewables Ltd

Key

Fraserburgh cable route corridor
Ecology survey area
(including 250m buffer)

Arable land and grassland:

A Arable land
I Improved
SI Semi-improved neutral
SI Poor semi-improved
Unimproved neutral
Marshy

Woodland:

Plantation mixed
Plantation broadleaved
Plantation coniferous
Semi-natural broadleaved
Semi-natural mixed
Semi-natural coniferous

Scrub, tall herb and fern:

Tall ruderal herb and fern
Scattered scrub
Dense/continuous scrub
Continuous bracken
Scattered bracken

Coastland:

Dune grassland

Mire:

Dry modified bog
Blanket bog
Acid/neutral flush & spring

Water and wetland features:

Running water
Marginal vegetation
Standing water
Swamp
Inundation vegetation

Built-up areas:

Buildings
Road
Amenity grassland
Ephemeral short perennial
Bare ground

Rock and Quarry:

Quarry
Acid/neutral exposure
Basic scree
No access

Peat in superficial geology

Tall ruderal herb and fern

Running water

Fence

Wall

Dry ditch

Earth bank

Hedges:

Intact, native species-rich
Intact, native species-poor
Defunct, native species-rich
With trees, native species-rich

Scrub: scattered

Target note

Scattered trees:

Broadleaved
Mixed
Coniferous

Horizontal Scale: 1:11,000

A3 Chart

0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

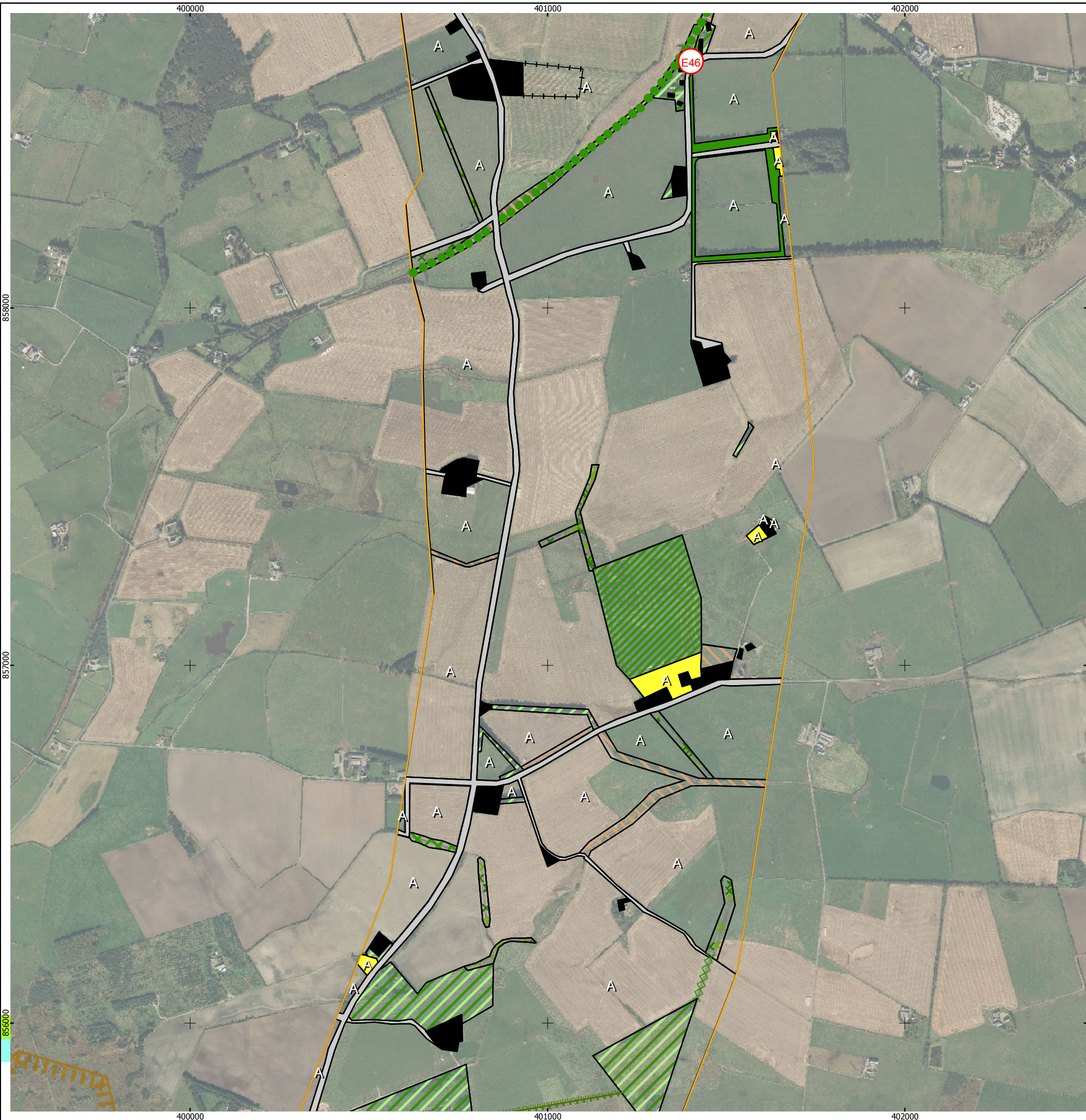
Date: 22/03/2012 Revision: C

REF: 8460001-PPW0200-RPS-MAP-042

Figure 24 / Phase 1 Habitat Survey Results
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Key

Fraserburgh cable route corridor

Ecology survey area (including 250m buffer)

Arable land and grassland:

A Arable land

I Improved

SI Semi-improved neutral

SI Poor semi-improved

Unimproved neutral

Marshy

Woodland:

Plantation mixed

Plantation broadleaved

Plantation coniferous

Semi-natural broadleaved

Semi-natural mixed

Semi-natural coniferous

Scrub, tall herb and fern:

Tall ruderal herb and fern

Scattered scrub

Dense/continuous scrub

Continuous bracken

Scattered bracken

Coastland:

Dune grassland

Mire:

Dry modified bog

Blanket bog

Acid/neutral flush & spring

Water and wetland features:

Running water

Marginal vegetation

Standing water

Swamp

Inundation vegetation

Built-up areas:

Buildings

Road

Amenity grassland

Ephemeral short perennial

Bare ground

Rock and Quarry:

Quarry

Acid/neutral exposure

Basic scree

No access

Peat in superficial geology

Tall ruderal herb and fern

Running water

Fence

Wall

Dry ditch

Earth bank

Hedges:

Intact, native species-rich

Intact, native species-poor

Defunct, native species-rich

With trees, native species-rich

Scrub: scattered

Target note

Scattered trees:

