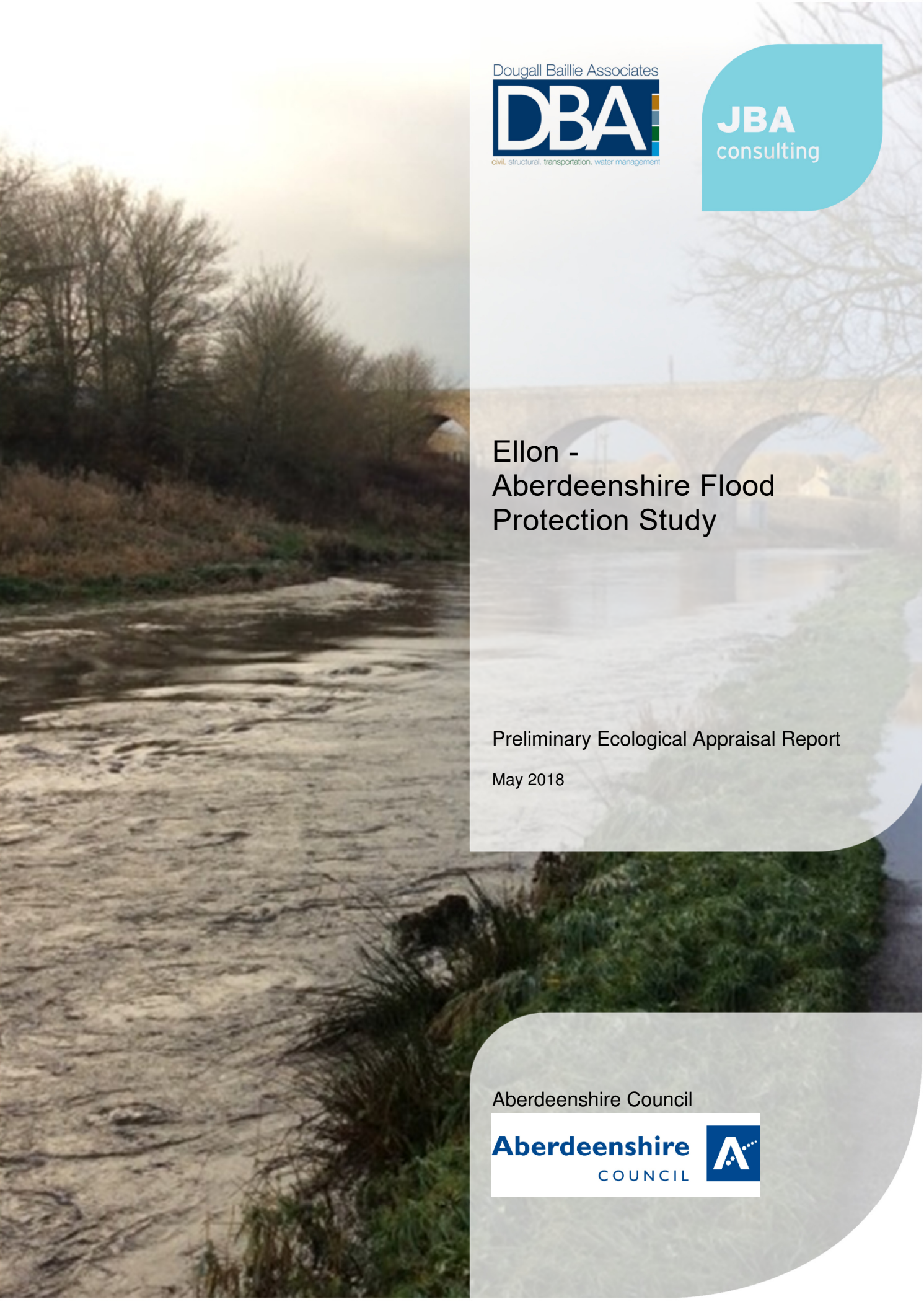

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JBA consulting

Ellon - Aberdeenshire Flood Protection Study

Preliminary Ecological Appraisal Report

May 2018

Aberdeenshire Council

Aberdeenshire COUNCIL

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Contract

This report describes work commissioned by Gavin Penman, on behalf of Aberdeenshire Council on 09/10/2017 by Purchase Order Number 1095192. Dougall Baillie's representative for the contract was Scott Macphail and Aberdeenshire Council's representative for the contract was Alistair Scotland. Jennifer Pullen and Catherine Porter of JBA Consulting carried out this work.

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Purpose

This document has been prepared as a Final Report for Aberdeenshire Council. JBA Consulting accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

JBA Consulting has no liability regarding the use of this report except to Aberdeenshire Council.

Acknowledgements

JBA would like to thank North East Scotland Biological Records Centre for the provision of protected species data, invasive non-native species and site citations for designated nature conservation sites.

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Executive Summary

JBA Consulting were commissioned by Aberdeenshire Council through Dougall Baillie Associates to complete a Preliminary Ecological Appraisal Report (PEAR) to assist with a Flood Protection Study within Ellon, Aberdeenshire. The PEAR was commissioned in view of the possible impacts of proposed works on the ecological components of the site; including both protected species and habitats.

A desk-based assessment was undertaken with records from the North East Scotland Biological Records Centre to identify any historical ecological records and any statutory and non-statutory designated nature conservation sites occurring within 2km of the location of proposed works. Further to this, an Extended Phase 1 Habitat Survey was carried out at the site by suitably experienced Ecologists on 27th - 29th November 2017.

A range of habitats were identified on the site walkover, including mixed woodland, tall ruderal vegetation, marshy grassland and standing water. The ecological value of the site was determined to be of moderate to high as the structural diversity across the surveyed area offers good foraging and refuge opportunities for birds, small mammals, bats and invertebrate assemblages.

The data search identified four statutory designated nature conservation sites within a 2km radius of the site extent. Three of these statutory sites, Sands of Forvie and Ythan Estuary SSSI; Forvie NNR; and Ythan Estuary, Sands of Forvie and Meikle Loch SPA, are located within the surveyed extent along the River Ythan. The Ythan Estuary and Meikle Loch RAMSAR is located 0.5km east of the surveyed extent. Scottish Natural Heritage will need to be consulted prior to works commencing to determine whether further assessments are required, but given the proximity to the designated sites, it is likely that works will require assessment following the Habitat Regulations Appraisal process.

Mature trees throughout the site are protected through Tree Protection Orders, and details of these TPOs can be sought from the local authority. If trees will be impacted by the works (including retained trees where roots may be impacted) then an arboricultural survey should be undertaken.

Within a 2km radius of the site, the North East Scotland Biological Records Centre holds several records for protected and notable species. The ecological importance of the site to protected species in its current state was considered high for Otter, bats, birds and fish, whilst it was considered moderate for Badger, Red Squirrel, Water Vole and reptiles and low for Great Crested Newts.

From a protected species perspective, the works should try to, as far as possible:

- avoid the need for land-take in semi-natural habitats;
- avoid tree and scrub removal (particularly for bats, birds, Red Squirrels);
- minimise in-channel works (Otters, Water Voles, fish);
- no in-channel works between October and March (fish, particularly Salmon);
- avoid night-working in the main active bat season (April - September).

Once the exact nature of the works is confirmed targeted surveys for protected species are likely to be required. Further protected species surveys could potentially include bat roost assessments, bat activity surveys, nesting bird assessments, fish surveys, Water Vole and Otter surveys and Freshwater Pearl Mussel surveys. These surveys must be carried out in suitable survey seasons and this seasonality is set out below.

Precautionary working methods are also advised for Red Squirrels, foraging and commuting bats, and Badger and recommendations are provided with regards to nesting birds and vegetation clearance.

Once detailed work plans are available a walkover survey should be completed in the summer to map out the location of invasive, non-native species. The locations can be used to determine necessary mitigation measures including removal, herbicide treatment or exclusion zones.

A Water Framework Directive Assessment should be undertaken prior to the works to ensure that the works are in line with European Legislation. Given the potential for in-channel nature of the works, pollution prevention measures should be adopted to prevent contamination of the watercourse.

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Abbreviations

AA ..... Appropriate Assessment
BAP ..... Biodiversity Action Plan
BCT ..... Bat Conservation Trust
BOD ..... Biochemical Oxygen Demand
CIEEM ..... Chartered Institute of Ecology and Environmental Management
CIRIA ..... Construction Industry Research and Information Association
EPS ..... European Protected Species
HRA ..... Habitats Regulations Appraisal
HSI ..... Habitat Suitability Index
JNCC ..... Joint Nature Conservation Committee
LBAP ..... Local Biodiversity Action Plan
LBS ..... Local Biodiversity Site
LNR ..... Local Nature Reserve
MAGIC ..... Multi Agency Geographic Information for the Countryside
NESBReC ..... North East Scotland Biological Records Centre
NNR ..... National Nature Reserve
OSGR ..... Ordnance Survey Grid Reference
PEA ..... Preliminary Ecological Appraisal
PEAR ..... Preliminary Ecological Appraisal Report
PRF ..... Potential Roosting Features
RBMP ..... River Basin Management Plan
RSPB ..... Royal Society for the Protection of Birds
SAC ..... Special Area of Conservation
SNH ..... Scottish Natural Heritage
SPA ..... Special Protection Area
SSSI ..... Site of Special Scientific Interest
WANE Act ..... Wildlife and Natural Environment Act
W&CA ..... Wildlife and Countryside Act 1981 (as amended)
WFD ..... Water Framework Directive

1 Introduction

1.1 Background

JBA Consulting was commissioned by Aberdeenshire Council through Dougall Baillie Associates to undertake a number of Preliminary Ecological Appraisals (PEA) as part of the Flood Protection Study within Ellon, Aberdeenshire. There are no specific plans as yet and, therefore, this commission is intended to highlight the likely ecological constraints to developments and/or benefits to the site for protected and notable species, priority habitats and other biodiversity features.

1.2 Site Location

The survey area is around the town of Ellon, north of Aberdeen (approx. central Ordnance Survey National Grid Reference (OSGR): NJ 95682 30322). The surveyed extent included the River Ythan and associated tributaries (Broomies Burn, Modley Burn, Tributary 3 and Meiklemill Burn). This area is referred to as "the site" throughout the report (Figure 1-1). The survey focused on urban areas, as the works are more likely to be located around built up areas along the River Ythan.

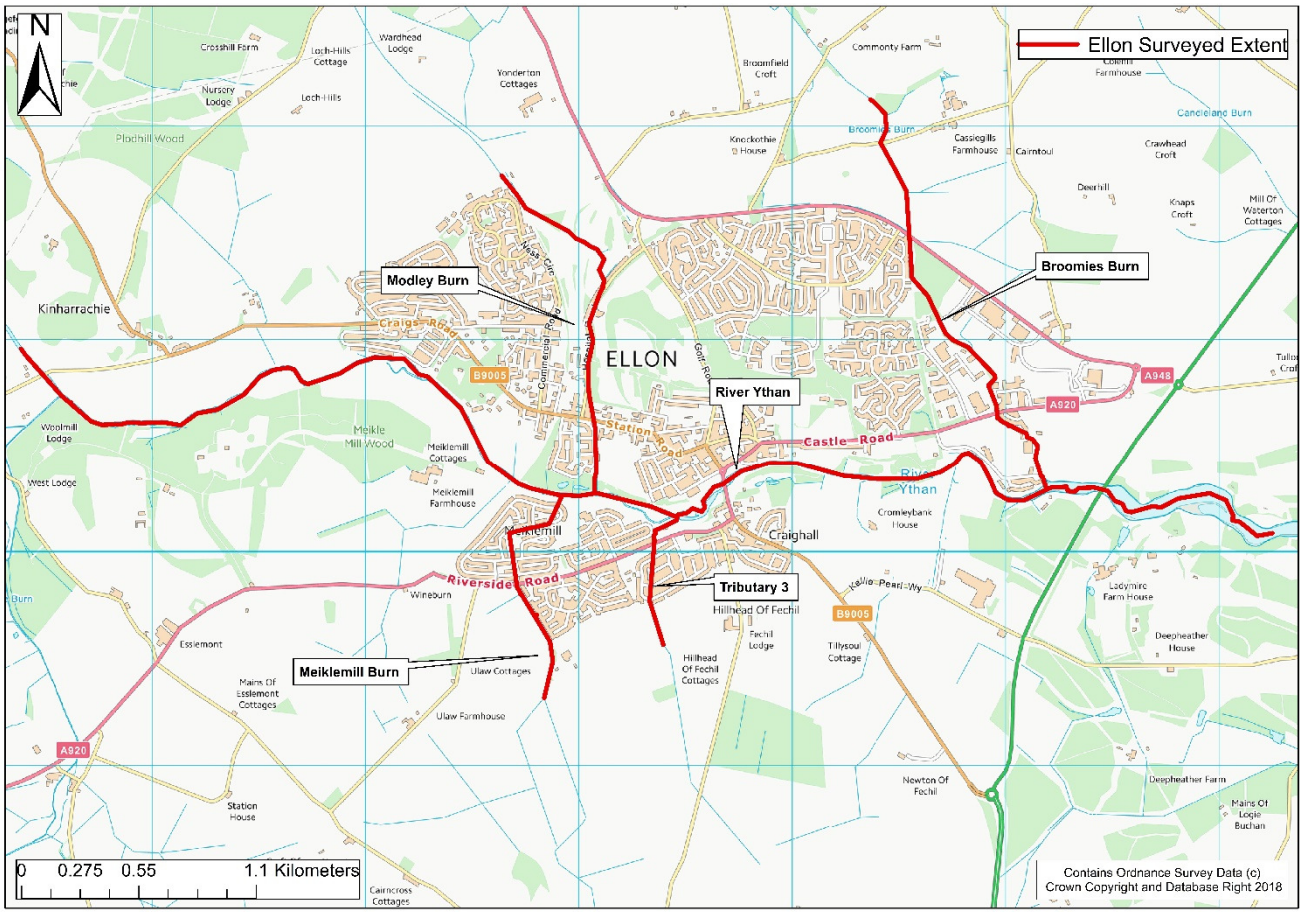

Figure 1-1: Ellon Surveyed Extent.

2 Legislation

The primary legislation in Scotland covering nature conservation and wildlife protection is outlined below. The legislation makes it an offence to kill or capture certain animals including birds, or to remove certain native plants. The law also protects certain animals from disturbance including disturbance of their nests and / or resting places. This section is not intended as a detailed appraisal of wildlife legislation, or provision of a legal opinion, but aims to provide a summary context to support the impact assessment.

2.1 Habitats Directive and Conservation (Natural Habitats, &c.) Regulations 1994

In Scotland, the Habitats Directive is transposed through a combination of the Habitats Regulations 2010 (in relation to reserved matters) and the 1994 Regulations. These Regulations afford protection to certain species identified in the Habitats Directive, including those requiring strict protection (European Protected Species (EPS)). Section 2.3 below provides further details on specific species.

The Habitats Regulations 1994 (as amended in Scotland) implement the species protection requirements of the Habitats Directive in Scotland on land and inshore waters (0-12 nautical miles). There are various Schedules attached to the Habitats Regulations including Schedule 2 and 4 which relates to European protected species (fauna and flora, respectively) and Schedule 3 with relates to those animals in Annex V of the Habitats and Species Directive whose natural range includes Great Britain.