Broadleaved

Mixed

Coniferous

Horizontal Scale: 1:11,000

A3 Chart

0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF

Reviewed: JJL

Approved: CR

Date: 22/03/2012

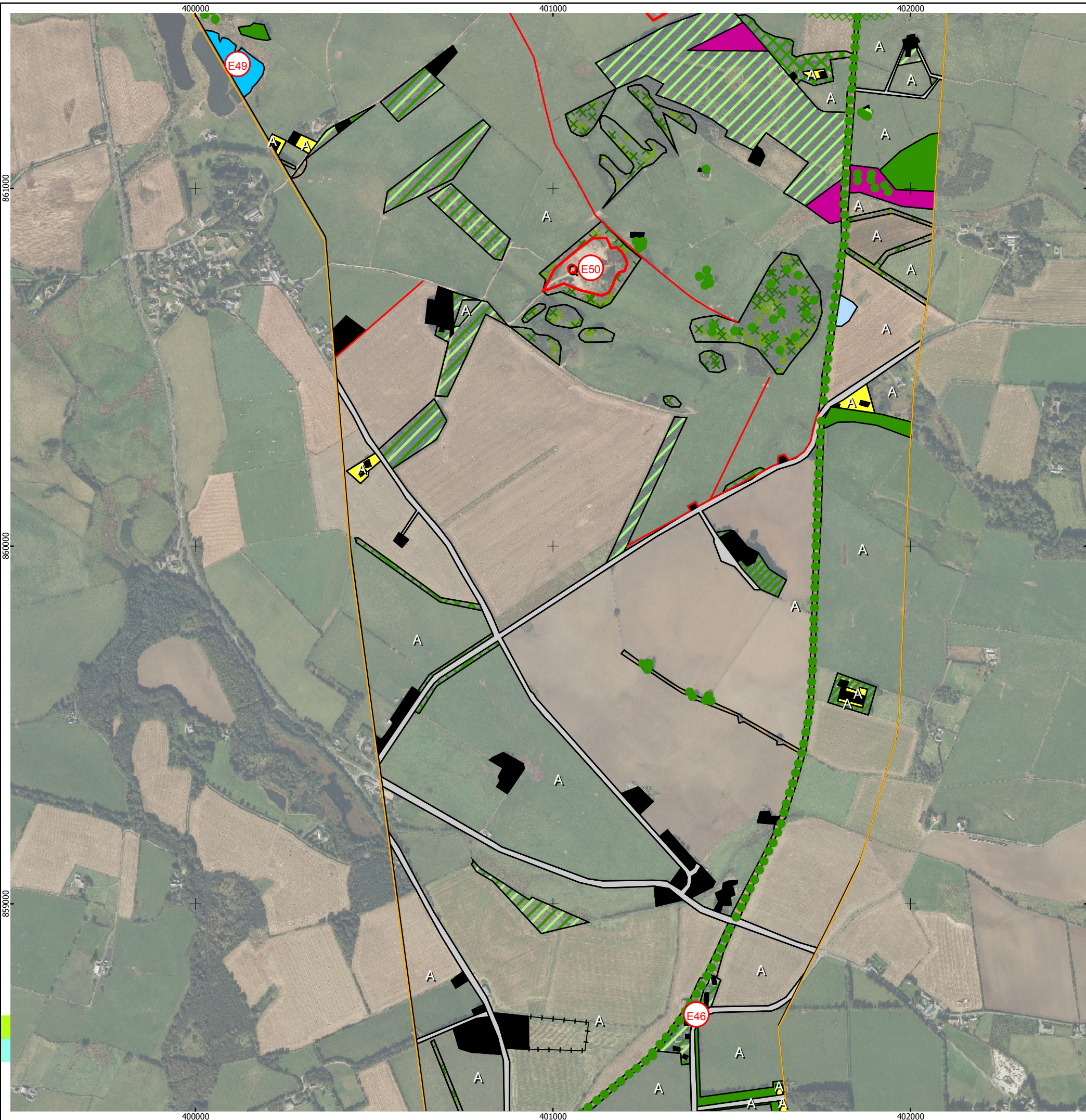
Revision: C

REF: 8460001-PPW0200-RPS-MAP-043

Figure 25 / Phase 1 Habitat Survey Results
(10 of 15)

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Key

Fraserburgh cable route corridor
Ecology survey area
(including 250m buffer)

Arable land and grassland:

A Arable land
I Improved
SI Semi-improved neutral
SI Poor semi-improved
Unimproved neutral
Marshy

Woodland:

Plantation mixed
Plantation broadleaved
Plantation coniferous
Semi-natural broadleaved
Semi-natural mixed
Semi-natural coniferous

Scrub, tall herb and fern:

Tall ruderal herb and fern
Scattered scrub
Dense/continuous scrub
Continuous bracken
Scattered bracken

Coastland:

Dune grassland

Mire:

Dry modified bog
Blanket bog
Acid/neutral flush & spring

Water and wetland features:

Running water
Marginal vegetation
Standing water
Swamp
Inundation vegetation

Built-up areas:

Buildings
Road
Amenity grassland
Ephemeral short perennial
Bare ground

Rock and Quarry:

Quarry
Acid/neutral exposure
Basic scree
No access

Peat in superficial geology

Tall ruderal herb and fern

Running water

Fence

Wall

Dry ditch

Earth bank

Hedges:

Intact, native species-rich
Intact, native species-poor
Defunct, native species-rich
With trees, native species-rich

Scrub: scattered

Target note

Scattered trees:

Broadleaved
Mixed
Coniferous

Horizontal Scale: 1:11,000

A3 Chart

0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJJ
Approved: CR

Date: 22/03/2012 Revision: C

REF: 8460001-PPW0200-RPS-MAP-044

Figure 26 / Phase 1 Habitat Survey Results
(11 of 15)

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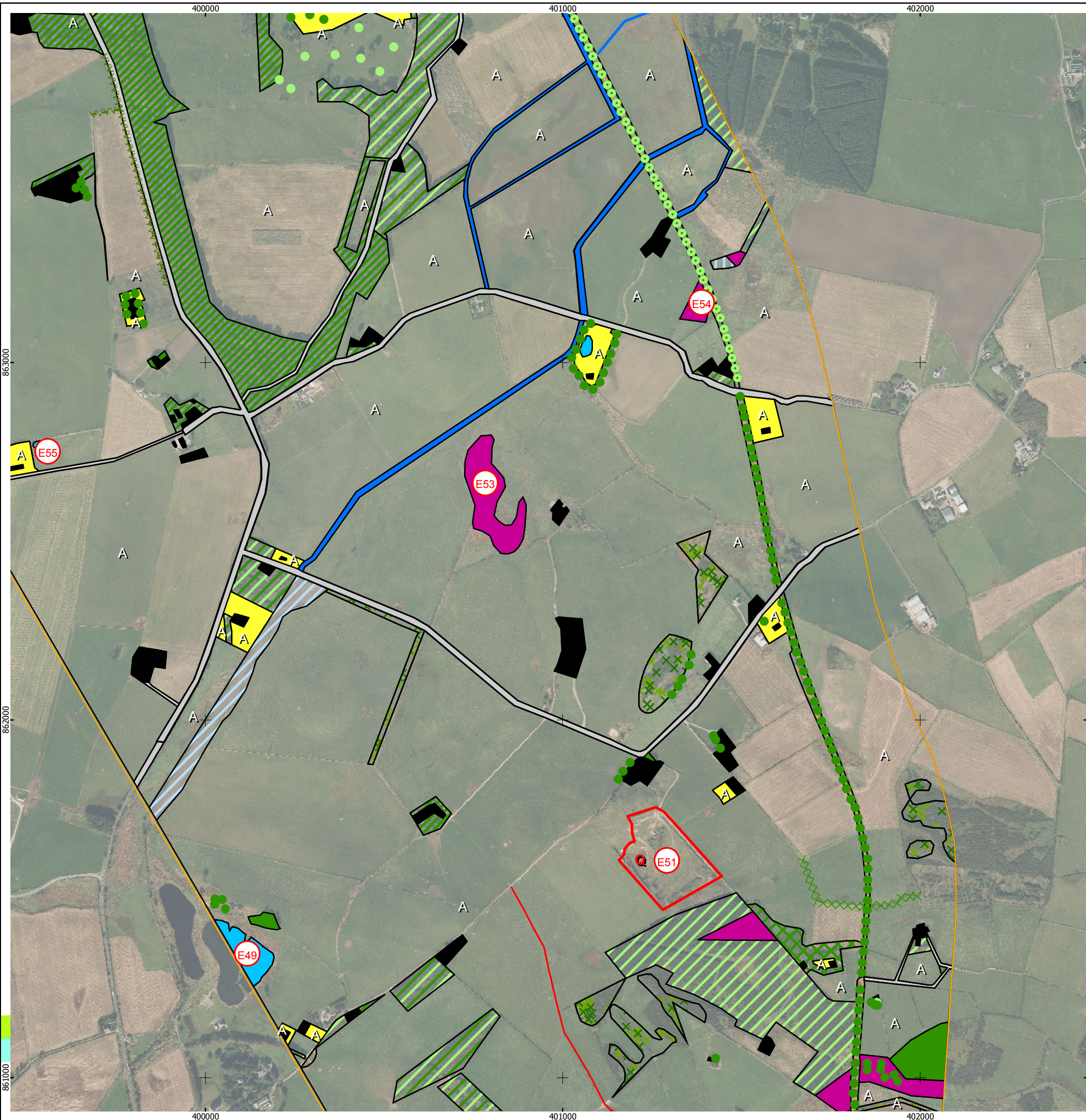
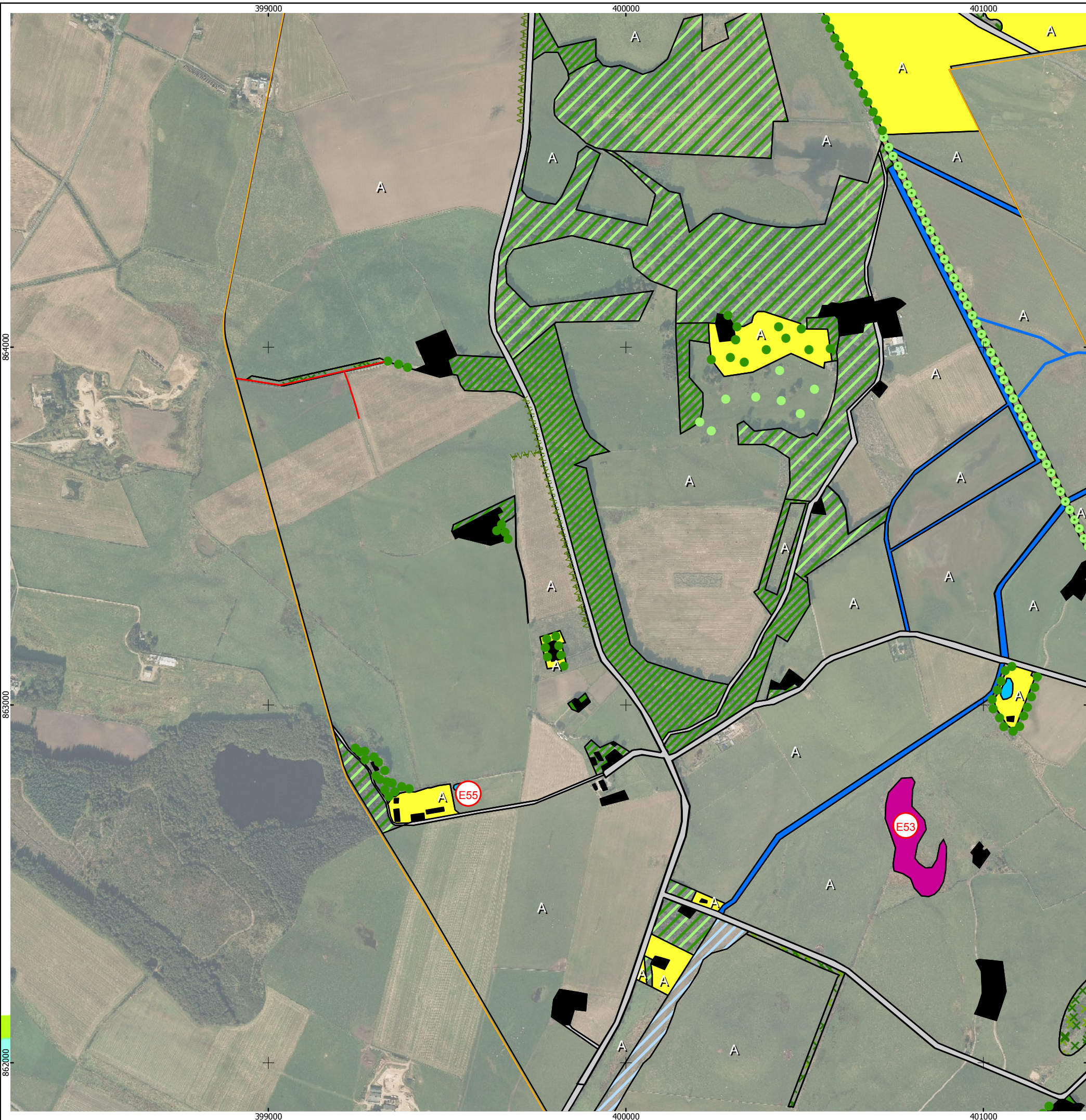


Figure 27 / Phase 1 Habitat Survey Results
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Key

Fraserburgh cable route corridor

Ecology survey area (including 250m buffer)

Arable land and grassland:

A Arable land

I Improved

SI Semi-improved neutral

SI Poor semi-improved

Unimproved neutral

Marshy

Woodland:

Plantation mixed

Plantation broadleaved

Plantation coniferous

Semi-natural broadleaved

Semi-natural mixed

Semi-natural coniferous

Scrub, tall herb and fern:

Tall ruderal herb and fern

Scattered scrub

Dense/continuous scrub

Continuous bracken

Scattered bracken

Coastland:

Dune grassland

Mire:

Dry modified bog

Blanket bog

Acid/neutral flush & spring

Water and wetland features:

Running water

Marginal vegetation

Standing water

Swamp

Inundation vegetation

Built-up areas:

Buildings

Road

Amenity grassland

Ephemeral short perennial

Bare ground

Rock and Quarry:

Quarry

Acid/neutral exposure

Basic scree

No access

Peat in superficial geology

Tall ruderal herb and fern

Running water

Fence

Wall

Dry ditch

Earth bank

Hedges:

Intact, native species-rich

Intact, native species-poor

Defunct, native species-rich

With trees, native species-rich

Scrub: scattered

Target note

Scattered trees:

Broadleaved

Mixed

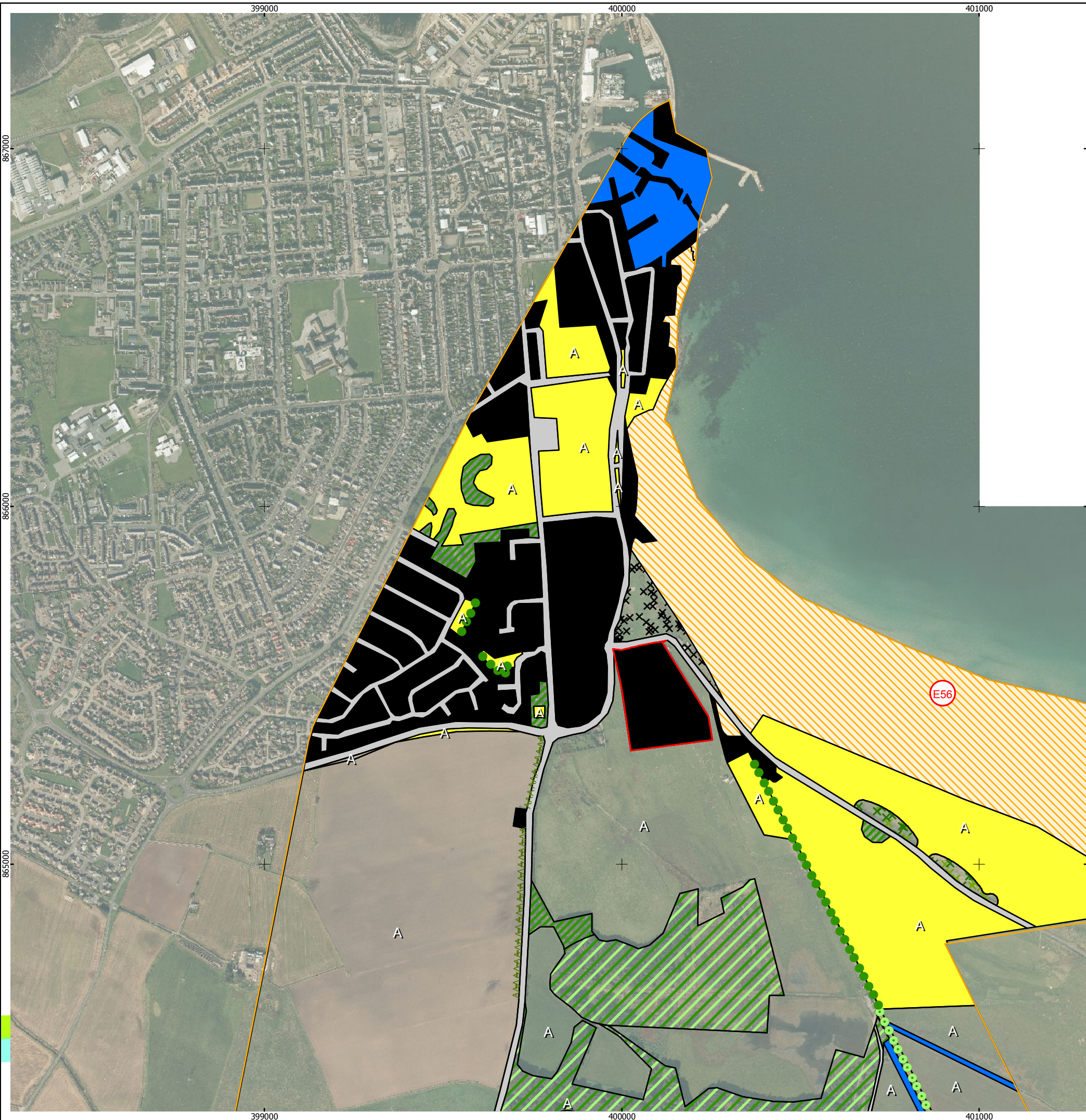
Coniferous



Horizontal Scale: 1:11,000
0 250 500 Meters
A3 Chart
Geodetic Parameters: BNG OSGB36
Produced: MF
Reviewed: JJJ
Approved: CR
Date: 22/03/2012
Revision: C
REF: 8460001-PPW0200-RPS-MAP-046

Figure 28 / Phase 1 Habitat Survey Results
(13 of 15)

Moray Offshore Renewables Ltd





Moray Offshore Renewables Ltd

Key

Fraserburgh cable route corridor

Ecology survey area (including 250m buffer)

Arable land and grassland:

A

Arable land

I

Improved

SI

Semi-improved neutral

SI

Poor semi-improved

U

Unimproved neutral

M

Marshy

Woodland:

PM

Plantation mixed

PBL

Plantation broadleaved

PC

Plantation coniferous

SMB

Semi-natural broadleaved

SM

Semi-natural mixed

SC

Semi-natural coniferous

Scrub, tall herb and fern:

TRHF

Tall ruderal herb and fern

SS

Scattered scrub

DCS

Dense/continuous scrub

CB

Continuous bracken

SCB

Scattered bracken

Coastland:

DG

Dune grassland

Mire:

DMB

Dry modified bog

B

Blanket bog

ANF

Acid/neutral flush & spring

Water and wetland features:

R

Running water

MV

Marginal vegetation

SW

Standing water

S

Swamp

IV

Inundation vegetation

Built-up areas:

B

Buildings

R

Road

AG

Amenity grassland

ESPP

Ephemeral short perennial

BG

Bare ground

Rock and Quarry:

Q

Quarry

ANE

Acid/neutral exposure

BS

Basic scree

NA

No access

PSG

Peat in superficial geology

TRHF

Tall ruderal herb and fern

R

Running water

F

Fence

W

Wall

DD

Dry ditch

EB

Earth bank

Hedges:

INR

Intact, native species-rich

INP

Intact, native species-poor

DFR

Defunct, native species-rich

WTR

With trees, native species-rich

SC

Scrub: scattered

E1

Target note

Scattered trees:

B

Broadleaved

M

Mixed

C

Coniferous

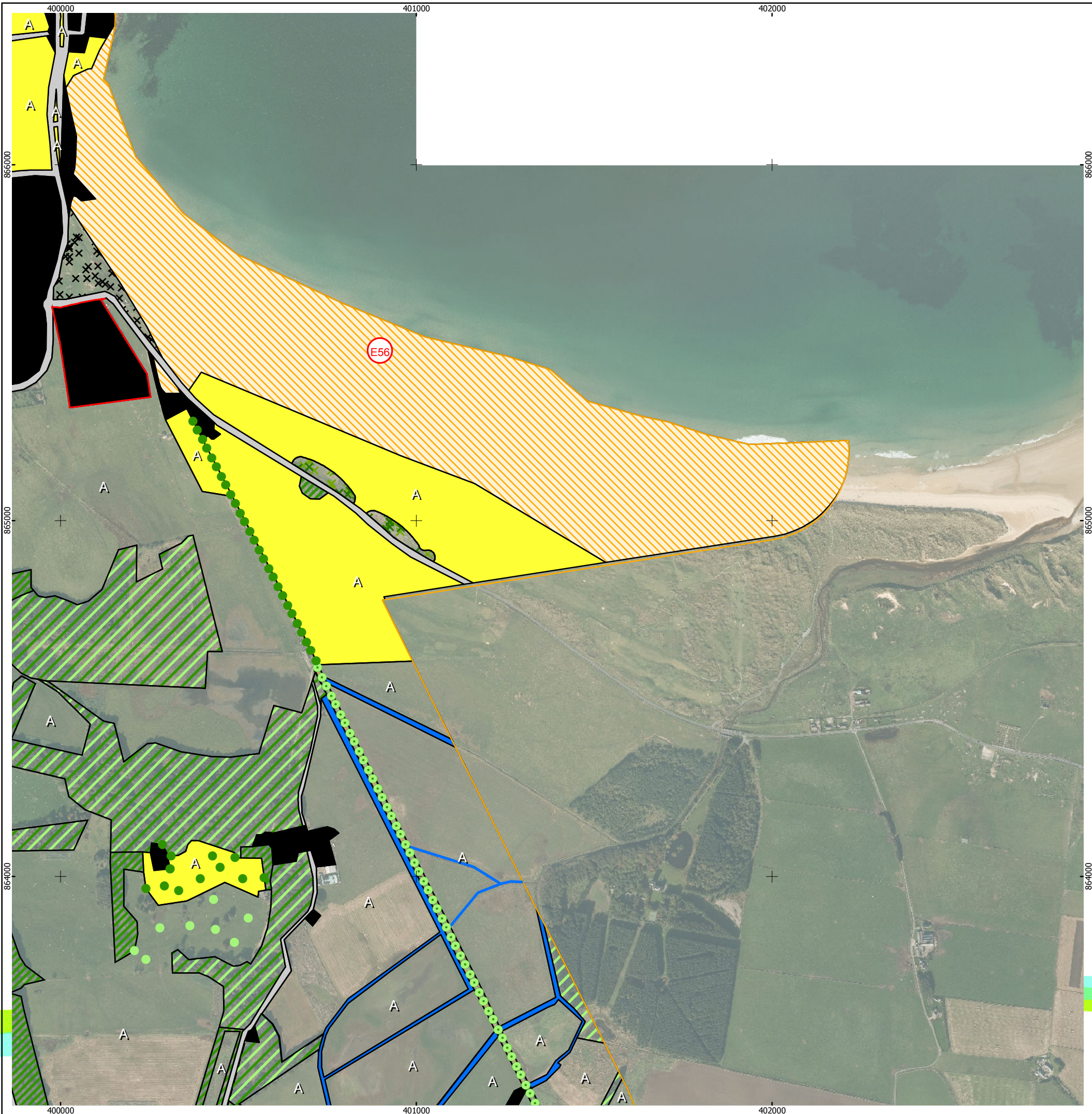


Horizontal Scale: 1:11,000
0 250 500 Meters
A3 Chart
Geodetic Parameters: BNG OSGB36
Produced: MF
Reviewed: JJJ
Approved: CR
Date: 22/03/2012
Revision: C
REF: 8460001-PPW0200-RPS-MAP-047

Figure 29 / Phase 1 Habitat Survey Results
(14 of 15)

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Geological Map Data © NERC, 2011.



renewables



Moray Offshore Renewables Ltd

Key

Fraserburgh cable route corridor
Ecology survey area
(including 250m buffer)

Arable land and grassland:

A Arable land
I Improved
SI Semi-improved neutral
SI Poor semi-improved
Unimproved neutral
Marshy

Woodland:

Plantation mixed
Plantation broadleaved
Plantation coniferous
Semi-natural broadleaved
Semi-natural mixed
Semi-natural coniferous

Scrub, tall herb and fern:

Tall ruderal herb and fern
Scattered scrub
Dense/continuous scrub
Continuous bracken
Scattered bracken

Coastland:

Dune grassland

Mire:

Dry modified bog
Blanket bog
Acid/neutral flush & spring

Water and wetland features:

Running water
Marginal vegetation
Standing water
Swamp
Inundation vegetation

Built-up areas:

Buildings
Road
Amenity grassland
Ephemeral short perennial
Bare ground

Rock and Quarry:

Quarry
Acid/neutral exposure
Basic scree
No access

Peat in superficial geology

Tall ruderal herb and fern

Running water

Fence

Wall

Dry ditch

Earth bank

Hedges:

Intact, native species-rich
Intact, native species-poor
Defunct, native species-rich
With trees, native species-rich

Scrub: scattered

Target note

Scattered trees:

Broadleaved
Mixed
Coniferous

Horizontal Scale: 1:11,000

A3 Chart

0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJJ
Approved: CR

Date: 22/03/2012 Revision: C

REF: 8460001-PPW0200-RPS-MAP-048

Figure 30 / Phase 1 Habitat Survey Results
(15 of 15)

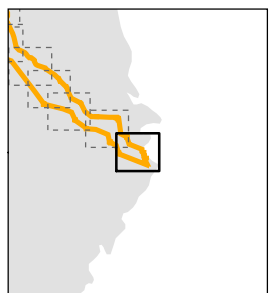
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- Key**
- Fraserburgh cable route corridor
 - Ecology survey area (including 250m buffer)
 - ▲ Otter: spraint
 - ▲ Otter: couch
 - ▲ Otter: print
 - ▲ Otter: spraint and prints
 - Badger: foraging sign
 - Badger: latrine
 - Badger: hair
 - Badger: print
 - Badger: scratching post




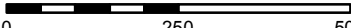
Horizontal Scale: 1:11,000		A3 Chart	
			
Geodetic Parameters:		BNG OSGB36	
Produced: MF			
Reviewed: JJL			
Approved: CR			
Date: 22/03/2012		Revision: C	
REF: 8460001-PPW0200-RPS-MAP-049			

Figure 31
Protected Species Survey Results
(1 of 11)

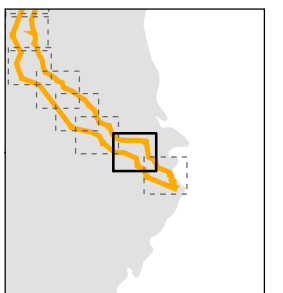
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Renewables Ltd



Moray Offshore Renewables Ltd

Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- ▲ Otter: spraint
- ▲ Otter: couch
- ▲ Otter: print
- ▲ Otter: spraint and prints
- Badger: foraging sign
- Badger: latrine
- Badger: hair
- Badger: print
- Badger: scratching post



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-050

Figure 32
Protected Species Survey Results
(2 of 11)

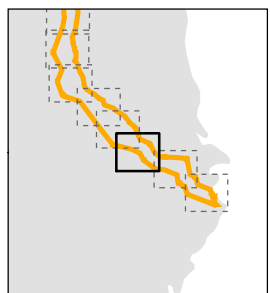
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- Key**
- Fraserburgh cable route corridor
 - Ecology survey area (including 250m buffer)
 - ▲ Otter: spraint
 - ▲ Otter: couch
 - ▲ Otter: print
 - ▲ Otter: spraint and prints
 - Badger: foraging sign
 - Badger: latrine
 - Badger: hair
 - Badger: print
 - Badger: scratching post




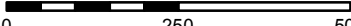
Horizontal Scale: 1:11,000		A3 Chart	
			
Geodetic Parameters:		BNG OSGB36	
Produced: MF			
Reviewed: JJL			
Approved: CR			
Date: 22/03/2012		Revision: C	
REF: 8460001-PPW0200-RPS-MAP-051			

Figure 33
Protected Species Survey Results
(3 of 11)

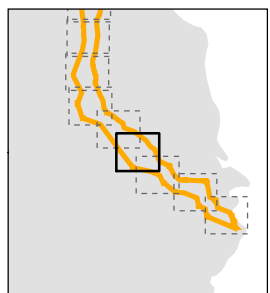
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- Key**
- Fraserburgh cable route corridor
 - Ecology survey area (including 250m buffer)
 - ▲ Otter: spraint
 - ▲ Otter: couch
 - ▲ Otter: print
 - ▲ Otter: spraint and prints
 - Badger: foraging sign
 - Badger: latrine
 - Badger: hair
 - Badger: print
 - Badger: scratching post