The designation and protection of domestic and European Sites e.g. Sites of Special Scientific Interest (SSSIs), Special Protection Areas (SPA) and Special Areas of Conservation (SAC) falls within these Regulations.

Public bodies (including the Local Planning Authority) have a duty to have regard to the requirements of the Habitats Directive in carrying out their duties i.e. when determining a planning application.

The Habitats Regulations Appraisal (HRA) requirements protect European sites by requiring that any plan or project which may have a 'likely significant effect' on a site (either individually or in combination with other plans or projects) must be subject to an Appropriate Assessment of its implications for the site in view of the site's conservation objectives. The HRA process is mandatory under the Habitats Directive implemented through The Conservation (Natural Habitats, &c.) Regulations 1994. As part of the process Scottish Natural Heritage (SNH) must be consulted.

The HRA is a multi-stage process through which Appropriate Assessment (AA) is carried out. If in the primary Screening stage of the HRA it is determined that the project may have an adverse impact upon a Natura 2000 site, such plans or projects may only proceed if they will not adversely affect the integrity of the European site concerned, without the decision of the over-riding public interest.

2.2 Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act (W&CA) 1981 (as amended) constitutes an important statute relating to the protection of flora, fauna and the countryside within Great Britain. Part 1 of the Act deals with the protection of wildlife. Most EPS are now covered under the Conservation of Habitats and Species Regulations (as amended) however certain species and activities are still covered by the W&CA. The W&CA also covered possession of species listed in the various schedules. In Scotland, the W&CA is amended by The Nature Conservation (Scotland) Act 2004 and The Wildlife and Natural Environment (Scotland) Act 2011.

2.3 Nature Conservation (Scotland) Act 2004

The Act serves to make provisions in relation to the conservation of biodiversity; to make further provision in relation to the conservation and enhancement of Scotland's natural features; to amend the law relating to the protection of certain birds, animals and plants; and for connected purposes. Under Section 2(4) of the Act a Scottish Biodiversity List, a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland, was compiled.

2.4 Wildlife and Natural Environment (Scotland) Act 2011

The Wildlife and Natural Environment (Scotland) Act (WANE Act) is an Act of the Scottish Parliament to make provision in connection with wildlife and the natural environment and related purposes.

2.5 Protected Species

Certain species and species groups are afforded specific protection under the Conservation (Natural Habitats, &c.) Regulations 1994 and the Wildlife and Countryside Act 1981 (as amended). Furthermore, under these laws provisions are made for control of spread of non-native invasive species. Relevant species and levels of protection are detailed below.

2.5.1 Badger

Badgers *Meles meles* and their setts are protected by the Protection of Badgers Act 1992. This Act has been supplemented by the WANE Act, making it illegal to kill, injure or take a Badger, or to interfere with an active sett, including blocking an active entrance or allowing a dog to enter the sett. Furthermore, under this legislation, it is illegal to dig for, cruelly ill-treat, or tag a Badger.

2.5.2 Red Squirrel

Red Squirrels *Sciurus vulgaris* are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). It is an offence to intentionally or recklessly:

- kill, injure or take a Red Squirrel,
- damage, destroy or obstruct access to any structure or place which a Red Squirrel uses for shelter or protection (a drey),
- disturb Red Squirrel when it is occupying a structure or place for that purpose,
- possess or control, sell, offer for sale or possess or transport for the purpose of sale any live or dead Red Squirrel or any derivative of such an animal.

2.5.3 Otter

The European Otter *Lutra lutra* is an EPS protected under the Conservation (Habitats &c) Regulations 1994, making it an offence to:

- deliberately capture, injure or kill an Otter,
- deliberately disturb an Otter such as to affect local populations or breeding success,
- damage or destroy an Otter holt, possess or transport an Otter or any part of an Otter,
- sell or exchange an Otter.

Otters also receive protection under the Wildlife and Countryside Act 1981 (as amended), this makes it an offence to:

- intentionally or recklessly disturb any Otter whilst within a holt,
- intentionally or recklessly obstruct access to a holt.

2.5.4 Water Vole

The Water Vole *Arvicola amphibious* is protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to:

- intentionally kill, injure or capture a Water Vole,
- possess or control a Water Vole, living or dead, or any part of a Water Vole,
- intentionally or recklessly damage, destroy or obstruct access to any place of shelter, or disturb a Water Vole within such a place,
- sell or offer for sale a Water Vole living or dead, or part of a Water Vole.

2.5.5 Bats

All UK bat species are EPS under the Conservation (Habitats &c) Regulations 1994. It is an offence to:

- deliberately kill, injure or capture any bat,
- intentionally or recklessly disturb a bat, or deliberately disturb a group of bats,
- damage or destroy, or intentionally or recklessly obstruct access to, a bat roosting place,
- possess, or sell (living or dead) any bat or part of a bat.

Furthermore, amendments to the Regulations (2007-2012) include, under Regulation 40, that it is no longer a defence to state that killing, capture or disturbance of bats or the destruction of their roosts was an incidental or unavoidable result of a lawful activity.

2.5.6 Breeding Birds

All wild birds (with certain exceptions listed in Schedule 2) are protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to intentionally:

- kill, injure, or take any wild bird,
- take, damage or destroy the nest of any wild bird whilst it is in use or being built,
- take, destroy or possess the egg of any wild bird.

Furthermore, certain species receive additional protection under Schedule 1, which makes it an offence to disturb these species while they are nest building, or at a nest containing eggs or young, or disturb the dependent young of such birds.

Those species listed on Schedules A1 and 1A receive additional protection which makes it an offence to intentionally or recklessly:

- at any time take, damage, destroy or otherwise interfere with any nest habitually used by any wild bird, when not in use, included in Schedule A1; and
- at any time harass any wild bird included in Schedule 1A.

2.5.7 Great Crested Newt

The Great Crested Newt *Triturus cristatus* is a EPS under the Conservation (Habitats &c) Regulations 1994. This makes it an offence to:

- kill, capture or disturb a Great Crested Newt,
- take or destroy the eggs of a Great Crested Newt,
- damage or destroy the breeding or resting places of Great Crested Newt.

It also receives additional protection under the Wildlife and Countryside Act 1981 (as amended) making it illegal to possess or control any Great Crested Newt, living or dead.

2.5.8 Freshwater Pearl Mussel

Freshwater Pearl Mussels receive full protection under the Wildlife and Countryside Act 1981 (as amended), this makes it an offence to:

- intentionally or recklessly kill, injure or take (capture) a freshwater pearl mussel; or
- damage, destroy or obstruct access to the resting place of a freshwater pearl mussel.

2.5.9 Reptiles and Amphibians

Legal protection varies considerably for different species. Natterjack Toads *Epidalea calamita* are EPS receiving the same protection as Great Crested Newt. Under the Wildlife and Countryside Act 1981 (as amended) Adder *Viperus berus*, Grass Snake *Natrix natrix*, Common Lizard *Zootoca vivipara* and Slow Worm *Anguis fragilis* are protected from intentional killing or injuring, additionally Common Frogs *Rana temporaria*, Common Toads *Bufo bufo* and other newt species are prohibited from sale.

2.5.10 Invasive Non-native Species

Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) lists 62 plant species, or groups of plants, and 69 animal species. The major amendment to this Act in Scotland is found in the WANE Act (2011). It is an offence to release or cause to spread in the wild any of these species. Of particular note are Japanese Knotweed *Fallopia japonica*, Himalayan Balsam *Impatiens glandulifera*, Giant Hogweed *Heracleum mantegazzanum* and Signal Crayfish *Pacifastacus leniusculus*.

3 Methodology

3.1 Desk Study

For the purposes of the desk study, the study area was defined to be the site and a 2km radius from the edges of the site. Information was requested from the North East Scotland Biological Records Centre (NESBReC), including records of protected and notable species, invasive non-native species, statutory designated conservation sites, and non-statutory designated conservation sites.

In addition, the MAGIC database was searched for statutory designated sites within 2km of the site including Site of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Local Nature Reserves (LNR).

3.2 Extended Phase 1 Habitat Survey

An Extended Phase 1 Habitat Survey was carried out at the site by suitably experienced Ecologists on 27- 29 November 2017. The methodology of the Extended Phase 1 Habitat Survey is based on mapping habitat parcels as described in the JNCC Handbook for Phase 1 Habitat Survey (JNCC, 2010). The survey is extended by determining the suitability of these habitats for supporting rare or legally protected species. As part of the survey, the following actions were carried out:

- Mapping of habitats on and adjacent to the site, following the Handbook of Phase 1 Habitat Survey;
- Recording of any evidence of protected species found on the site and assessment of habitat's potential to support protected species;
- Recording of bird species observed and suitable habitat for use by birds; and
- Recording of any invasive non-native species present, such as Japanese Knotweed *Fallopia japonica*, Himalayan Balsam *Impatiens glandulifera* and Giant Hogweed *Heracleum mantegazzianum*.

Key habitats or ecological features identified during the Extended Phase 1 Habitat Survey were further categorised as being of either 'negligible', 'low', 'moderate' or 'high' ecological value.

Habitat codes contained within the JNCC Handbook for Phase 1 Habitat Survey (JNCC, 2010) were used to produce a habitat map for the site, as shown under Appendix A . All photographs taken during the Extended Phase 1 Habitat survey are featured under Appendix B.

3.2.1 Protected Species

Badger

The site and immediate vicinity were searched for signs of the presence of Badgers. In addition to the presence of active setts, the following signs of activity were also searched for: latrines, footprints, evidence of feeding activity and well-worn paths through vegetation. Badgers will use a number of setts throughout their territory at different times of year; any large holes with the potential to be used by Badgers, but not showing obvious signs of recent activity, were recorded.

Red Squirrel

Red Squirrels are present in woodland habitat within Scotland and the site was searched for signs of their presence. This involved looking for any dreys, feeding signs (i.e. pine cones that have been eaten by Red Squirrels) and any direct sightings.

Otter

The Otter survey method was based on the standard works of RSPB (1994) and Chanin (2003). This involved walking the survey area, examining banks and prominent features for spraints (droppings) and footprints. A search was also made for possible holt and couch (resting) sites. Otters are extremely difficult to observe, and this method provides the most effective and efficient means of investigating presence or absence.

Water Vole

The standard Environmental Assessment field survey method outlined in Dean *et al*. (2016) was used. Field signs were searched for within the survey area, and an assessment made of the suitability of the habitat for Water Voles. The most important, diagnostic field sign for Water Voles

is the presence of latrine sites. These are locations repeatedly used by Water Voles to deposit their droppings, often in prominent locations along the bank. Other field signs include the presence of burrows, feeding sites and footprints. Although these other signs provide indications of presence and are useful supporting evidence to latrines, they are of limited value on their own.

Bats

Structures and trees likely to be impacted by the proposed works were inspected to determine their potential value for roosting bats, using the methods specified in the Bat Conservation Trust (BCT) Bat Surveys for Professional Ecologists - Good Practice Guidelines (3rd edn) (Collins, 2016).

The roosting potential of buildings, structures and trees on the site were categorised as having either 'negligible', 'low', 'moderate' or 'high' roosting potential and this was determined by applying the definitions given within the BCT Guidelines. Evidence of bat activity associated with potential roost sites includes bat droppings, urine staining, feeding remains and dead/alive bats. Indicators that potential roost locations and access points are likely to be inactive include the presence of cobwebs and general detritus within the apertures.

Potential Roosting Features (PRFs) on trees include cracks, crevices, loose bark, woodpecker holes and splits. Evidence indicating bat presence, including dark stains running below holes or cracks, bat droppings, odours, or scratch marks.

Furthermore, the value for habitats across the site to support commuting and foraging bats was assessed in terms of habitat type, abundance, connectivity and distribution. These were categorised as having either 'negligible', 'low', 'moderate' or 'high' value for bats which was determined by applying the categories given within the BCT Guidelines.

Breeding Birds

During the site visit, an assessment of the potential for the habitats present to support breeding birds was made and any evidence of former nesting identified.

Great Crested Newt

Where access was possible, any substantial water bodies within 500m of the site, and which have ecological connectivity to the site, were assessed for their potential to support newts. This assessment was based on the Habitat Suitability Index (Oldham *et al*., 2000; Natural England, 2001). This system involves assessment of ten suitability indices per waterbody and is an accepted method of assessing the likelihood for a particular pond to hold breeding Great Crested Newts.

Reptiles and other Amphibians

An assessment of the habitat suitability of the area for reptiles was made, involving inspection of the site for key habitat features such as refuges, open sandy areas and interfaces between different habitat types. Any potential refuges found on site (e.g. log piles, large stones) were also investigated, where possible, for the presence of any amphibians and reptiles.

Fresh-water Pearl Mussel

A preliminary assessment of habitat suitability for Freshwater Pearl Mussel *Margaritifera margaritifera* was made along the watercourses. Freshwater Pearl Mussels require cool, well-oxygenated, soft-water rivers free of pollution and turbidity. They prefer a substrate with sand, pebbles and boulders.

Invasive Non-native Species

Any non-native species observed during the survey were recorded. For stand-forming plant species, the extents of such stands were noted.

Other Protected and/or Notable Species

During the survey, any signs or sightings of other protected or notable species were also recorded.

3.3 Approach to Evaluation

3.3.1 Designated Sites, Habitats and Species

Valuing designated sites

International sites of high ecological value are those designated as SPAs, SACs or Ramsar sites. National sites are NNRs, SSSIs, or sites of equivalent value. Regional/County-level sites of low to moderate ecological value are designated as LNRs or equivalent value.

Valuing habitats

Habitats identified under the UK and local BAP have biodiversity value. This is adjusted for value according to the size of the site, quality of the habitat and its ability to be replaced.

The full assessment of habitat value will depend on a number of factors, including the size of the habitat, its conservation status and quality.

Valuing species

Species of international value are those protected by the Habitats Regulations 1994 (as amended in Scotland). Species of national value are those protected by the Wildlife and Countryside Act 1981 (as amended). Species identified under the UK and local BAP also have biodiversity value, as do other notable species, such as those on the Red Data Book list. The valuation will depend on a number of factors including distribution, status, rarity, vulnerability, and the population size present. The potential value and secondary/supporting value is also considered.

3.4 Limitations

3.4.1 Data Limitations

Data from biological records centres, or on-line databases, is historical information and datasets might be incomplete, inaccurate or missing. It is important to note that even where data is held, a lack of records for a defined geographical area does not necessarily mean that the species is absent; the area may simple be under-recorded.

It must be noted that fish data was not obtained from Ythan Trust, as they were not contactable.

3.4.2 Access

Access was not possible along a central section of Broomies Burn (approx. NJ 96836 31098). A further inaccessible area was along Tributary 3 where a building site was located along the south-east of the surveyed extent. These inaccessible areas have been identified on the Phase 1 Habitat Maps, see Appendix A.

3.4.3 Surveying Conditions

The time of year this survey was carried out is sub-optimal for plant species, including invasive non-native species, due to them dying back over winter. Therefore, species can be easily missed which could affect the results of the survey.

4 Results

4.1 Desk Study

4.1.1 Statutory Designated Sites

Within 2km of the site boundary, there are four statutory designated sites including the Sands of Forvie and Ythan Estuary SSSI, the Forvie NNR, Ythan Estuary and Meikle Loch RAMSAR, and the Ythan Estuary, Sands of Forvie and Meikle Loch SPA. The statutory sites overlap within the study area, therefore Figure 4-1 identifies the common boundary. Appendix C presents the individual statutory site boundaries. Brief descriptions of the sites are given in Table 4-1.

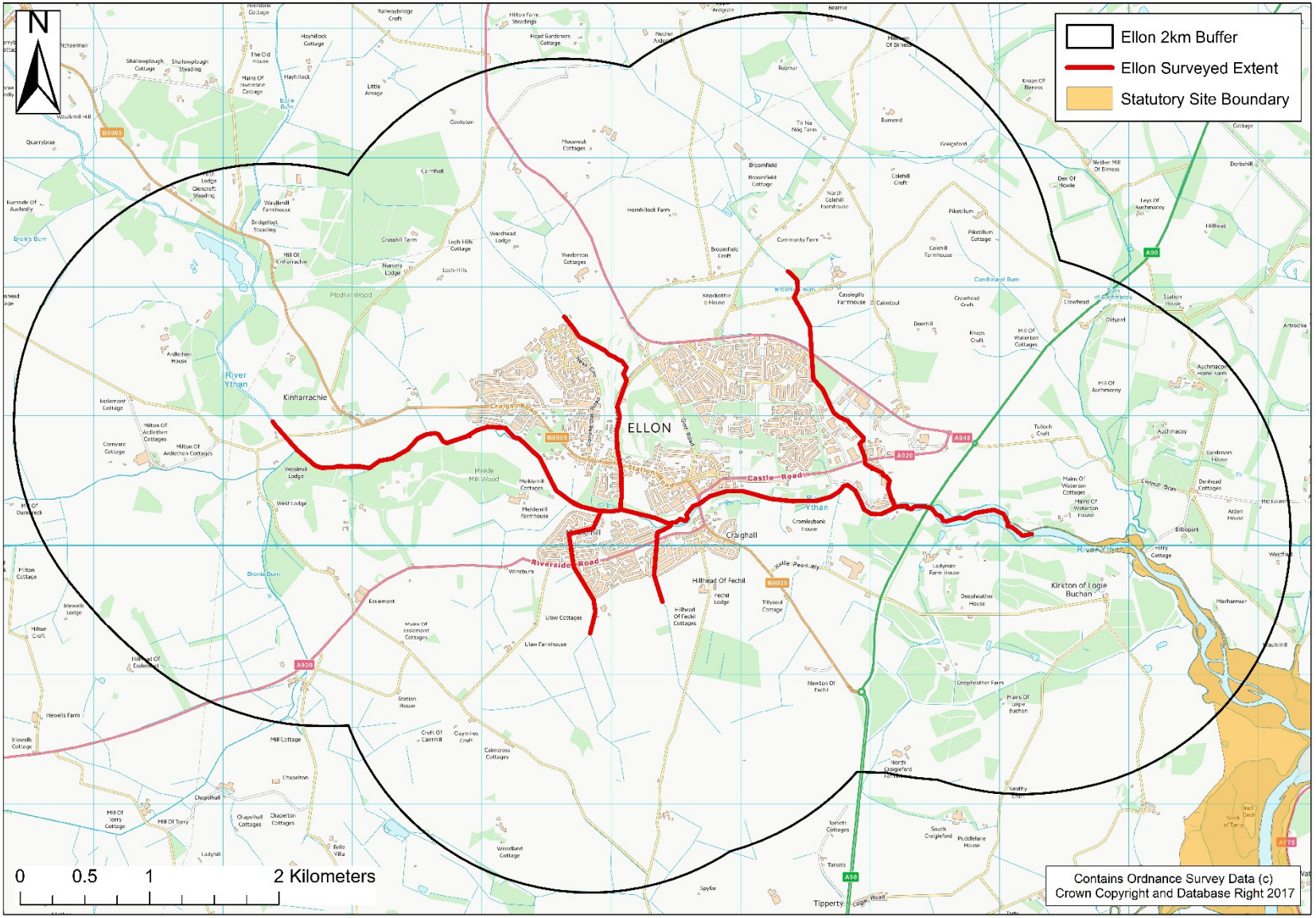

Figure 4-1: Statutory designated sites located within 2km of the site.

Table 4-1: Statutory site descriptions within 2km of the works area.

Site Name	Designation	Description	Proximity to Site
Sands of Forvie and Ythan Estuary	SSSI	The site is designated as an SSSI for both biological and geological interests. The Sands of Forvie comprises of large areas of sandy foreshore, mobile and fixed dunes, coastal heath and dune pasture. Serval of these dune habitats are off European importance. The shifting embryonic dunes are a rare habitat within the United Kingdom. Dune heathland with Crowberry is found within the system, another rare habitat within the United Kingdom. Vascular plant diversity is high within the area, with 348 species recorded, including Curved Sedge *Carex maritima*, Oysterplant *Mertensia maritima*, Purple Milk-vetch *Astragalus danicus*, Small Adder's-tongue *Ophioglossum azoricum*, Seaside Centaury *Centaurium littorale*, Crowberry *Empetrum nigrum* and Heath Dog-violet *Viola canina*. The site is of international importance supporting waterfowl populations. The site is also of European importance for overwintering Pink-footed Goose *Anser brachyrhynchus*. Geological interest is a resultant of the evidence which is relevant for understanding the past, present and future of coastal landforms. The Sands of Forvie dune system is a dune system with unique large sand sheets. Abandoned and raised shingle beaches, estuarine terraces and cliffs provide a highly important relict record of past changes in relative sea level. The sand dune complex of North Forvie contains complex series of diverse surfaces, including parabolic dunes developing over the bedrock plateau and glacial deposits.	Within site area (Eastern extent)
Forvie	NNR	The site is designated as a National Nature Reserve due to its unique shifting sand dunes and the habitats provided for both international and European importance for birds including Waterfowl and Pink-footed Goose.	Within site area (Eastern extent)
Ythan Estuary and Meikle Loch	RAMSAR	The site is of international importance for supporting large populations of Waterfowl in the winter. Additionally, for supporting Sandwich tern *Thalasseus sandvicensis* and Pink-footed goose.	Within site area (Eastern extent)
Ythan Estuary, Sands of Forvie and Meikle Loch	SPA	The site is of European Importance for supporting Common Tern *Sterna hirundo*, Little Tern *Sterna albifrons*, Sandwich Tern *Sterna sandvicensis* during the breeding season. Pink-footed Goose *Anser brachyrhynchus* is supported over winter.	Within site area (Eastern extent)

4.1.2 Non-Statutory Designated Sites

There are currently no non-statutory designated sites within 2km of the site area and, therefore, these will not be discussed further.

Conservation Areas and Priority Habitats

No Conservation Areas were identified within Ellon, however, there are several Tree Preservation Orders (TPOs) within the 2km boundary, see below table.

Table 4-2: Tree Preservation Orders within 2km of the site extent (Aberdeenshire Gov., 2017).

TPO	Location
AC (CD) TPO7 (2001)	Larchwood, Station Road, Ellon
AC TPO1 (2015)	Ellon Castle Gardens
AC TPO 19 (2015)	Craigs Road, Ellon
AC TPO 32 (2016)	Old Rectory Avenue, Ellon
AC TPO 63 (assigned)	Station Road, Ellon

Exact grid references for these TPOs were not provided, however, it appears they are sufficiently distant from the works area that no adverse impacts are anticipated.

The following priority habitats were identified within the 2km site boundary, majority of which are within close proximity, or ecologically connected, to the site.

- Intertidal Substrate Foreshore
- National Forestry Inventory:
  - Woodland, Broadleaved
  - Woodland, Young Trees
  - Woodland, Conifer
  - Assumed Woodland
  - Felled Woodland

4.1.3 Protected Species

The data search from NESBReC returned many recent and historical records for protected species within 2km of the site. Details of these records including key legislative protection and proximity of the record to the surveyed extent (watercourse) is given in Table 4-3 below. Due to the large amount of data returned, the record closest to the site and the most recent record for each species (post-2000) was given greatest consideration.

Table 4-3: Protected and notable species records held by NESBReC within 2km of Ellon surveyed extent.

Common Name	Latin Name	Designation	Location and Date
Riparian Mammals			
European Water Vole	*Arvicola amphibius*	W&CA (1981) Sch. 5	0.1km N (2003)
Otter	*Lutra lutra*	W&CA (1981) Sch. 5	0.3km N (2008)
Terrestrial Mammals (excluding bats)			
Eurasian Badger	*Meles meles*	Protection of Badgers Act 1992	Confidential Records
Eurasian Red Squirrel	*Sciurus vulgaris*	W&CA (1981) Sch. 5	0.2km E (2010)
Brown Hare	*Lepus europaeus*	FEP7/2, ScotBL, Sect.41, Sect.42, UKBAP	0.9km N (2007)
Bats			
Soprano Pipistrelle	*Pipistrellus pygmaeus*	W&CA (1981) Sch. 5 LBAP	0.5km E (2003)
Common Pipistrelle	*Pipistrellus pipistrellus*		0.9km E (2015)
Daubenton's Bat	*Myotis daubentonii*		0.9km E (2015)
Brown Long-eared Bat	*Plecotus auritus*		0.4km S (2010)
Birds			
Kingfisher	*Alcedo atthis*	W&CA (1981) Sch. 1. Annex 1	1.3km SE (2003)
Garganey	*Anas querquedula*	W&CA (1981) Sch. 1.	1.3km SE (2003)

Goldeneye	*Bucephala clangula*	UKBAP	1.3km SE (2006)
Ruff	*Calidris pugnax*	W&CA (1981) Sch. 1. Annex 1	1.3km SE (2004)
Eurasian Marsh Harrier	*Circus aeruginosus*		1.3km SE (2005)
Merlin	*Falco columbarius*		0.4km N (2006)
Peregrine	*Falco peregrinus*		1.3km SE (2006)
Kestrel	*Falco tinnunculus*	Bern-A2, CMS-A2, CITES-A2, LBAP	1.2km N (2006)
Black-tailed Godwit	*Limosa limosa*	W&CA (1981) Sch. 1	1.3km SE (2008)
Osprey	*Pandion haliaetus*		2009 1.3km SE (2009)
Bearded Tit	*Panurus biarmicus*		1.3km S (2009)
Green Sandpiper	*Tringa ochropus*		0.7km E (2013)
Redwing	*Turdus iliacus*		1.3km NW (2014)
Barn Owl	*Tyto alba*		0.3km W (2015)
Amphibians			
Common Toad	*Bufo bufo*	W&CA (1981) Sch. 5	1.3km NW (2006)

4.1.4 Invasive Species

The data search from NESBReC returned several records of invasive non-native species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), within 2km of the site. Details of these records including key legislative protection and proximity of the record to the site (watercourse) is given in Table 4-4. Due to the large amount of data returned, the record closest to the site and the most recent record for each species (post-2000) was given greatest consideration.

Table 4-4: Invasive Non-native species records held by NESBReC within 2km of the site

Common Name	Latin Name	Designation	Location and Date
Japanese Knotweed	*Fallopia japonica*	W&CA (1981) Sch9	1.4km NW; 2005
Rhododendron	*Rhododendron ponticum*	W&CA (1981) Sch9	Numerous records in the area, within the town and to the east and west, not on the banks of watercourses; 2005
Japanese Rose	*Rosa rugosa*	W&CA (1981) Sch9	0.7km S; 2010

4.2 Extended Phase 1 Habitat Survey

4.2.1 Habitats

The surveyed area is situated predominately on the River Ythan and the following tributaries Broomies Burn, Modley Burn, Tributary 3 and Meiklemill Burn. The surrounding land use is predominantly residential with areas of arable farmland, mixed woodland plantation, and amenity grassland. The River Ythan had a high-water level at the time of survey, with some areas of flooding noted, and all the watercourses surveyed had a fast water flow creating turbid waters.

A Phase 1 Habitat Map for Ellon is provided in Appendix A, along with Target Notes, and all photographic material is given in Appendix B.

A1.1.1 Broadleaved Woodland - Semi-natural

Pockets of woodland mapped as semi-natural broadleaved woodland were located along the River Ythan (Photographic Plate 1). These areas of woodland were generally dominated by mature Beech *Fagus sylvatica* with frequent Common Lime *Tilia x europaea.* Whilst these trees originate from planting (neither are true natives in the area) they are long-established and form a habitat functionally equivalent to semi-natural woodland. Bracken *Pteridium aquilinium* dominated the

understorey. These areas of broadleaved woodland provide suitable nesting features for birds as well as foraging opportunities for mammals and invertebrates.

An area of broadleaved wet woodland (approx. NGR: NJ 95054 30303) is located to the north of the River Ythan with two standing waterbodies (see 'G1.1 Standing Water - Eutrophic'). This wet woodland supported Alder *Alnus glutinosa*, Sycamore *Acer pseudoplatanus,* and Willow *Salix sp.* The unmanaged appearance of this wet woodland has created suitable features (e.g. resting place) for Otter.

Due to the large areas of coniferous plantation woodland within the wider landscape, and therefore very small areas of semi-natural woodland, and the opportunities this habitat provides to birds, mammals, reptiles and invertebrates it is considered that this habitat is of high ecological value. Furthermore, the wet woodland habitat provides additional features for protected species, including Otter, this habitat is assessed as being of high ecological value.

A1.1.2 Broadleaved Woodland - Plantation

Small areas of young plantation broadleaved woodland are located along the surveyed extent (Photographic Plate 2). These areas of woodland comprised of Willow *Salix* sp., Hazel *Corylus avellana*, Sycamore, Oak *Quercus robur*, Silver Birch *Betula pendula*, Field Maple *Acer campestre*, Wych Elm *Ulmus glabra* and Alder. This habitat can provide suitable features for nesting birds as well as foraging opportunities for mammals and invertebrates.

Due to the opportunities this habitat provides to birds, mammals and invertebrates it is considered that this habitat is of high ecological value.

A1.2.2 Coniferous Woodland - Plantation

A few small areas of coniferous plantation (Photographic Plate 3) are located within the surveyed area which included Scots Pine *Pinus sylvestris* and Spruce *Picea* sp. This habitat can offer potential nesting features for birds and suitable foraging opportunities for mammals, such as Red Squirrels.

Within the wider area there are large extents of conifer plantation providing substantial habitat for birds and Red Squirrels, and for this reason, this habitat is assessed as being of moderate ecological value.

A1.3.2 Mixed Woodland - Plantation

The surrounding area of the River Ythan has several large sections of mixed woodland plantation (Photographic Plate 4). This habitat included, but not limited to, Beech, Common Lime, Scots Pine and Norway Spruce *Picea abies*. This habitat can offer opportunities to nesting birds, mammals and invertebrates.

The large extent of these woodlands provides substantial habitat to support nesting birds, mammals and invertebrates and therefore this habitat is assessed as being of moderate ecological value.

A2.1 Scrub - Dense

A small area of dense scrub was noted on the right bank of the River Ythan. This comprised of Bramble *Rubus fruticosus* agg. and Hawthorn *Crataegus monogyna*. The nature of dense scrub provides suitable nesting and refuge features for birds, whilst creating refuge for small mammals and reptiles.