Horizontal Scale: 1:11,000		A3 Chart	N
			
Geodetic Parameters:		BNG OSGB36	
Produced: MF			
Reviewed: JJL			
Approved: CR			
Date: 22/03/2012		Revision: C	
REF: 8460001-PPW0200-RPS-MAP-053			

Figure 34
Protected Species Survey Results
(4 of 11)

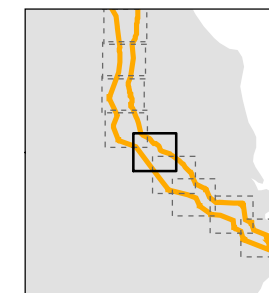
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Renewables Ltd



Moray Offshore Renewables Ltd

Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- ▲ Otter: spraint
- ▲ Otter: couch
- ▲ Otter: print
- ▲ Otter: spraint and prints
- Badger: foraging sign
- Badger: latrine
- Badger: hair
- Badger: print
- Badger: scratching post



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-055

Figure 35
Protected Species Survey Results
(5 of 11)

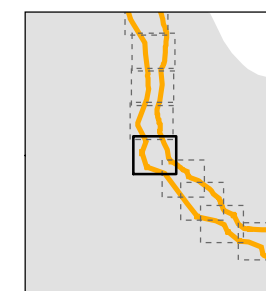
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Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- ▲ Otter: spraint
- ▲ Otter: couch
- ▲ Otter: print
- ▲ Otter: spraint and prints
- Badger: foraging sign
- Badger: latrine
- Badger: hair
- Badger: print
- Badger: scratching post



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-058

Figure 36
Protected Species Survey Results
(6 of 11)

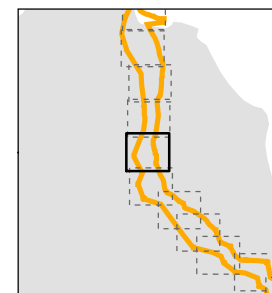
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Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- ▲ Otter: spraint
- ▲ Otter: couch
- ▲ Otter: print
- ▲ Otter: spraint and prints
- Badger: foraging sign
- Badger: latrine
- Badger: hair
- Badger: print
- Badger: scratching post



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-059

Figure 37
Protected Species Survey Results
(7 of 11)

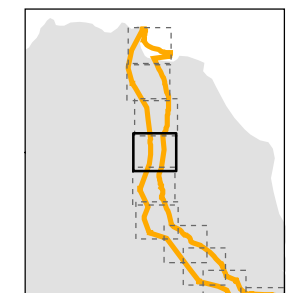
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- Key**
- Fraserburgh cable route corridor
 - Ecology survey area (including 250m buffer)
 - ▲ Otter: spraint
 - ▲ Otter: couch
 - ▲ Otter: print
 - ▲ Otter: spraint and prints
 - Badger: foraging sign
 - Badger: latrine
 - Badger: hair
 - Badger: print
 - Badger: scratching post



Horizontal Scale: 1:11,000 A3 Chart N

0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C

REF: 8460001-PPW0200-RPS-MAP-060

Figure 38
Protected Species Survey Results
(8 of 11)

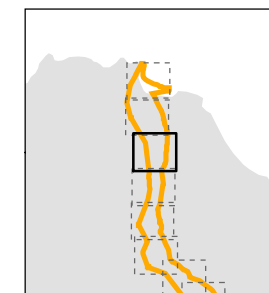
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Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- ▲ Otter: spraint
- ▲ Otter: couch
- ▲ Otter: print
- ▲ Otter: spraint and prints
- Badger: foraging sign
- Badger: latrine
- Badger: hair
- Badger: print
- Badger: scratching post



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-061

Figure 39
Protected Species Survey Results
(9 of 11)

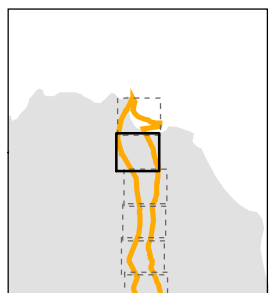
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- Key**
- Fraserburgh cable route corridor
 - Ecology survey area (including 250m buffer)
 - ▲ Otter: spraint
 - ▲ Otter: couch
 - ▲ Otter: print
 - ▲ Otter: spraint and prints
 - Badger: foraging sign
 - Badger: latrine
 - Badger: hair
 - Badger: print
 - Badger: scratching post





Horizontal Scale: 1:11,000		A3 Chart	N
			
Geodetic Parameters:		BNG OSGB36	
Produced: MF			
Reviewed: JJL			
Approved: CR			
Date: 22/03/2012		Revision: C	
REF: 8460001-PPW0200-RPS-MAP-062			

Figure 40
Protected Species Survey Results
(10 of 11)

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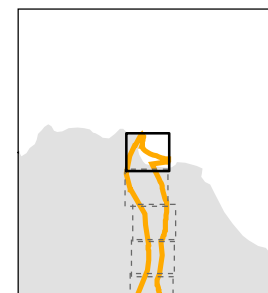


Moray Offshore Renewables Ltd

Key

Fraserburgh cable route corridor
Ecology survey area
(including 250m buffer)

- ▲ Otter: spraint
- ▲ Otter: couch
- ▲ Otter: print
- ▲ Otter: spraint and prints
- Badger: foraging sign
- Badger: latrine
- Badger: hair
- Badger: print
- Badger: scratching post



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-063

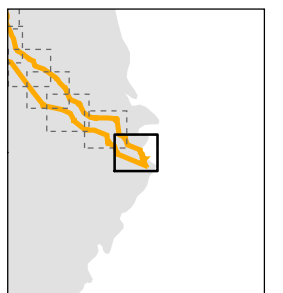
Figure 41
Protected Species Survey Results
(11 of 11)

Moray Offshore
Renewables Ltd



Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Potentially high value bat habitat
- Potentially medium value bat habitat
- Potentially low value bat habitat
- E1 Target note
- 1 Interpretation note



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

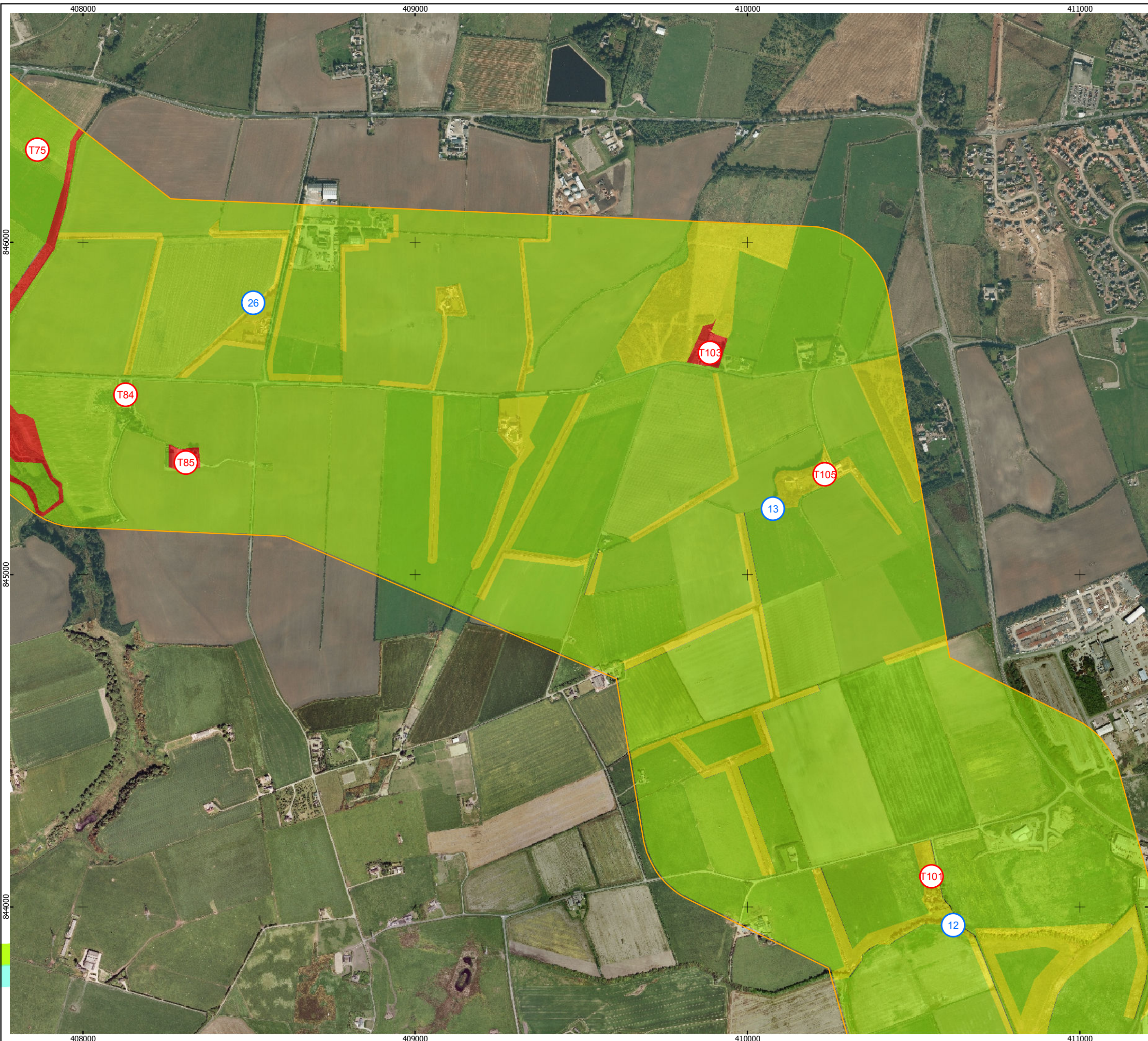
Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-064