Although this habitat provides nesting and refuge features for protected species, it has been assessed as being of low ecological value as this habitat is easily re-established.

A2.2 Scrub - Scattered

Scattered scrub was noted along the eastern extent of the River Ythan on the left bank. This habitat was primarily Gorse *Ulex europaeus* located within poor semi-improved grassland fields (Photographic Plate 5). The dense structure of Gorse can offer refuge for birds, reptiles and small mammals, as well as provide features for invertebrates.

As the surveyed extent had only a small area of scrub habitat, this habitat is assessed as being of moderate ecological value due to the features it can provide to birds, reptiles, small mammals and invertebrates that are not otherwise available in the landscape.

A3.1 Scattered Trees

Along both the River Ythan and associated tributaries are several areas of scattered trees, primarily consisting of broadleaved trees (Photographic Plate 6). Species included Beech, Sycamore, Oak, Ash *Fraxinus excelsior* and, on watercourse banks, Alder. The northern extent of the Modley Burn travels through a parkland and golf course, which comprised of scattered broadleaved trees, primarily Beech, with an amenity grassland understorey (Photographic Plate 7).

These sections of scattered trees offer suitable features for nesting birds, roosting bats, invertebrates and mammals. Therefore, this habitat is considered to be of high ecological value.

B4 Improved Grassland

Areas of improved grassland were located within the surveyed area. Areas of this habitat were sheep grazed which creates a low sward. This habitat is generally of low ecological value dominated by Perennial Rye Grass *Lolium perenne*. The intense management of this habitat has created a low vascular plant species diversity.

In light of the low species richness and highly managed nature of this type of grassland, this habitat is assessed as being of negligible ecological value.

B5 Marshy Grassland

Along the western extent of the River Ythan were areas of marshy grassland on both the right and left bank (Photographic Plate 8). This habitat is characterised by Soft-rush *Juncus effusus* and a Sedge *Carex* sp, both of which were common within the marshy grassland.

As this habitat is less common within the surveyed area and the potential it offers to waterfowl and amphibians, this habitat is assessed as being of high ecological value.

B6 Poor Semi-improved Grassland

Poor semi-improved grassland was primarily noted along the eastern extent of the River Ythan. These were low in vascular plant species diversity, although more diverse than improved grassland, and were less intensely managed.

For the above reasons, this habitat is assessed as being of low ecological value.

C3.1 Tall Ruderal Vegetation

Tall ruderal vegetation was located across the surveyed areas often dominating the watercourse banks (Photographic Plate 9). This habitat comprised of Rosebay Willowherb *Chamerion angustifolium*, Cow Parsley *Anthricus sylvestris*, Reed Sweet-grass *Glyceria maxima*, Common Reed *Phragmites australis*, Nettle *Urtica dioica*, Broadleaf Dock *Rumex obtusifolius*, and Common Hogweed *Heracleum sphondylium*. This habitat can offer suitable opportunities for birds, small mammals and invertebrates.

Due to the large extent of this habitat within the surveyed area and the refuge and foraging opportunities it offers to birds, small mammals and invertebrates, it is considered to be of moderate ecological value.

G1.1 Standing Water - Eutrophic

Two areas of standing water were located at NJ 95027 30301 and NJ 94930 30313, immediately north of the River Ythan. These two waterbodies were located within a wet woodland habitat (TN3 and TN4) supporting Alder, Sycamore and Willow with a Common Reed-dominated understorey. The reed habitat encroached onto the waterbodies creating limited visibility of the standing water. This habitat provides suitable features for waterfowl and amphibians. The wet woodland habitat appears to be unmanaged and created suitable features (e.g. resting place) for Otter.

These standing waterbodies are considered to be of high ecological value due to the limited presence of this habitat within the wider area and the potential for supporting waterfowl and amphibians, including Great Crested Newt.

G2.2 Running Water - Mesotrophic

At the time of survey, the River Ythan (Photographic Plate 10) had a very high-water level with fast flowing conditions, therefore, assessment of the River bed and species within the watercourse was not possible. The banks of the River Ythan were natural with earth banks supporting tall ruderal vegetation and occasional broadleaved trees, such as Willow and Alder. There were areas of

eroded bank noted along the River (NJ 94783 30285). Furthermore, the River Ythan supports fish, including Salmon and Sea Trout (Ythan Fisheries, 2016), see Section 4.2.2.9.

The natural characteristics of the River Ythan provides suitable habitat for commuting and foraging Otter as well as fish and waterfowl, therefore, this habitat is assessed as being of high ecological value.

Broomies Burn had a high-water level and fast flow, at the time of survey, with natural earth banks and tall ruderal vegetation and Bramble dominating the banks (Photographic Plate 11). A small section of scattered boulders was noted along the left bank of the northern extent of the burn (approx. NJ 96473 31823). The right bank at NJ 96556 31369 comprises of a wall. A small area of the middle section of the burn was not accessible and therefore this section was not surveyed. The bed was noted to comprise of rock and cobble, however, the fast flow of the watercourse led to high turbidity causing limitation in assessing the bed.

Broomies Burn has potential to support Water Vole where natural earth banks are present, however, the fast water flow could reduce its suitability. It also provides features suitable for Otter, waterfowl, amphibians and aquatic invertebrates. Therefore, this watercourse is assessed as being of moderate-high ecological value, dependent on Water Vole and/or Otter presence.

The Modley Burn comprised of earth and stone bank with tall ruderal vegetation and scrub dominated the banks (Photographic Plate 12). Excluding the area travelling through the golf course which comprised of amenity grassland banks and had been highly modified with reinforced banks. This watercourse, at the time of survey, had a very fast water flow and high turbidity creating difficulties in identifying the watercourse bed and vegetation present. Gabion baskets were noted along the southern extent of the burn (approx. NGR: NJ 95080 30444).

The highly modified section of this watercourse does not provide suitable features for riparian mammals or waterfowl. The areas of bank which were natural would be suitable for Water Vole burrowing, but there was limited in-channel vegetation suitable for foraging and refuge, however, time of year may have influenced this. This watercourse has been assessed as being of moderate ecological value.

Tributary 3 was primarily culverted. The left bank of the northern extent of the watercourse ran parallel to an arable field, whilst on the right bank there was a building site which was not accessible. The earth banks comprised of tall ruderal vegetation including Broadleaf Dock and Rosebay Willowherb (Photographic Plate 13). The watercourse consisted of a cobble bed with a fast water flow.

Meiklemill Burn southern extent was located within an arable dominated landscape. The watercourse was narrow with infrequent rock and tall ruderal vegetation located along the toe of the bank (Photographic Plate 14). Sycamore trees were sporadically located along the watercourse with occasional Broom and Dogwood. The northern extent of the watercourse was culverted underneath a housing estate, before entering the River Ythan.

Tributary 3 and Meiklemill Burn natural earth banks could have the potential to support Water Vole. The watercourses provide habitat for waterfowl and aquatic invertebrates. For these reasons, these watercourses are assessed as being of moderate ecological value, whilst the culverted sections are assessed as being of low ecological value, as they offer negligible value to protected species, but these areas still provide connectivity to upstream Rivers.

J1.1 Arable

The wider landscape surrounding the River Ythan and associated tributaries is dominated by arable fields (Photographic Plate 15). This habitat is intensively managed and has low species diversity offering limited features for species to inhabit.

In light of the low species richness and the managed nature of the arable fields, this habitat has been assessed as being of low ecological value.

J1.2 Amenity Grassland

Areas of amenity grassland are located within the urban sections of the surveyed extent (Photographic Plate 16). This habitat contains low species diversity and is intensively managed.

Due to the low species richness and managed nature of this grassland, this area was assessed as being of low ecological value.

J3.6 Buildings

The River Ythan runs directly through the town of Ellon and therefore residential and commercial buildings are present within the wider area of the River and tributaries. It is considered that the buildings are at a sufficient distance away from the waterbodies to not be impacted upon by any future proposed flood alleviation works. It must be noted that the tributaries often had a culverted section when entering residential areas.

It is considered the buildings will not be impacted upon by the works. Further consideration into the ecological value of these buildings is, therefore, not required.

J4 Bare Ground

Hardstanding was noted along several areas of surveying extent, primarily forming paths and tarmacked surfaces (Photographic Plate 17). These areas did not support any significant assemblages of vegetation.

For the above reasons this habitat was assessed as being of negligible ecological value.

J5 Other Habitat

A building site located along Tributary 3 has been recorded as Other Habitat (TN7) and was not accessible to survey (Photographic Plate 18). The bare ground could offer reptiles basking opportunities, but the high disturbance of the site reduces this likelihood. Another inaccessible section (TN10) was located along Broomies Burn and therefore, this has been recorded as Other Habitat.

TN7 is assessed as being of negligible ecological value due to the nature of the site. The inaccessible area (TN10) ecological value cannot be commented on further.

4.2.2 Protected Species

4.2.2.1 Badgers

No field signs such as footprints, latrines or sett entrances were recorded within the surveyed extent. However, the areas of scrub and woodland across the site provide opportunities for foraging Badger, additionally areas of the woodland could provide suitable sett digging habitat. The data search returned records of Badger within 2km of the site, some of which were in close proximity to the likely area of works. *The site has therefore been assessed as moderate ecological value to Badger.*

4.2.2.2 Red Squirrels

No Red Squirrels were noted on site, nor were any field signs (including, dreys) observed during the walkover. The data search returned a large amount of Red Squirrel records (approx. 225), many of which are in close proximity to the watercourses. It is, therefore, highly likely that Red Squirrels are present within the proposed works area. However, the extent of the woodland is not restricted to the watercourse banks and therefore, *the overall ecological value of the site to Red Squirrels is considered to be moderate.*

4.2.2.3 Water Voles

The River Ythan was not considered suitable for Water Voles to inhabit due to the fast-flow conditions noted during the survey. No field signs (including burrows, latrines) were observed along the River Ythan. The high-water level conditions may have affected the results of this survey by covering or washing away any field signs. The data search returned a single record of Water Vole in close proximity to the River Ythan.

Broomies Burn, Modley Burn, Tributary 3 and Meiklemill Burn were all considered to have some potential to support Water Voles due to the earth banks that are suitable for burrowing. No field signs were observed during the survey and the survey was conducted outside of the optimal survey season (April to September). The data search returned a record of Water Vole near to the River Ythan, therefore, Water Vole could be present within the tributaries associated with the River Ythan.

Due to the potential for these tributaries to support Water Vole and the data search record, the site has been assessed as moderate ecological value for Water Voles.

4.2.2.4 Otters

Areas along the River Ythan were noted as good habitat for Otter holts due to overhanging trees, see TN13 (Photographic Plate 19), although no Otter holts were seen during the walkover.

Additionally, the River Ythan is considered suitable for foraging and commuting Otters. Broomies Burn is considered suitable for commuting Otter, but the other surveyed tributaries are not considered suitable due to modifications (e.g. culverts). No Otter holts or field signs were observed during the survey, but the data search did return a record of Otter along the River Ythan and the Broomies Burn. *Therefore, the overall ecological value of the site to Otter is considered to be high.*

4.2.2.5 Bats

Mature trees were located across the surveyed extent, many of these were situated away from the watercourse banks and therefore are unlikely to be impacted upon by future works; if these works are restricted to the waterbodies. Mature woodland was quite extensive across the surveyed site and it is considered likely that there will be trees with suitable bat roosting potential within these woodlands.

During the walkover several mature Sycamore trees were noted as having low BRP at NJ 95064 31046 (TN5) with high Ivy coverage disguising potential bat roosting features (Photographic Plate 20).

A stone bridge located at NJ 95076 30270 crossing the River Ythan was considered to have low BRP (TN2 and Photographic Plate 21) due to a small number of cracks noted along the eastern face of the bridge. No other structures with BRP were noted during the survey.

The River Ythan and associated tributaries offer suitable commuting and foraging opportunities for bats in the local area. *The overall ecological value of the site to bats is high.*

4.2.2.6 Birds

No specific bird surveys were conducted as part of the initial PEA survey, however, all incidental sightings during the site survey were recorded and included:

- Blackbird *Turdus merula*
- Blue Tit *Cyanistes caeruleus*
- Buzzard *Buteo buteo*
- Carrion Crow *Corvus corone*
- Chaffinch *Fringilla coelebs*
- Cormorant *Phalacrocorax carbo*
- Dipper *Cinclus cinclus*
- Great Tit *Parus major*
- Goosander *Mergus merganser*
- Grey Heron *Ardea cinerea*
- Mallard *Anas platyrhynchos*
- Mute Swan *Cygnus olor*
- Pheasant *Phasianus colchicus*
- Robin *Erithacus rubecula*
- Rook *Corvus frugilegus*
- Starling *Sturnus vulgaris*
- Woodpigeon *Columba palumbus*
- Wren *Troglodytes troglodytes*

No birds listed under Schedule 1 of the Wildlife & Countryside Act 1981 (as amended) were recorded during the survey. The habitats across the site were considered suitable to provide nesting opportunities for birds, in particular the areas of woodland and dense reeds. Additionally, the watercourses provide further nesting and foraging opportunities within marginal/bankside vegetation. An eroded cliff (TN1 and Photographic Plate 22) located at NJ 94459 60476, south-west of the River Ythan, had holes that could be used by Sand Martins. This eroded cliff is not immediately along the River Ythan and therefore has been assessed as not having high suitability for Kingfishers. However, Kingfishers are listed under Schedule 1 of the Wildlife & Countryside Act 1981 (as amended) and therefore, they should be considered during works.

This site is considered to have high ecological value for birds.

4.2.2.7 Great Crested Newts

Two standing waterbodies were noted within the surveyed area during the site walkover. A Habitat Suitability Index assessment was conducted for these two waterbodies, the results of which are included in the table below.

Table 4-5: Habitat Suitability Index scores for standing water areas within the surveyed extent.

Pond Target Note (Refer to Phase 1 Habitat Map)	HSI Score
TN3	0.55 (below average)
TN4	0.56 (below average)

The above scores identify that the two standing waterbodies have a below average suitability to support Great Crested Newts. These waterbodies scored below average due to the heavily shaded habitat surrounding the ponds and because Northern Scotland is not considered the optimal location for Great Crested Newt.

Across the surveyed area were drystone walls, scrub, and debris piles which can provide suitable refuges and hibernacula for Great Crested Newts (Photographic Plate 23 - 24). However, the data search returned no records of Great Crested Newts within 2km of the watercourse. Taking into consideration the HSI score of the ponds and the data search records, *it is considered that the site has low ecological value for Great Crested Newts.*

4.2.2.8 Reptiles

No reptiles were observed on site, although this is expected during December which falls within the hibernation period. The areas of scrub and old drystone walls offer potential refuges and hibernacula for reptiles (Photographic Plate 23 - 24). Bare ground and tarmacked surfaces also offer suitable basking opportunities (Photographic Plate 25). However, the data search returned no records of reptiles within 2km of the site. *The ecological value of the site is considered to be moderate for reptiles.*

4.2.2.9 Freshwater Pearl Mussels

There are no records of Freshwater Pearl Mussels within the study area. The centre of the surveyed reach was not considered suitable for Freshwater Pearl Mussel (where the River flows within or near to development) but the far eastern and western reaches of the River Ythan were more naturalised and could support this species.

4.2.2.10 Fish

Scottish Sea Trout and Salmon are known to be present within the River Ythan (Ythan Fisheries, 2016). It is therefore considered that the River Ythan is used as a spawning habitat for these species. *The ecological value of the site for fish is high*.

4.2.3 Invasive Non-native Species

During the survey, there were observations of Wall Cotoneaster *Cotoneaster horizontalis* (approx. NJ 96550 31471) (Photographic Plate 26), Rhododendron *Rhododendron ponticum* (approx. NJ 97140 30490) (Photographic Plate 27) and Common Snowberry *Symphoricarpos albus* (Photographic Plate 28) (approx. NJ 95423 30234). No further invasive non-native species were noted during the site walkover. The data search returned records of Japanese Knotweed and Japanese Rose outside of the site area, but returned records of Rhododendron within the site area.

5 Conclusions and Recommendations

5.1 Statutory Designated Nature Conservation Sites

5.1.1 Statutory Designated Sites

The Forvie NNR and Sands of Forvie and Ythan Estuary SSSI and SPA, and the Ythan Estuary & Meikle Loch RAMSAR are located within the outermost eastern surveyed extent and the proposed flood alleviation works could adversely impact upon the interest features of these designated sites. The river also provides ecological connectivity between the site and the main body of the designated sites.

It will be necessary to consult with Scottish Natural Heritage on the works and any potential impacts upon these statutory designated sites. It is likely that the proposed works will require assessment under the Habitat Regulations to ensure that the integrity of the interest features of the NNR, SSSI, SPA and RAMSAR, are not significantly affected by the works. A Habitat Regulation Appraisal (HRA) Screening Assessment will be necessary to identify any likely significant effects and/ or uncertain impacts in the designated sites. If any are identified, then an Appropriate Assessment (AA) will be conducted by the competent authority.

5.2 Habitats

The habitats across the surveyed extent were, generally, considered to be of moderate to high ecological value due to the structural variety. The habitats offer suitable opportunities for several protected species including nesting birds, Water Vole and Otter. Therefore, any permanent land-take of semi-natural habitats should be kept to a minimum.

It is likely that the future flood alleviation works will involve bank works, and so it is recommended that this is restricted to as small an area as possible and that any loss of riparian habitat should be compensated. Avoidance and mitigation measures for ecological features along with ecological enhancement should be designed into the works from an early stage. Suitable enhancement measures could include the re-planting of riparian vegetation using native species sourced from local provenance.

Should any tree works be proposed to facilitate the works (e.g., to provide access), it will be necessary to liaise with the local council regarding TPOs within the local area prior to works commencing. If trees will be impacted by the works (including retained trees where roots may be impacted) then an arboricultural survey should be undertaken. Furthermore, the local council should be contacted regarding Priority Habitats that could be impacted upon by the works.

5.3 Protected Species

5.3.1 De-vegetation and Nesting Birds

Woodland, dense tall ruderal vegetation and scrub habitats were all determined to be suitable for use by nesting birds. Should de-vegetation be proposed during the main nesting season (i.e., March to September, inclusive), a nesting bird check will be required prior to any clearance works commencing. This should be undertaken by a suitably experience ecologist who will advise a way forward, if nests are found.

The eroded cliff noted as having potential to support nesting Sand Martins is located approximately 80m from the River Ythan and therefore, may not be impacted upon by the works. However, if this area is likely to be impacted upon by the works, further nesting bird surveys will be required.

5.3.2 Bats

Foraging

If works are scheduled between April-September inclusive, when bats are most active, any night time working should be avoided. Should night working be required this should use directional lighting rather than floodlights to avoid causing unnecessary disturbance to foraging or commuting bats during the works. Lights should be fitted with a directional cowl to avoid unnecessary light spill and should be directed away from any potential foraging/commuting habitats; in this case, woodland habitat and the river and banks. If the works are likely to alter the watercourse significantly, such as moving a section of the watercourse, bat activity surveys would be recommended to determine any

impacts upon the local bat population utilising the watercourses. Following these surveys, mitigation measures would be recommended.

Roosting

Works should in the first instance avoid any impact to the trees on site. However, should the trees identified in Section 4.2.2.5 of this report, or any other mature trees, require intrusive arboricultural works, such as loping, pruning or felling, it is advised that these are first assessed at elevation using an aerial tree climber who holds a Scottish Natural Heritage Bat Survey Licence. If trees cannot be safely climbed, or if potential bat roosts are identified, it will be necessary to undertake infrared and emergence surveys of these trees during the main bat activity season (i.e., May to September, inclusive) in order to characterise the roosts. If works cannot avoid impacting on roosts it will be necessary to apply to SNH for a mitigation licence for works affecting the roost. The assessment for bats should be reviewed once the exact location of the works is known.

If the stone bridge identified as having low BRP (TN2) is likely to be impacted upon by the works further bat roosting assessments may be required, which could lead to the requirement of activity surveys. It must be noted that bat activity surveys can only be carried out between May to September, inclusive.

5.3.3 Badgers

No evidence of Badger activity was recorded during the survey but, due to records of Badgers within 2km of the site area and potential foraging opportunities identified within the surveyed extent, future works may cause minor disturbance to Badgers foraging locally. Badgers regularly create new setts, so it is recommended that a walkover survey is undertaken up to three months before works start to confirm that no new Badger setts have been created within 30m of the works areas. It is recommended that to limit disturbance to Badger, all workings and excavations should be covered overnight to prevent exploration by Badger and that night time working should be avoided. If night time working is required all lighting should be downward facing, directional and fitted with a cowl to prevent light spill and directed away from areas of scrub.

5.3.4 Red Squirrels

Although no dreys were identified within the works area, due to the large amount of records for Red Squirrel it is advised that any tree works which could impact upon Red Squirrel (e.g. coniferous trees) follow a precautionary approach. Tree works should be avoided between February and September, inclusive when the kits are born and are dependent on their mother. Once specific trees have been identified for removal they should be inspected prior to removal by an experienced ecologist to check for the presence of dreys. If dreys are present, then further mitigation will be required.

5.3.5 Water Vole

The PEA survey was conducted at a sub-optimal time of year to gauge activity levels of Water Vole, and the high-water level and fast-flow created a further limitation. No field signs were noted on site, but the data search did return records of Water Vole within 2km of the watercourses. For the River Ythan it is recommended that a precautionary approach is taken during the works (e.g. minimal bank works). Whereas, for the tributaries it is recommended that a further Water Vole survey is carried out during the optimal survey season (April to September, inclusive), focussing primarily on areas of watercourse which have slower flow conditions and suitable banks for burrowing.

5.3.6 Otter

An Otter survey of the area will be necessary prior to works beginning on site once the exact location of the works is known and should the works impact upon potential holt sites and resting places. Depending on the nature of the proposed works, this may require trail camera traps in addition to a search of Otter field signs (e.g. spraints, footprints, etc.).

5.3.7 Amphibians and Reptiles

The two standing waterbodies noted on site were identified, by the HSI assessment, to have below average suitability to support Great Crested Newts. Although, no records were returned within the data search for Great Crested Newts, it is considered the habitat is suitable for supporting this species. If any future works will impact upon these areas of standing water it is recommended that further Great Crested Newt surveys are conducted to determine presence/absence. The method of survey recommended for this site is environmental DNA (eDNA) surveys, which require the

collection of water samples to be sent off for analysis to determine the presence/ absence of Great Crested Newt eDNA.

Further to this, it is recommended any drystone walls and debris piles, that will be disturbed, undergo a destructive hand search by a suitably experienced ecologist prior to works commencing.

5.3.8 Fish

Sea Trout and Salmon are known to be present within the River Ythan, it is therefore recommended that any in-channel works should avoid the spawning season for these species. Further to this, in-channel works should not be scheduled for between October and March, inclusive, to avoid impacting upon migrating and spawning Atlantic Salmon. Fish surveys may be required where some impacts are unavoidable, and this should be reviewed once the detailed project designs are in place.

Short-term adverse impacts could arise should temporary in-channel works be necessary. Impacts could include a potential decrease in water quality, for example through release of contaminative materials (e.g. concrete, oils), silt mobilisation or decreased oxygen levels in the water. To mitigate against potential impacts on fish species, the footprint of the works should be minimised to as small an area as necessary, and any bed materials removed or disrupted as part of the works should be replaced. To ensure there are no long-term adverse impacts upon fish the final works design should be re-assessed to determine there are no obstructions and/or alterations to the channel that could impact negatively upon fish.

To prevent adverse impacts on water quality, an appropriate silt containment system should be implemented throughout the duration of the works to ensure that silt mobilisation does not cause degradation of habitats of value to spawning fish. Relevant pollution prevention measures should be followed (see Section 5.5).

The works also have the potential to decrease dissolved oxygen levels through disturbance of organic material and resulting increased Biochemical Oxygen Demand (BOD). Increased BOD and decreased oxygen can have significant adverse impacts on fish. This can be avoided by not working in excessively high temperatures and maintaining water flow. It is recommended that Dissolved Oxygen (DO) levels are monitored throughout the works and if the DO levels drop below 5mg/l works should stop until DO levels have recovered.

5.3.9 Freshwater Pearl Mussel

Although the presence of Freshwater Pearl Mussel is unlikely, there should be precautionary checks on the River Ythan between NJ 95924 30423 and NJ 98338 30078 (eastern reach) and between NJ 94688 30329 and NJ 92510 30845 (western reach) should in-channel works or significant bank works be required.

5.4 Invasive Non-native Species

5.4.1 Rhododendron and Cotoneaster

Rhododendron and Wall Cotoneaster are both a non-native, invasive plant that was introduced into Britain. It is listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and it is an offence to cause spread of these species into the wild. These species were noted within the surveyed area and measures will need to be put in place to ensure that there is no further spread of these species as a result of carrying out the works. Once detailed work plans are available a walkover survey should be completed in the summer to map out the location of invasive, non-native species. The locations can be used to determine necessary mitigation measures including removal, herbicide treatment or exclusion zones.

5.5 Pollution Prevention

Appropriate mitigation measures should be implemented prior to the construction phase to ensure that the water quality of the river and tributaries is not adversely affected through pollution incidents and silt mobilisation. This mitigation should include:

- Abiding by relevant pollution prevention measures e.g. CIRIA Guidance: Control of water pollution from construction sites. Guidance for consultants and contractors (C532D) (Masters-Williams, 2001). Information useful for Toolbox Talks on working near water and pollution prevention can be found at: https://www.ciria.org/Resources/All_toolbox_talks/Env_toolbox_talks/Working_on_or_near_watercourses.aspx [Accessed: 18/12/17].

- Preventing accidental oil and fuel leaks can be achieved by the following actions:
    - Any chemical, fuel and oil stores should be located on impervious bases within a secured bund with a storage capacity 110% of the stored volume.
    - Biodegradable oils and fuels should be used where possible.
    - Drip trays should be placed underneath any standing machinery to prevent pollution by oil/fuel leaks. Where practicable, refuelling of vehicles and machinery should be carried out on an impermeable surface in one designated area well away from any watercourse or drainage (at least 10m).
    - Emergency spill kits should be available on site and staff trained in their use.
    - Operators should check their vehicles on a daily basis before starting work to confirm the absence of leakages. Any leakages should be reported immediately.
    - Daily checks should be carried out and records kept on a weekly basis and any items that have been repaired/replaced/rejected noted and recorded. Any items of plant machinery found to be defective should be removed from site immediately or positioned in a place of safety until such time that it can be removed.
- Silt run off should be prevented by incorporating the following actions:
    - Silt curtains should be used where appropriate to prevent silt from the construction works entering the watercourse.
    - Exposed bare earth should be covered as soon as possible to prevent soil erosion and silt run-off. Alternatively, geotextile coverings can be used to cover any exposed earth and prevent soil erosion.
- Water quality downstream of the works should be monitored regularly to detect any changes in water quality that could indicate a pollution incident. Should monitoring indicate potential pollution from the construction activities, works should be stopped and a solution found to prevent the pollution source entering the watercourse. Monitoring could include:
    - Visual monitoring to see if water colour has changed or if a plume is visible indicating sediment input.
    - Water quality meter measurements for Dissolved Oxygen and pH.
- Environmentally sensitive products should be used where possible. For example, this could include the use of less harmful innovative products such as Cemfree™ http://www.cemfree.co.uk/cemfree-product-information [site accessed 4/1/17] in place of concrete.

5.6 Water Framework Directive

A Water Framework Directive (WFD) assessment should be conducted in advance of works to ensure that the proposals are in line with European legislation and to mitigate against any adverse in-channel effects. A WFD assessment is a desk-based assessment which relies on information given of the status of the waterbodies as detailed within the River Basin Management Plan (RBMP).

5.7 Biosecurity

If in-channel works are necessary, measures will need to be put in place to ensure there is no spread of diseases within the watercourses. The Check-Clean-Dry approach should be followed, ensuring that all PPE and equipment is cleaned before leaving site. For more information go to www.nonnativespecies.org/checkcleandry.