Figure 42
Bat Roost and Habitat Suitability
Survey Results (1 of 11)

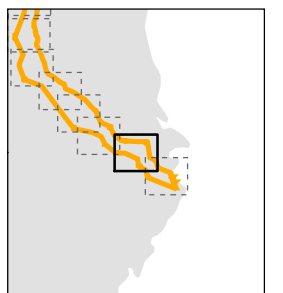
Moray Offshore
Renewables Ltd



Moray Offshore Renewables Ltd

Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Potentially high value bat habitat
- Potentially medium value bat habitat
- Potentially low value bat habitat
- (E1) Target note
- (1) Interpretation note



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-065








Figure 43
Bat Roost and Habitat Suitability
Survey Results (2 of 11)

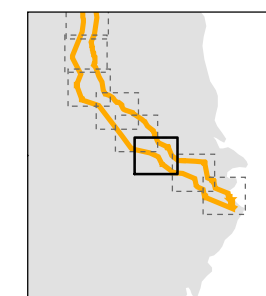
Moray Offshore
Renewables Ltd




Moray Offshore Renewables Ltd

Key

-  Fraserburgh cable route corridor
-  Ecology survey area (including 250m buffer)
-  Potentially high value bat habitat
-  Potentially medium value bat habitat
-  Potentially low value bat habitat
-  Target note
-  Interpretation note



Horizontal Scale: 1:11,000 A3 Chart N


Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-066

Figure 44
Bat Roost and Habitat Suitability
Survey Results (3 of 11)

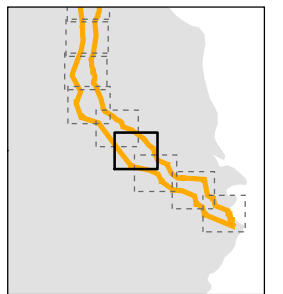
Moray Offshore
Renewables Ltd



Moray Offshore Renewables Ltd

Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Potentially high value bat habitat
- Potentially medium value bat habitat
- Potentially low value bat habitat
- E1 Target note
- 1 Interpretation note



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-068

Figure 45
Bat Roost and Habitat Suitability
Survey Results (4 of 11)

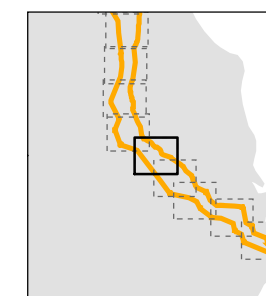
Moray Offshore
Renewables Ltd



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Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Potentially high value bat habitat
- Potentially medium value bat habitat
- Potentially low value bat habitat
- (E1) Target note
- (1) Interpretation note



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-070

Figure 46
Bat Roost and Habitat Suitability
Survey Results (5 of 11)

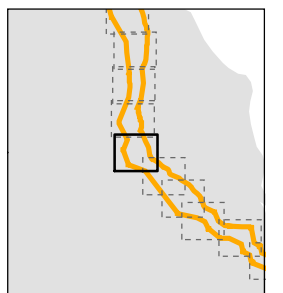
Moray Offshore
Renewables Ltd



Moray Offshore Renewables Ltd

Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Potentially high value bat habitat
- Potentially medium value bat habitat
- Potentially low value bat habitat
- E1 Target note
- 1 Interpretation note



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-073

Figure 47
Bat Roost and Habitat Suitability
Survey Results (6 of 11)

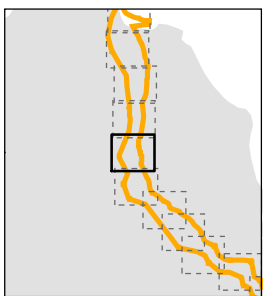
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Renewables Ltd



Moray Offshore Renewables Ltd

Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Potentially high value bat habitat
- Potentially medium value bat habitat
- Potentially low value bat habitat
- E1 Target note
- 1 Interpretation note



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-074

Figure 48
Bat Roost and Habitat Suitability
Survey Results (7 of 11)

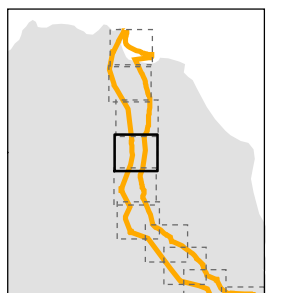
Moray Offshore
Renewables Ltd



Moray Offshore Renewables Ltd

Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Potentially high value bat habitat
- Potentially medium value bat habitat
- Potentially low value bat habitat
- (E1) Target note
- (1) Interpretation note



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

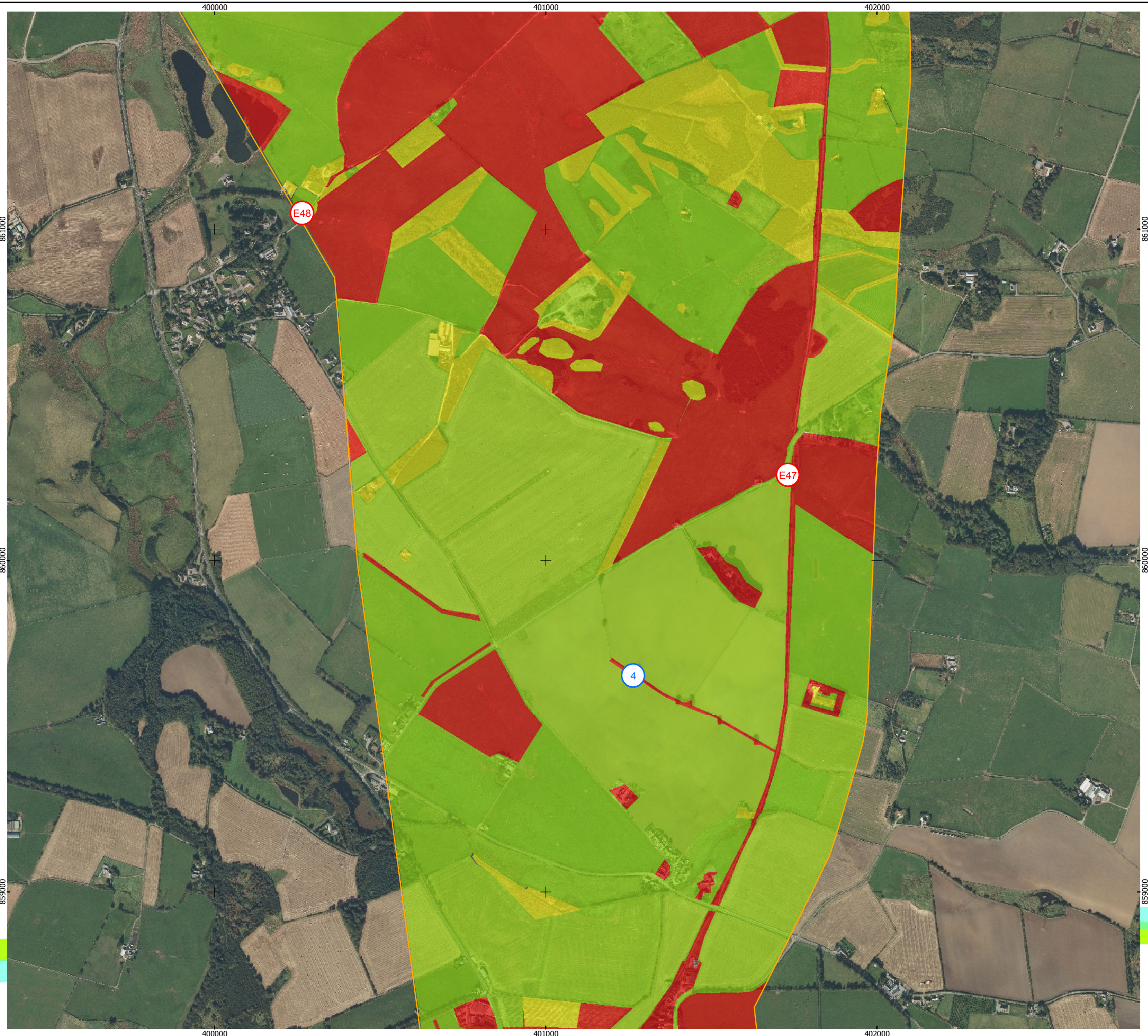
Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-075

Figure 49
Bat Roost and Habitat Suitability
Survey Results (8 of 11)