Appendices

A Phase 1 Habitat Maps

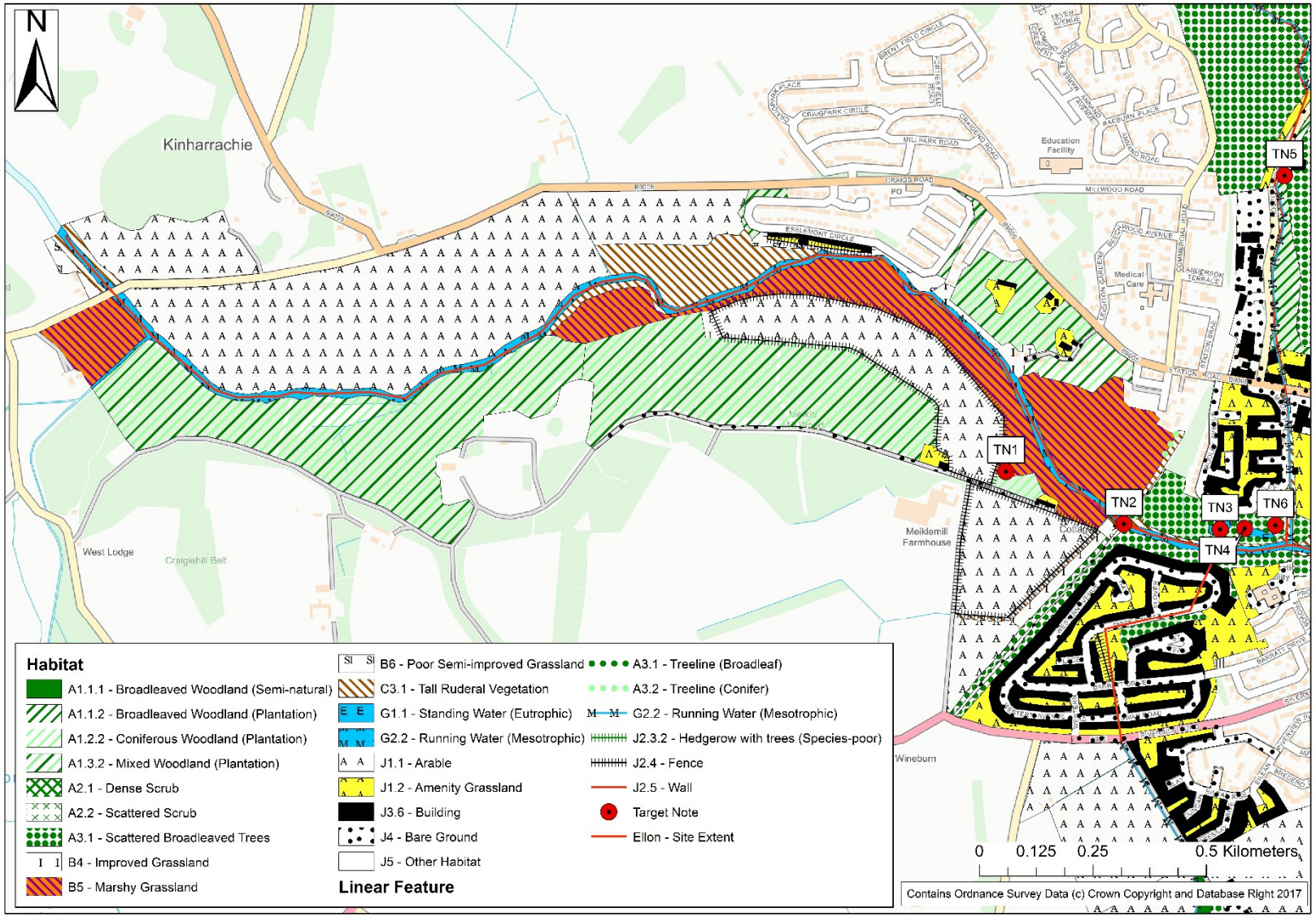

Figure A 1: Phase 1 Habitat Map - Western extent of the River Ythan

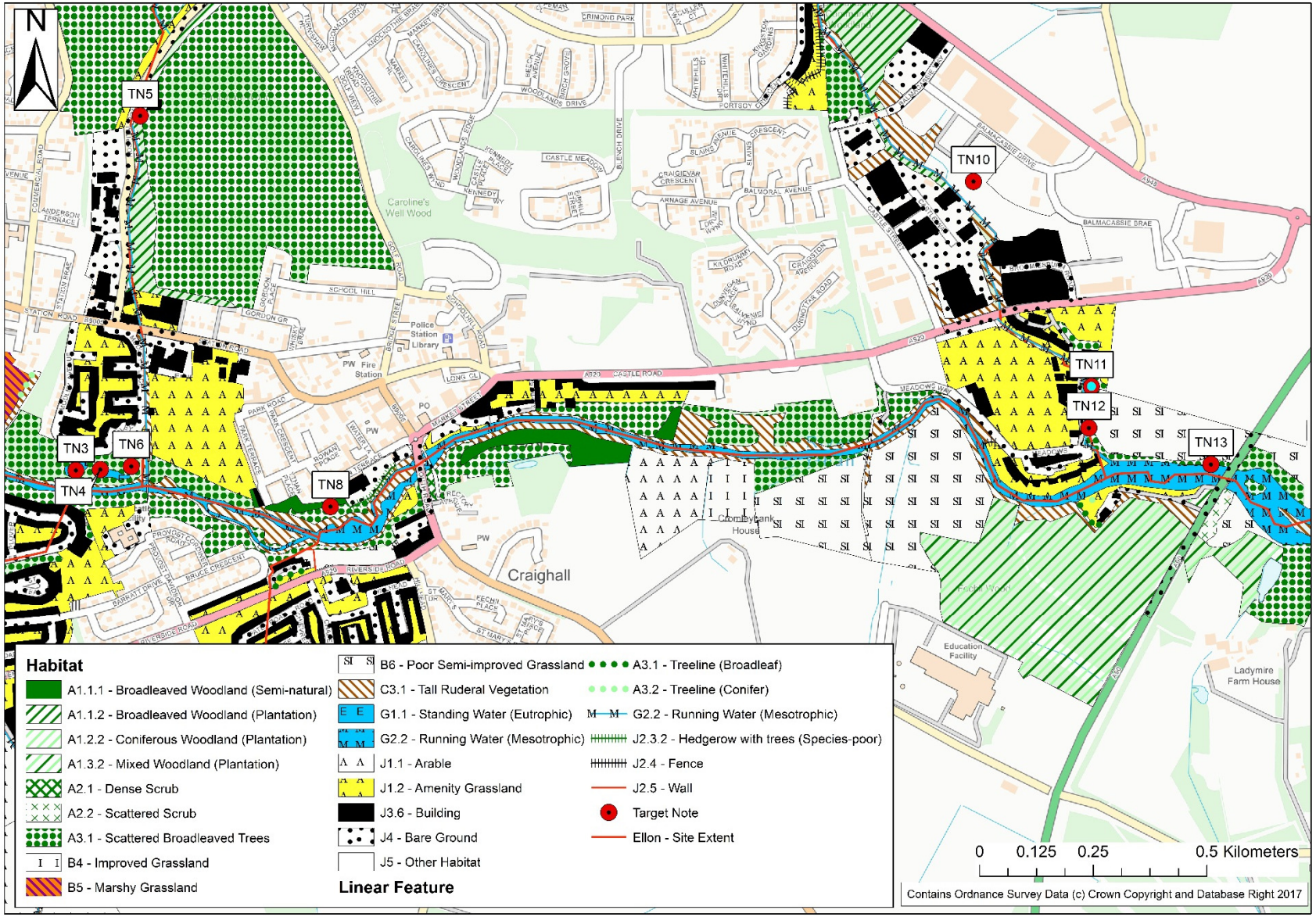

Figure A 2: Phase 1 Habitat Map - Central and East extent of the River Ythan.

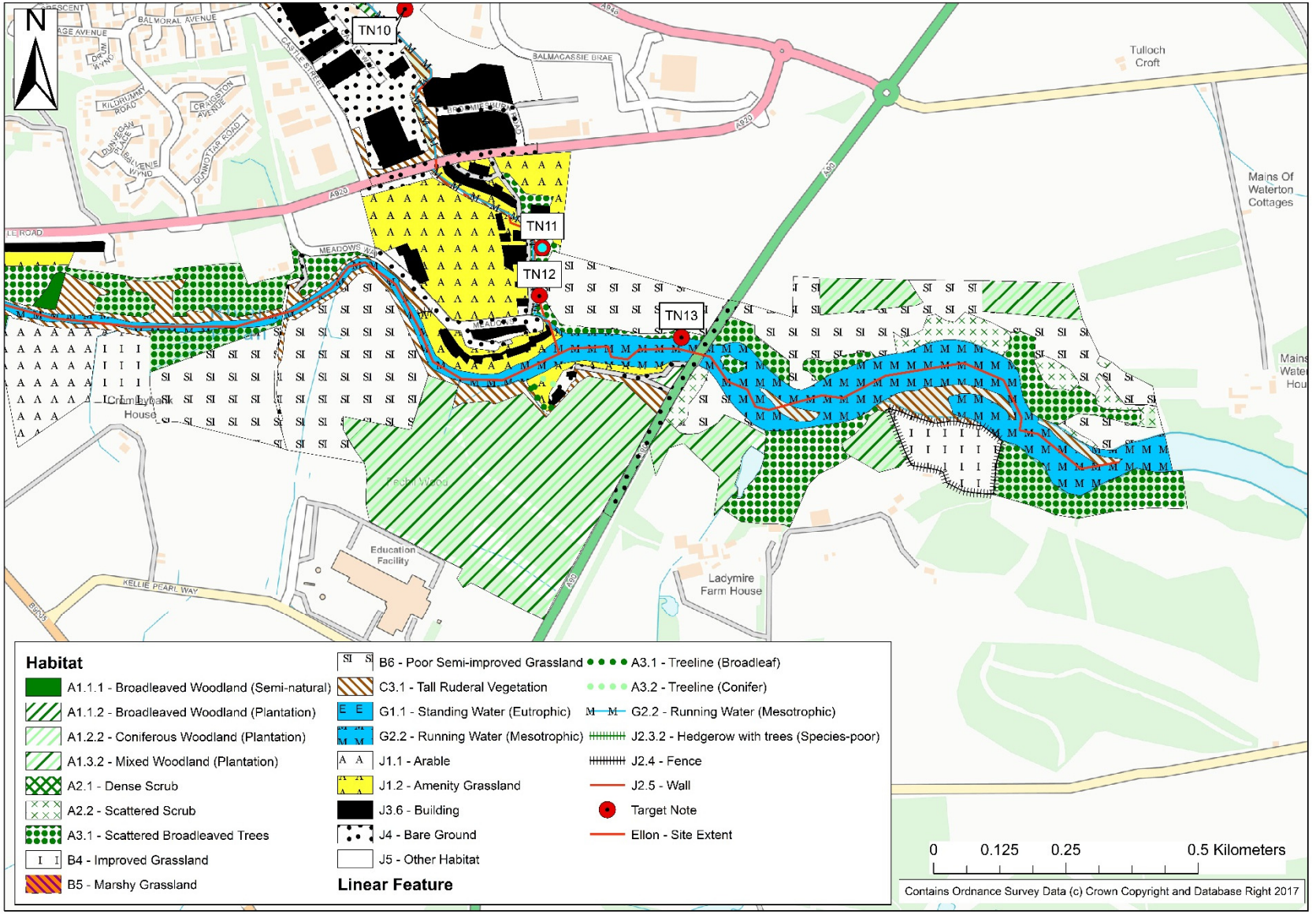

Figure A 3: Phase 1 Habitat Map - Eastern extent of River Ythan.

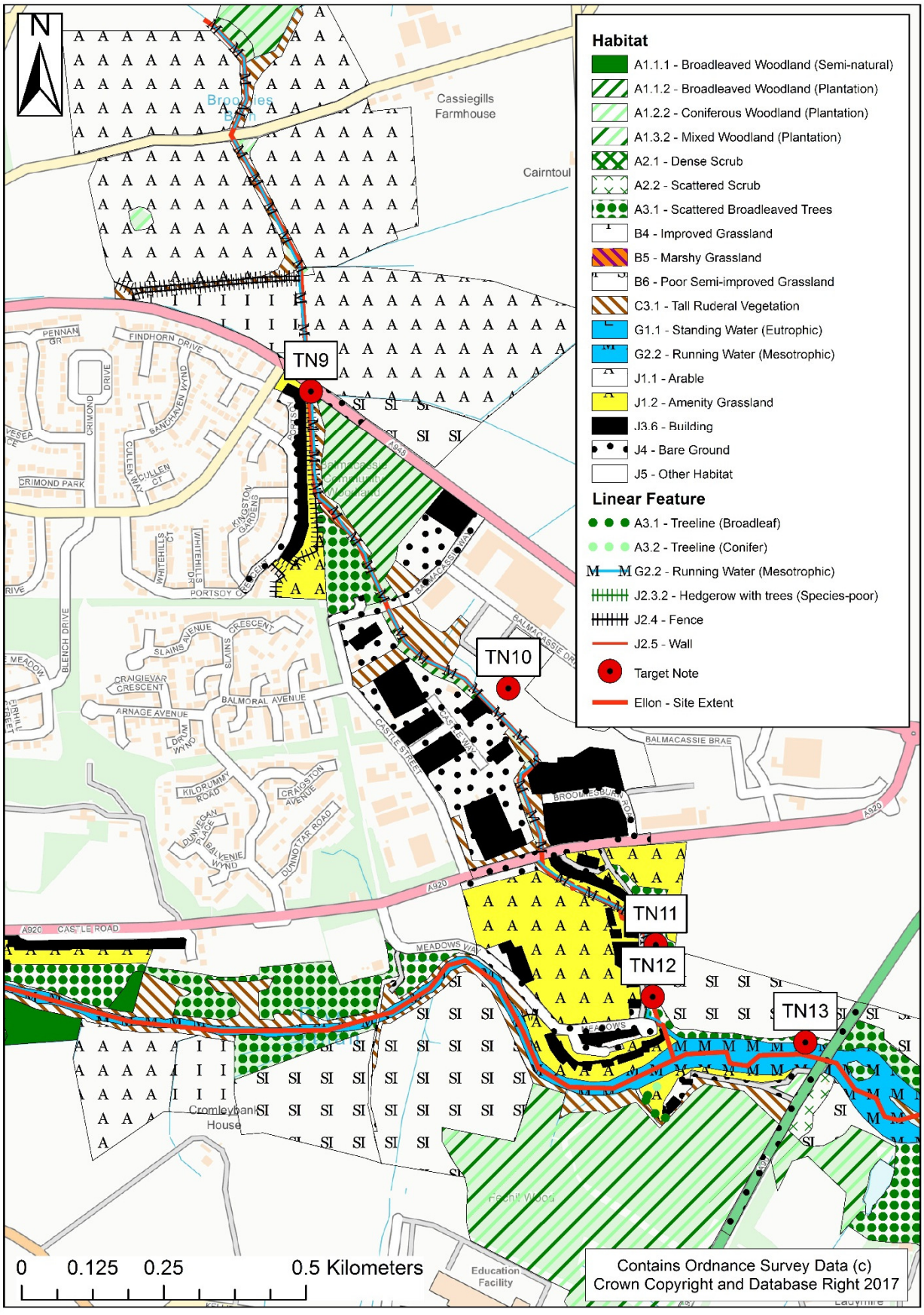

Figure A 4: Phase 1 Habitat Map - Broomies Burn.

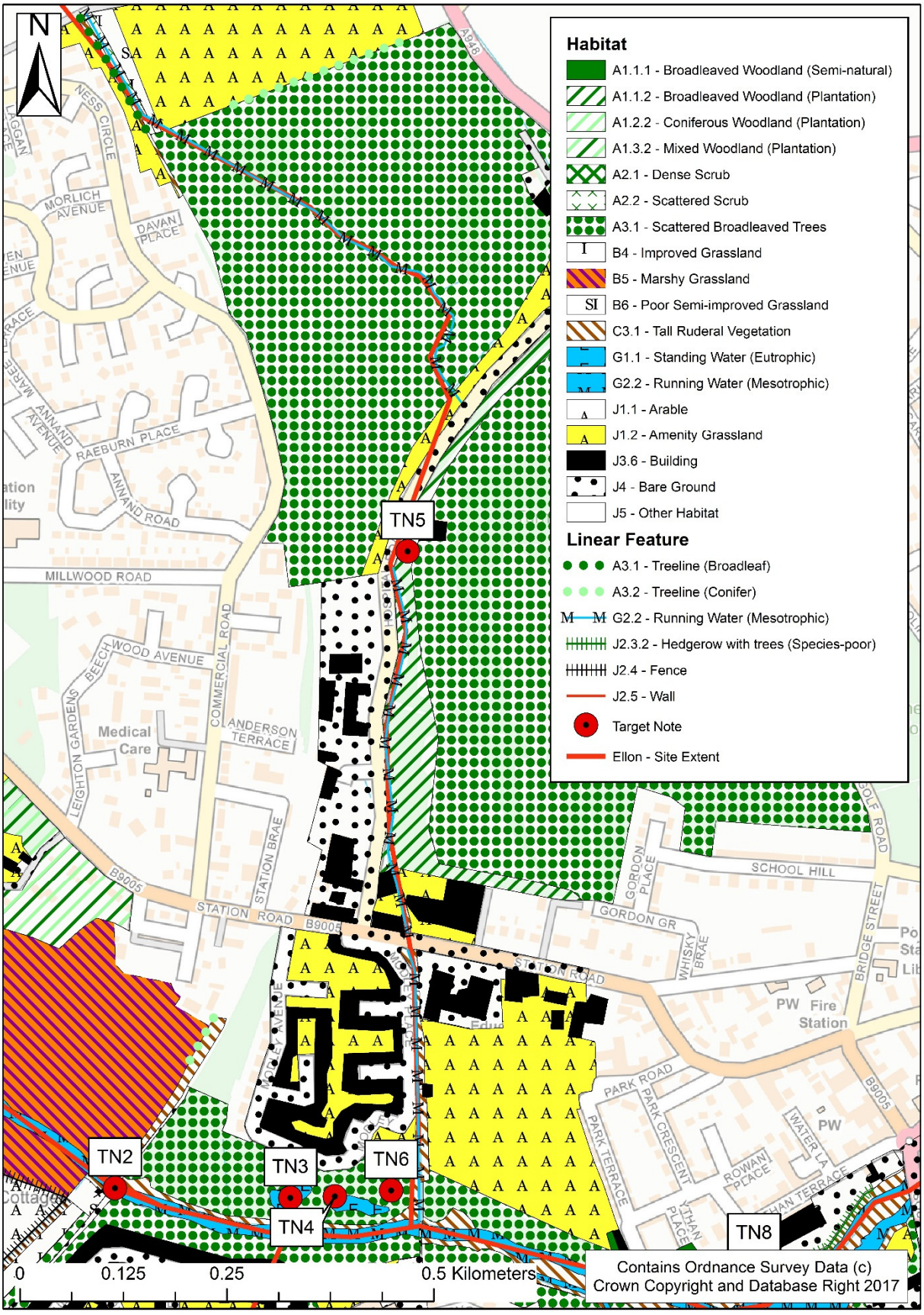

Figure A 5: Phase 1 Habitat Map - Modley Burn.

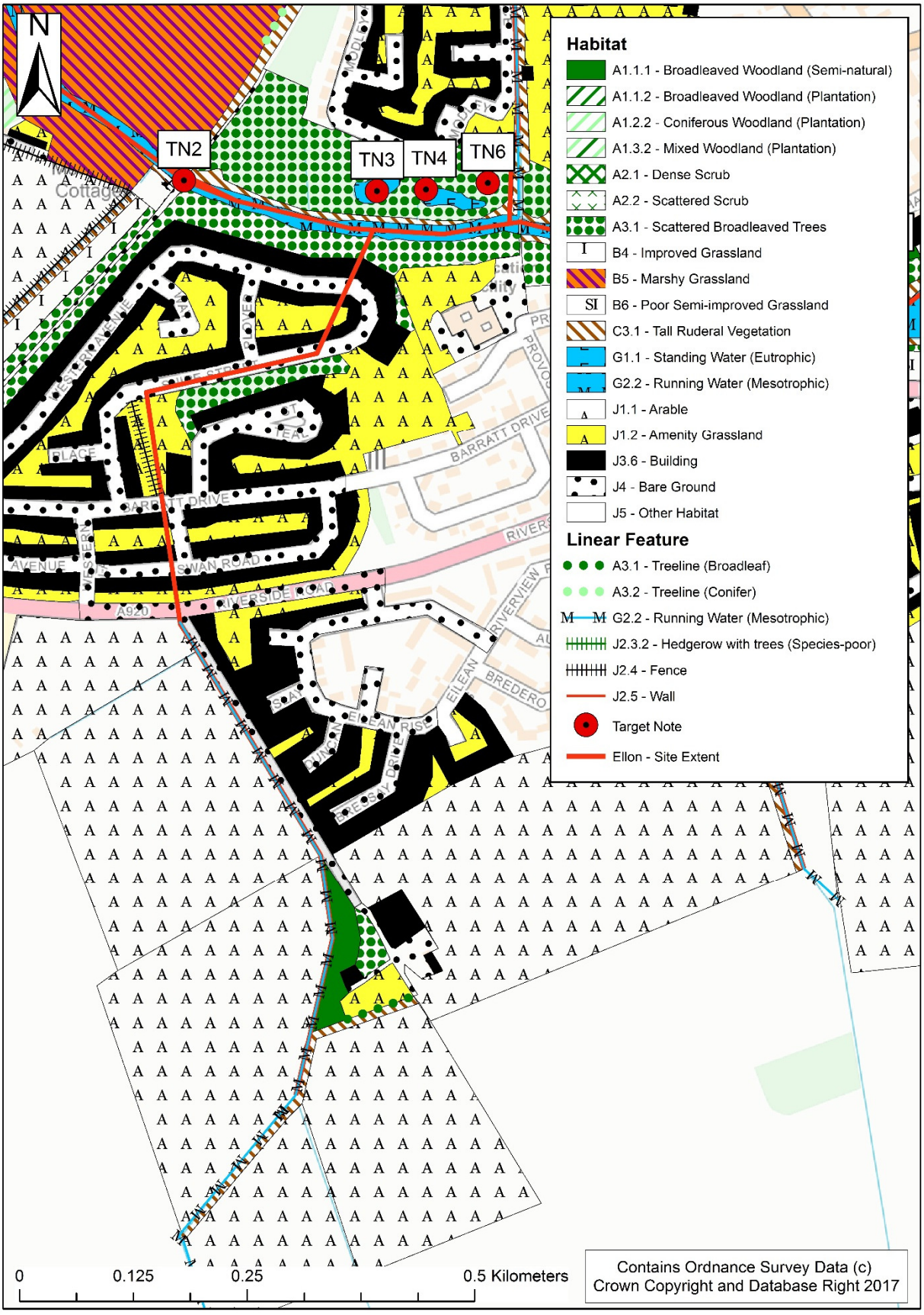

Figure A 6: Phase 1 Habitat Map - Meiklemill Burn.

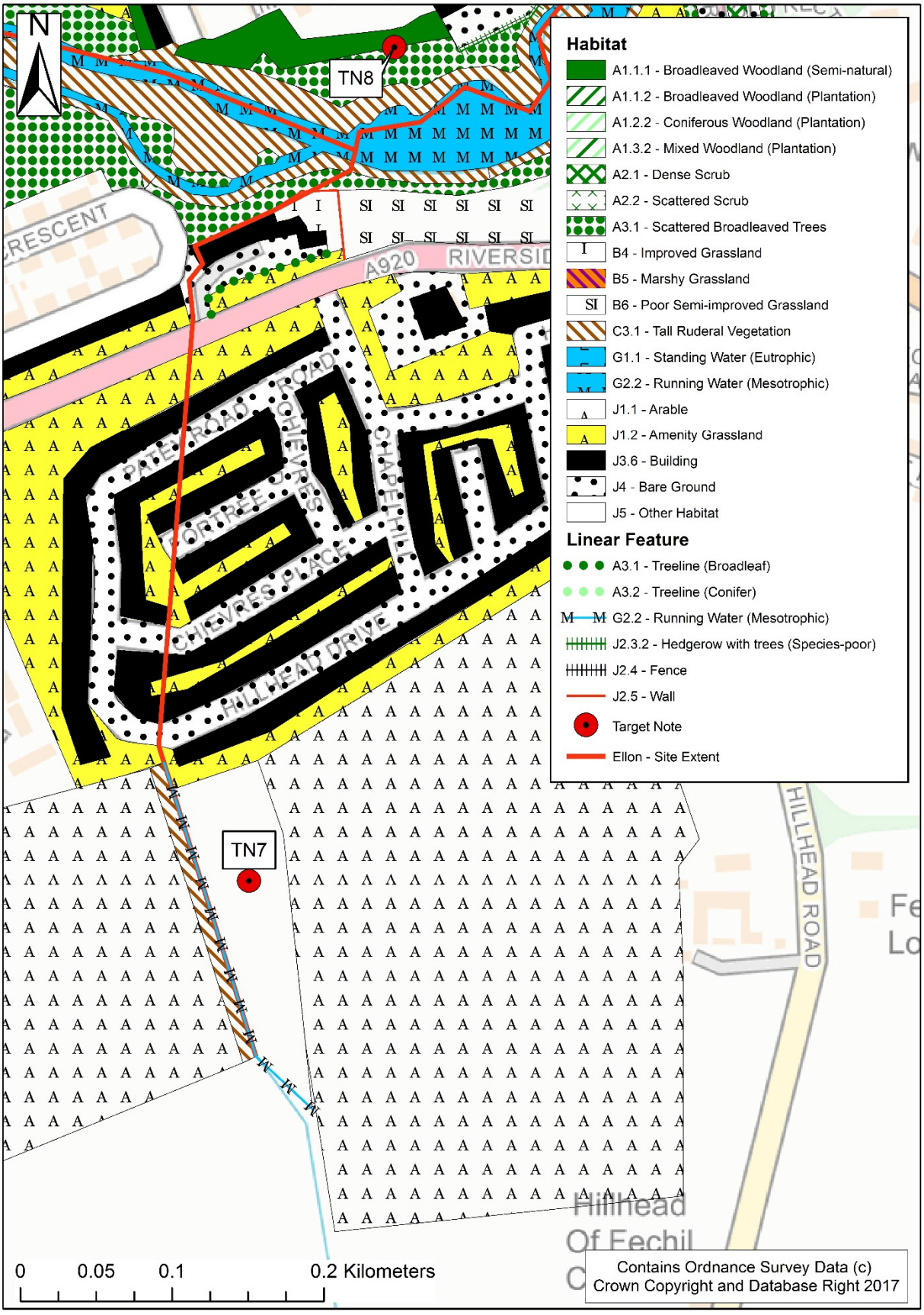

Figure A 7: Phase 1 Habitat Map - Tributary 3.

Table A 1: Target Note details, refer to Phase 1 Habitat Maps for locations.

Target Note Number	Comment	Relevant Phase 1 Habitat Maps
TN1	Eroded cliff creating potential habitat for Sand Martins. Holes were noted during the walkover.	Figure A 1
TN2	Stone bridge with a few cracks noted. Low BRP.	Figure A 1; Figure A 5; Figure A 6
TN3	Standing waterbody creating habitat for amphibians, including Great Crested Newts. HSI assessment was	Figure A 1; Figure A 2; Figure A 5; Figure A 6
TN4	Standing waterbody creating habitat for amphibians, including Great Crested Newts. HSI assessment was	Figure A 1; Figure A 2; Figure A 5; Figure A 6
TN5	Several mature Sycamore trees with heavy Ivy cover offering potential for bats. Low BRP.	Figure A 1; Figure A 2; Figure A 5; Figure A 6
TN6	Wet woodland habitat.	Figure A 1; Figure A 2; Figure A 5; Figure A 6
TN7	Building site - inaccessible for walkover.	Figure A 7
TN8	Snowberry.	Figure A 2; Figure A 7
TN9	Wall Cotoneaster.	Figure A 4
TN10	No access.	Figure A 2; Figure A 3; Figure A 4
TN11	Rhododendron.	Figure A 2; Figure A 3; Figure A 4
TN12	Wood debris piles suitable for reptile hibernaculum.	Figure A 2; Figure A 3; Figure A 4
TN13	Overhanging trees creating potential Otter holt habitat.	Figure A 2; Figure A 3; Figure A 4

B Photographic Plates

Photograph	Comment
	**Photographic Plate 1:** Semi-natural broadleaved woodland, dominated by Beech, located along the right bank of the River Ythan. NGR: NJ 97686 30147
	**Photographic Plate 2:** Plantation broadleaved woodland, located along the northern extent of Broomies Burn. NGR: NJ 96433 32098
	**Photographic Plate 3:** Conifer plantation. NGR: NJ 93900 30652

	**Photographic Plate 4:** Mixed woodland located along Broomies Burn. NGR: NJ 94928 31513
	**Photographic Plate 5:** Scattered scrub, primarily Gorse, located along the River Ythan. Dominant on the left bank, east of Ellon town, (red circle highlight). NGR: NJ 97688 30253
	**Photographic Plate 6:** Scattered trees located along the River Ythan. NGR: NJ 95889 30432

	**Photographic Plate 7:** Scattered trees/ parkland located along Modley Burn, within a golf course. NGR: NJ 94953 31533
	**Photographic Plate 8:** An area of marshy grassland located along the right bank of the River Ythan. NRG: NJ 94460 30576
	**Photographic Plate 9:** Tall ruderal vegetation located along the watercourse banks. NGR: NJ 94680 30335

Photographic Plate 10:

River Ythan - high-water level and flooding evident on the banks.

NGR: NJ 93811 30808

NGR: NJ 94870 30282

Photographic Plate 11:

Broomies Burn northern and southern section.

NGR: NJ 96435 32000

NGR: NJ 97100 30556

Photographic Plate 12:

Modley Burn.

NGR: NJ 94976 31487

NGR: NJ 95044 30890

Photographic Plate 13:

Tributary 3.

NGR: NJ 95344 29732

	**Photographic Plate 14:** Meiklemill Burn. NGR: NJ 94860 29424
	**Photographic Plate 15:** Arable fields located within the wider area of TRIB 4. NGR: NJ 94922 29346
	**Photographic Plate 16:** An area of amenity grassland noted within the surveyed extent. NGR: NJ 95329 29766

Photographic Plate 17:

Several areas of bare ground were located along the surveyed extent, primarily forming paths.

NGR: NJ 97189 30247

Photographic Plate 18:

Building site located next to TRIB 3.

NGR: NJ 95381 29693

Photographic Plate 19:

Suitable habitat for Otter holts located on the left bank of the River Ythan.

NGR: NJ 97489 30303

Photographic Plate 20:

Ivy clad Sycamore trees located along the Modley Burn (TN5).

NGR: NJ 95067 31043

Photographic Plate 21:

Stone bridge crossing the River Ythan.

Some cracks were noted along the stonework, creating potential bat roosting features. Low BRP.

NGR: NJ 94712 30322

Photographic Plate 22:

Eroded cliff situated away from the River Ythan on the right bank (TN1).

Holes were noted within this cliff, creating potential habitat for Sand Martins.

NGR: NJ 94465 30451

Photographic Plate 23:

Areas of old collapsed drystone walls were present across the surveyed extent.

Providing suitable hibernacula for amphibians and reptiles.

NGR: NJ 94627 30328

Photographic Plate 24:

Debris/ stone piles creating hibernacula for reptiles and amphibians.