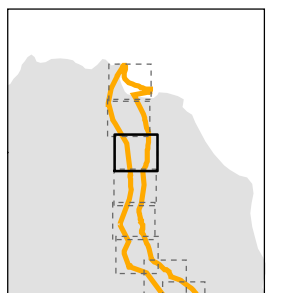
Moray Offshore
Renewables Ltd



Moray Offshore Renewables Ltd

Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Potentially high value bat habitat
- Potentially medium value bat habitat
- Potentially low value bat habitat
- (E1) Target note
- (1) Interpretation note



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-076

Figure 50
Bat Roost and Habitat Suitability
Survey Results (9 of 11)

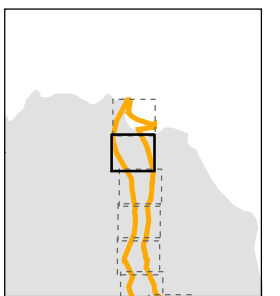
Moray Offshore
Renewables Ltd



Moray Offshore Renewables Ltd

Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Potentially high value bat habitat
- Potentially medium value bat habitat
- Potentially low value bat habitat
- E1 Target note
- 1 Interpretation note



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-077

Figure 51
Bat Roost and Habitat Suitability
Survey Results (10 of 11)

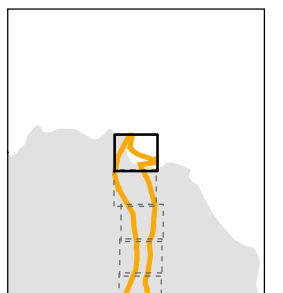
Moray Offshore
Renewables Ltd



Moray Offshore Renewables Ltd

Key

- Fraserburgh cable route corridor
- Ecology survey area (including 250m buffer)
- Potentially high value bat habitat
- Potentially medium value bat habitat
- Potentially low value bat habitat
- Target note
- Interpretation note



Horizontal Scale: 1:11,000 A3 Chart
0 250 500 Meters

Geodetic Parameters: BNG OSGB36

Produced: MF
Reviewed: JJL
Approved: CR

Date: 22/03/2012 Revision: C
REF: 8460001-PPW0200-RPS-MAP-078

Figure 52
Bat Roost and Habitat Suitability
Survey Results (11 of 11)

Moray Offshore
Renewables Ltd

Appendix A – Breeding bird survey schedule, 2011

Ecology survey file	Round 1 date	Round 2 date	Round 3 date	Round 3 additional survey survey date
P2	10 May	27 May	14 Jun	N/A
P3	10 May	27 May	14 Jun	N/A
P4	10 May	27 May	14 Jun	N/A
P5	10 May	28 May	15 Jun	N/A
P6	11 May	28 May	15 Jun	N/A
P7	11 May	28 May	15 Jun	N/A
P8	11 May	28 May	15 Jun	30 Jun
F1	11 May	28 May	15 Jun	N/A
F2	11 May	29 May	15 Jun	N/A
F3	12 May	29 May	20 Jun	N/A
F4	12 May	29 May	20 Jun	30 Jun
F5	12 May	29 May	20 Jun	N/A
F6	12 May	29 May	20 Jun	30 Jun
F7	13 May	29 May	20 Jun	N/A
F8	13 May	29 May	20 Jun	30 Jun
F9	13 May	29 May	20 Jun	30 Jun
F10	13 May	29 May	20 Jun	N/A
F11	13 May	30 May	21 Jun	Not surveyed
F12	13 May	30 May	21 Jun	Not surveyed
F13	13 May	30 May	21 Jun	Not surveyed
F14	28 May	31 May	21 Jun	N/A
F15	28 May	31 May	21 Jun	Not surveyed
F16	28 May	31 May	21 Jun	N/A
F17	28 May	31 May	21 Jun	Not surveyed
F18	28 May	07 Jun	21 Jun	Not surveyed
F19	28 May	07 Jun	21 Jun	30 Jun
F20	25 May	31 May	21 Jun	30 Jun
F21	25 May	31 May	28 Jun	N/A
F22	25 May	31 May	28 Jun	30 Jun
F23	25 May	31 May	28 Jun	N/A
F24	25 May	31 May	28 Jun	30 Jun
F25	25 May	31 May	28 Jun	01 Jul
F26	25 May	31 May	22 Jun	N/A
F27	25 May	31 May	22 Jun	01 Jul
F28	25 May	31 May	22 Jun	N/A
F29	25 May	31 May	22 Jun	N/A
F30	N/A	N/A	N/A	30 Jun
F31	N/A	N/A	N/A	30 Jun
F32	N/A	N/A	N/A	Not surveyed
F33	N/A	N/A	N/A	30 Jun
F34	N/A	N/A	N/A	30 Jun
F35	N/A	N/A	N/A	01 Jul

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Appendix B – RSPB consultation response

4.7 A

APPENDIX

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Dr Rhys Bullman
RPS
7 Clairmont Gardens
Glasgow
G3 7LW
19th July 2011

Dear Dr Bullman,

MORL Onshore Cable Route: Ornithology and Ecology Methods Statement

Thank you for consulting RSPB Scotland on the Ornithology and Ecology Methods Statement for the MORL Onshore Cable Route. RSPB Scotland would like to make the following comments.

Overall, RSPB Scotland is satisfied that the proposed ornithological survey methods are appropriate and should therefore permit the proper assessment of the potential impacts of the proposal.

It should be noted that the BBS Corridor to Rattray passes through agricultural land used by geese which roost at Loch of Strathbeg Special Protection Area. Therefore, it is likely that some assessment of goose use of the area will be necessary and that an Appropriate Assessment under the terms of the Habitats Regulations may be required if undergrounding work is to take place during mid-September to early May when geese are present.

The BBS Corridor to Rattray also passes through the Loch of Strathbeg SSSI which is notified, in part, because of its geomorphologic interest. It is considered that the undergrounding of the cable at this location has the potential to negatively impact on the coastal dune system.

The BBS shared corridor to Peterhead passes through and around Boddam. The coastal area of Boddam is heavily used by herring gulls which nest at nearby Bullers of Buchan, which form part of the Buchan Ness to Collieston Special Protection Area. This should be taken into consideration during the monitoring and, again, there may be a requirement for Appropriate Assessment.

I hope that these comments are helpful and we look forward to being consulted on the resulting Environmental Statement.

Yours Sincerely,

Kathleen Sinclair
Assistant Conservation Officer, RSPB North East Scotland

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Appendix C – Phase 1 habitat and bat roost and habitat suitability survey schedule, 2011

Ecology survey file	Survey date
P2	22 Jul
P3	22 Jul
P4	22 Jul
P5	22 Jul
P6	22 Jul
P7	22 Jul
P8	22 Jul
F1	21 Jul
F2	21 Jul
F3	21 Jul
F4	21 Jul
F5	18 Jul
F6	18 Jul
F7	18 Jul
F8	18 Jul
F9	19 Jul
F10	19 Jul
F11	18 Jul
F12	20 Jul
F13	21 Jul
F14	20 Jul
F15	20 Jul
F16	20 Jul
F17	21 Jul
F18	21 Jul
F19	21 Jul
F20	22 Jul
F21	22 Jul
F22	22 Jul
F23	25 Jul
F24	25 Jul
F25	25 Jul
F26	25 Jul
F27	25 Jul
F28	25 Jul
F29	25 Jul
F30	21 Jul
F31	26 Jul
F32	26 Jul
F33	26 Jul
F34	26 Jul
F35	26 Jul

Appendix D – Protected species survey schedule, 2011

Ecology survey tile	Survey date
P2	22 Jul
P3	22 Jul
P4	21 Jul
P5	21 Jul
P6	21 Jul
P7	21 Jul
P8	21 Jul
F1	21 Jul
F2	21 Jul
F3	21 Jul
F4	20 Jul
F5	19 Jul
F6	20 Jul
F7	20 Jul
F8	19 Jul
F9	19 Jul
F10	19 Jul
F11	19 Jul
F12	18 Jul
F13	20 Jul
F14	20 Jul
F15	18 Jul
F16	19 Jul
F17	18 Jul
F18	22 Jul
F19	22 Jul
F20	31 Aug
F21	31 Aug
F22	31 Aug
F23	24 Aug
F24	31 Aug
F25	24 Aug
F26	31 Aug
F27	16 Aug
F28	23 Aug
F29	16 Aug
F30	21 Aug
F31	31 Aug
F32	19 Jul
F33	22 Jul
F34	31 Aug
F35	31 Aug

Appendix E – Freshwater pearl mussel survey schedule, 2011

Survey area	Survey date
Upstream from NK099463	09-10 Aug
Up and downstream from NK006525	24 Aug
Upstream from NK026504	24 Aug
Upstream from NK033505	24 Aug
Upstream from NK054485	03-04 Sep
Upstream from NK063487	24 Aug
Upstream from NK056484	03 Sep
Upstream from NK061485	03 Sep
Upstream from NK081465	09-10 Aug

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Appendix F – SNH consultation response (freshwater pearl mussel survey methodology)

4.7 A

APPENDIX

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Scottish Natural Heritage Dualchas Nàdair na h-Alba

All of nature for all of Scotland
Nàdar air fad airson Alba air fad

Frazer MacFarlane MIEEM
Principal Ecologist
Horizon Ecology Ltd
The Kraesult Lodge
Leny Feus
Callander
Perthshire
FK17 8AS

E-mail: frazer@horizonecology.co.uk

31 August 2011

Our Ref: A568382

Dear Mr MacFarlane

Freshwater Pearl Mussel Records – River Ugie

Thank you for your information request which we received on 7 August 2011.