NGR: NJ 97829 30164

	**Photographic Plate 25:** Bare ground creating suitable reptile basking opportunities. NGR: NJ 96703 30421
	**Photographic Plate 26:** Wall Cotoneaster located along the Broomies Burn (TN9). NGR: NJ 96550 31475

	**Photographic Plate 27:** Rhododendron scattered throughout a section of broadleaved woodland located along the southern extent of Broomies Burn. NGR: NJ 97150 30525
	**Photographic Plate 28:** Snowberry located within scattered broadleaved woodland located along the left bank of the River Ythan. NGR: NJ 95397 30228

C Statutory Designated Site Maps

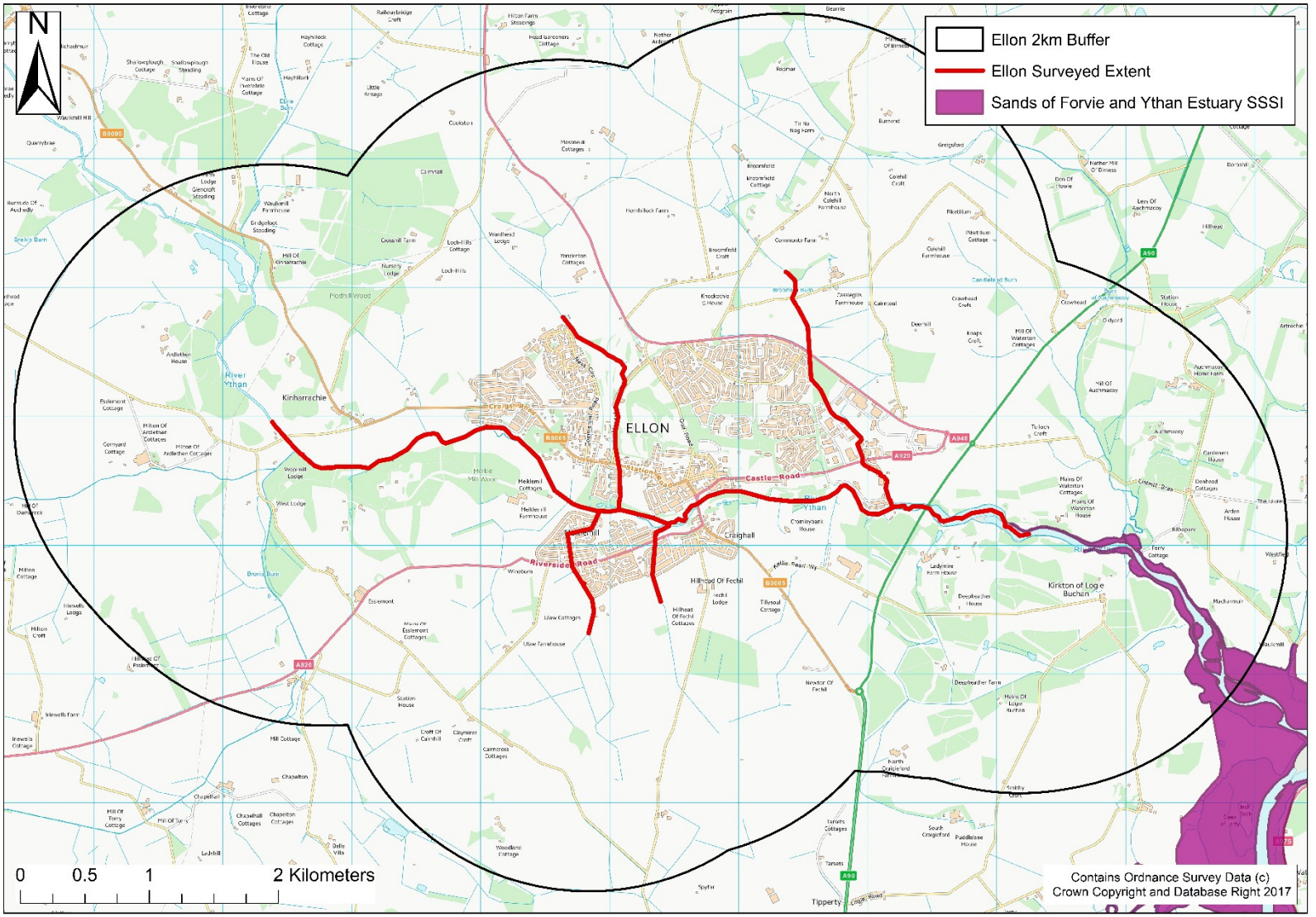

Figure C 1: Location of Sands of Forvie and Ythan Estuary SSSI.

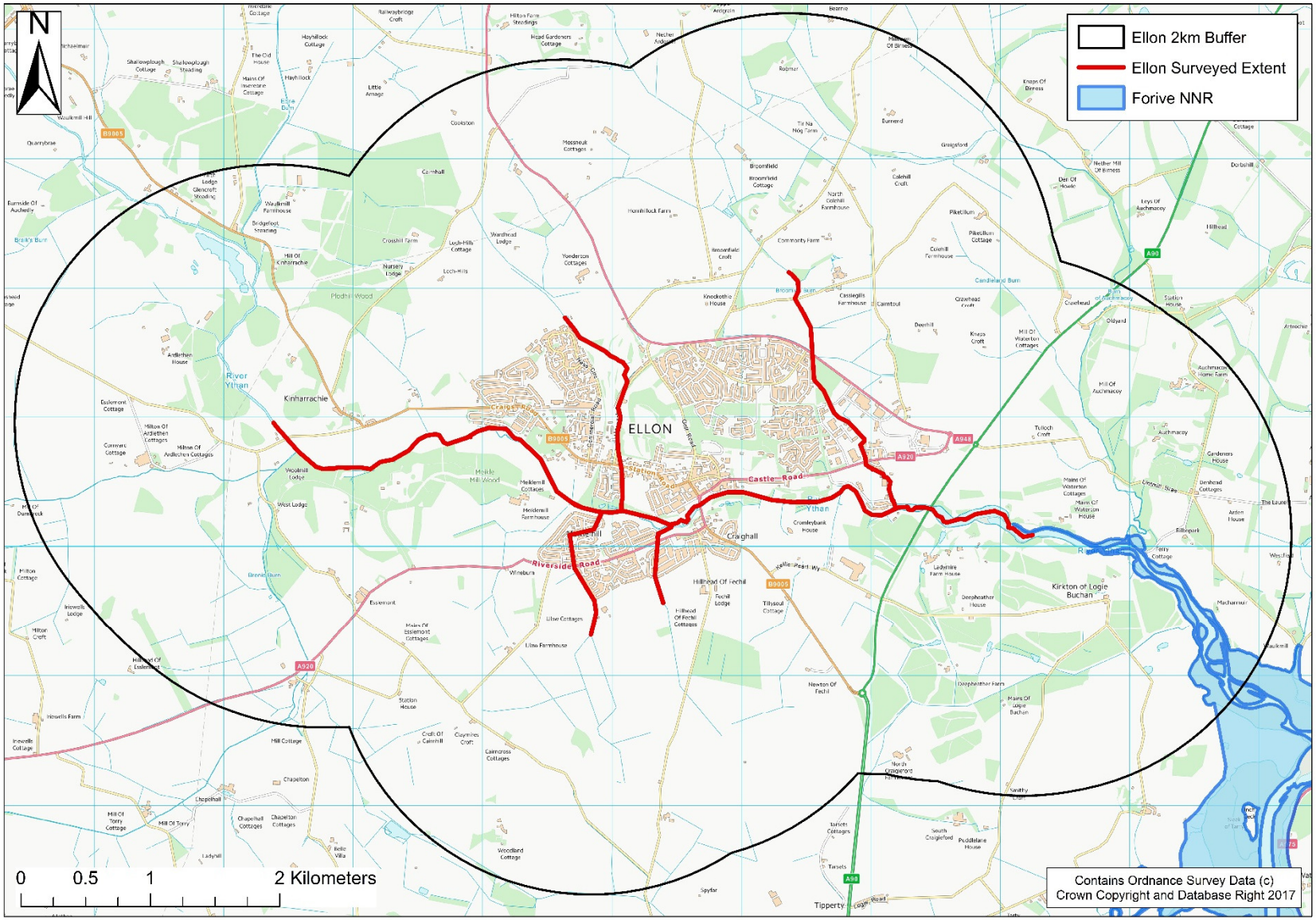

Figure C 2: Location of Forvie NNR.

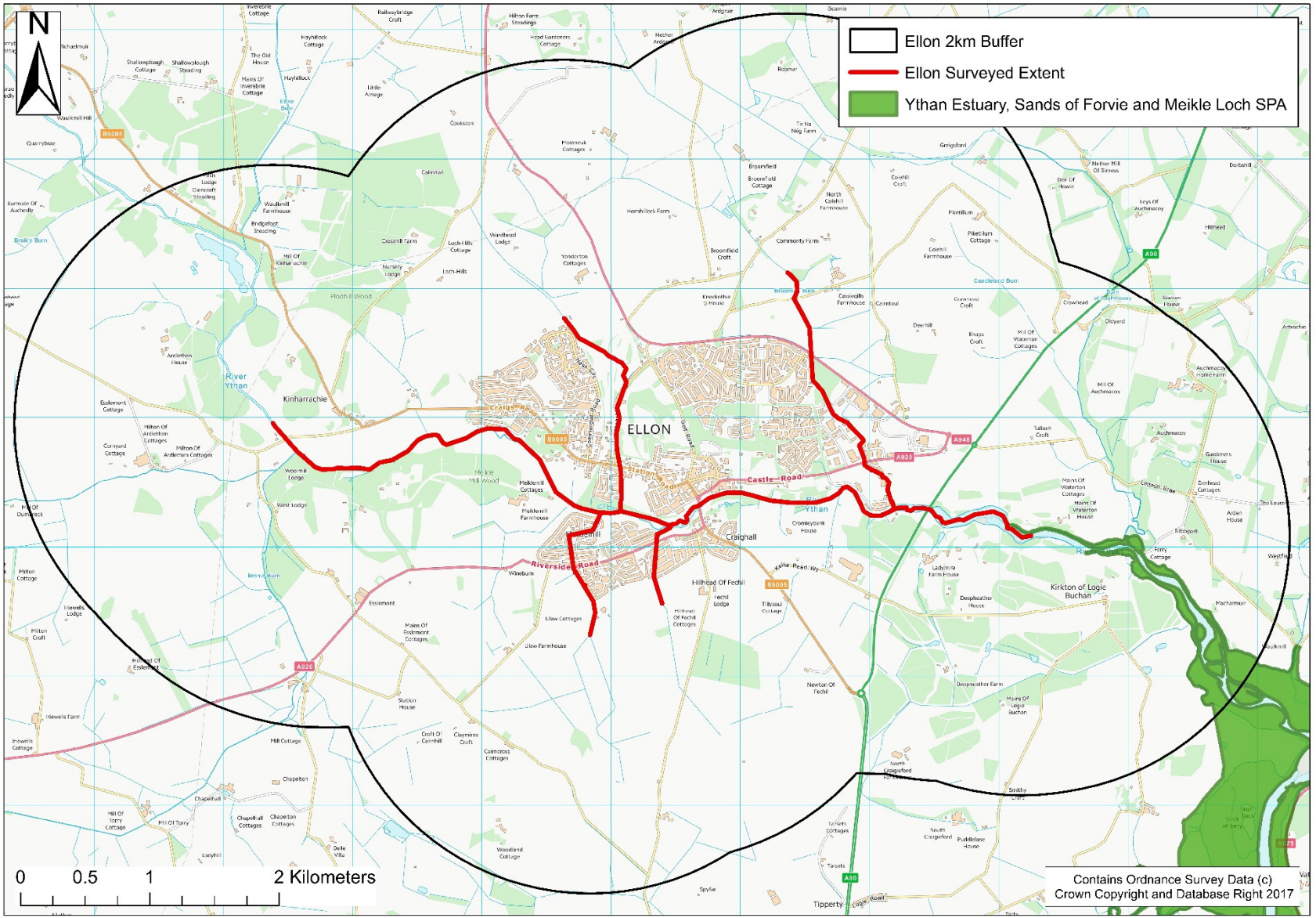

Figure C 3: Location of Ythan Estuary, Sands of Forvie and Meikle Loch SPA.

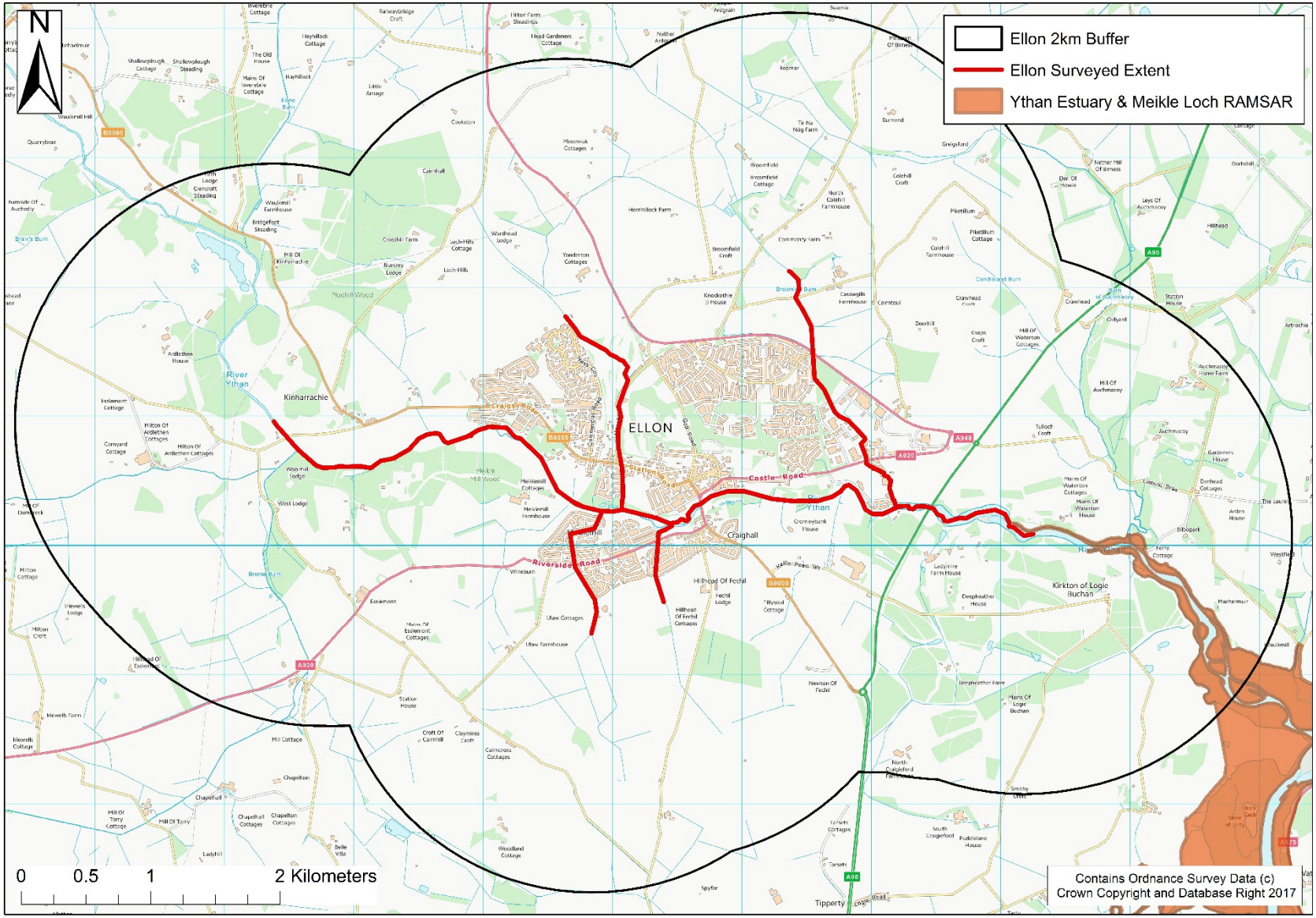

Figure C 4: Location of Ythan Estuary and Meikle Loch RAMSAR.

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