You asked us for information about the occurrence of Freshwater Pearl Mussel *Margaritifera margaritifera* in the River Ugie, Aberdeenshire, around grid reference NK 075 492.

There are no recent records held by SNH of this species from the River Ugie. Several historical records from the 1980s and earlier were given by Cosgrove (1997), including some within your area of search, and I have copied an extract of the relevant portion of his report below. These locations were visited during the national survey in 1996/97, and no mussels were found at that time. As no extant populations are known from the area, a data restriction license is not required in this case. However, if your own survey produces any records, we would be most grateful if you could let us know and treat such records as confidential. Confidentiality of the locations of Freshwater Pearl Mussel are a key element of their conservation.

R. Ugie NJ/NK-----, map 30 Various **1843* - 1989***.

- 1) North Ugie Water. Fords nr Ravenscraig, btwn Middleton of Rora & Main of Butlaw & at junction of N & S Ugie NK0--4--, Tocher (ed) <1910. Artlaw, just d/s of Middleton of Rora, 5 mussels killed, Williams 1980.
- 2) South Ugie Water. From conflu with N Ugie to Baluss Bri, S of Mintlaw, Tocher (ed) <1910.
- 3) Several miles searched, almost extinct NK0--4--, McCormick 1970's.
- 4) Inverugie, Booth 1910*. 6 mussels killed 100 yds d/s of bri & castle at Inverugie NK0--4--, Sinclair 1979/80.
- 5) **Hearsay**. Fetterangus NJ9--5--, Sinclair no date.
- 6) No location given, MacGillivray <1843*, Booth 1913/17*.
- 7) Aberlour NJ26-43-, Smith 1890*.
- 8) NK08-49- McCormick 1989*.
- 9) Howes of Buchburn? (Howe of Buchan on map) NK10-46-, Garioch 1965*.



INVESTOR IN PEOPLE

Scottish Natural Heritage, Battleby, Redgorton, Perth, PH1 3EW
Tel 01738 444177 Fax 01738 458611 www.snh.org.uk

Reference

Cosgrove, PJ (1997) Distribution survey of freshwater pearl mussels *Margaritifera margaritifera*: Observation records by Vice Counties in Scotland. Confidential report to SNH.

I hope the information we have provided meets your requirements, however if you are not satisfied please don't hesitate to contact me.

Yours sincerely

Colin McLeod

Colin McLeod
Data Manager

Appendix G – SNH consultation response (freshwater pearl mussel records)

4.7 A

APPENDIX

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FRESHWATER PEARL MUSSEL SURVEY PROTOCOL

for use in site-specific projects.

Introduction

Standard survey methods have been developed for this species through a number of previous SNH-funded projects. These have been adapted for more site-specific projects and the following is a full version of methods for employing at specific sites:

Licensing and access permission

Freshwater pearl mussel is fully protected under the Wildlife and Countryside Act (1981) therefore all surveyors must be licensed by SNH. Surveyors must have secured access permission from land owners before any fieldwork is undertaken. Given the ongoing threat that illegal activity, including pearl fishing, poses to freshwater pearl mussels it is considered good practice that surveyors notify the nearest police station about their survey prior to going out on site. Further information about illegal activity affecting pearl mussels, and what to do if any is detected, is available from [SNH](#).

Health and safety

All surveyors will have legal responsibilities under the Health and Safety at Work Act to ensure the health and safety of their employees and any other person who may be affected by their actions or omissions. All surveyors should be trained in safe working practices. It is recommended that thigh waders rather than chest waders are worn (to discourage work in deep, fast-flowing and dangerous water), surveyors should work in pairs, a special wading and mussel gathering staff is used, and a life jacket worn.

Field season

Survey work can only be undertaken in periods of low water flow. Generally survey work cannot be undertaken between October and March.

Site selection

The length of river to be surveyed will vary depending on the nature of the proposed project. Where there is river engineering proposed (such as bank protection or work on the river bed), then typically it will be the area of river bed directly affected by the project together with a minimum of 0.1 km upstream and 0.5 km downstream which may be indirectly affected (the 'survey site'). Where a development will result in reduced flows over a river reach, then the length of the affected reach (the 'survey site') should be surveyed for the presence of freshwater pearl mussels.

Survey of the area likely to be directly affected by proposed engineering project

The entire river bed should be surveyed in this part of the survey site. This can be done by laying out a 1 m x 1 m grid, and counting and measuring all mussels in each grid square. Searches for hidden and juvenile mussels should also be carried out in 20% of the squares in which visible mussels are recorded.

Survey of the downstream area likely to be indirectly affected by proposed project

A general survey is made of the river and its substrate types within the survey site, by walking along the river bank and/or by wading in the water. The aim is to identify specific areas that are most likely to harbour mussels using information on their habitat preferences from previous studies and experience. Information on the habitat preferences of mussels is [available](#) but it is important that surveyors have past experience of working with freshwater pearl mussels.

Once an apparently suitable area is found, the river is entered at the nearest point and a search conducted, concentrated in the most favourable substrate types so as to optimise search efficiency. To ensure compatibility with other surveys, searches are made:

- using a glass-bottomed viewing bucket.
- conducted under favourable conditions i.e. bright light, clear water, low flow regime.
- in water sufficiently shallow for safe wading.
- in an upstream direction, checking favourable sites e.g. in the shelter of cobbles, boulders or overhanging banks.
- loose debris and trailing weed should be moved gently aside but no disturbance of the river bed is required.

Negative results: If no mussels are found in a specific search area, then the search is moved to other suitable areas within the survey site. Even if mussels are not found anywhere in the survey site, site information should still be recorded on a standard recording form as described below. A copy of the standard recording form is available in Appendix A of the [method that describes how to survey designated sites](#).

Positive results: If a live mussel or dead shell is found then a systematic search should be made as follows. Within the area where mussels are found, one transect 50m long by 1m wide should be searched, laid out so as to traverse the main area of suitable habitat. If an initial search of the whole transect indicates that there are likely to be fewer than 250 mussels, all mussels should be counted.

If there are too many mussels in the transect to count accurately (i.e. >250), 1 m x 1 m quadrats should be laid at 10, 20, 30, 40, and 50 m intervals. Counts and measurements of the mussels in these five quadrats is used to provide an extrapolated estimate for the whole 50 m transect.

At 10, 20, 30, 40, and 50 m along the transect, a 1 m x 1 m quadrat is laid on the substrate. All mussels visible within the quadrat are counted and then removed (to be replaced in the same quadrat later). Loose stones and debris are then dislodged to reveal any hidden mussels and in particular to search for any juveniles. All these mussels are measured along their longest dimension to the nearest 1 mm (using dial callipers). Measurement of the mussels allows a size/age profile to be produced. It is particularly important to establish whether juvenile mussels are present, indicating active recruitment at that location. A pearl mussel is considered 'juvenile' if it is ≤65 mm long; mussels ≤30 mm long are likely to be under 5 years old and their presence is especially important as they indicate *recent* recruitment.

For each 50 m transect, site details are recorded on a standard recording form. These include an eight figure grid reference, average width and depth(m), substrate composition (based on the widely used Wentworth Scale), main types of adjacent land-use, bankside vegetation, evidence of impacts, and details of any discussions with local people concerning the river. At least one photograph should be taken to indicate the position of the transect in relation to the river bank.

Standard abundance terms

Results should be reported using the following abundance categories A-E:

No. of live mussels per 50 m x 1 m transect	Abundance level
0	E
1 - 49	D
50 - 499	C
500 - 999	B
≥1000	A

Spreadsheets

Data should be provided in a spreadsheet form that is compatible with existing spreadsheets containing pearl mussel data. Therefore it is suggested that the following data about the pearl mussel survey is collated: mussel numbers in each 50m transect (sampling point code, date, grid reference, no. live mussels in each quadrat and total transect, no. dead shells, % of juvenile pearl mussels ($\leq 65\text{mm}$) in each 50m transect, number of pearl mussels $\leq 30\text{mm}$ in each 50m transect etc.); and measurements of pearl mussel shell dimensions (sampling point code, date, measurements etc.). Similar information should also be supplied for any area of riverbed that will be directly affected by a proposal.

A notes column should also be provided in the above spreadsheet that should include information about potential or actual threats, particularly evidence of recent, illegal pearl fishing, and management issues which may be relevant to the pearl mussel population. Any juvenile salmonids observed during pearl mussel surveys should also be recorded in the 'notes' column.

Summary habitat information principally describing the river width, water depth, and substrate types (linked to the sampling point code and grid reference), should also be included as a separate spreadsheet.

Deep water survey

Recently a technique has been developed for surveying visible mussels in deep water ($>1\text{ m}$). Information is available at <http://www.snh.org.uk/pubs/detail.asp?id=950>.

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