



Waterford to New Ross Greenway

Ecological Impact Assessment

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DECEMBER 2016

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TABLE OF CONTENTS

1. INTRODUCTION	1
1.1 Background	1
1.2 Requirement for an Ecological Impact Assessment (EclA).....	1
1.3 Approach and Objectives	2
1.4 Main Sources of Consultation	3
2. SCOPING	4
2.1 Overview.....	4
2.2 Existing Land-Use.....	4
2.3 Watercourses.....	4
2.4 Material Assets	5
3. ESTABLISHING THE BASELINE	7
3.1 Scope of the Assessment	7
3.2 Establishing the Zone of Influence	7
3.3 Consultation and Desk Study.....	7
3.4 Specific Ecological Methodologies	8
3.4.1 Multi-disciplinary Walkover Surveys.....	8
3.4.2 Watercourses.....	8
3.5 Protected Mammal Surveys	9
3.5.1 Otter (<i>Lutra lutra</i>)	9
3.5.2 Badger (<i>Meles meles</i>).....	9
3.5.3 Bats.....	9
3.5.4 Additional Protected Species	10
3.6 Fisheries	11
3.7 Ecological Evaluation and Impact Assessment Methodology	11
3.7.1 Mitigation	12
3.7.2 Survey Limitations	13
4. IMPORTANT ECOLOGICAL FEATURES	14
4.1 Designated Sites.....	14
4.2 Habitats	18
4.2.1 Fossitt Habitat Descriptions	18
4.3 Annex 1 Habitats	22
4.4 Flora Overview.....	22
4.4.1 Vascular Plants.....	22
4.5 Protected Fauna	23
4.6 Invasive Alien Species (IAS).....	24

5.	FIELD SURVEY RESULTS	25
5.1	General Description and Context	25
5.2	Protected Mammal Survey	25
5.2.1	Otter	25
5.2.2	Badger	25
5.2.3	Bats	26
5.2.4	Irish Stoat/Pygmy Shrew	26
5.3	Reptiles and Amphibians	26
5.4	Barn Owl	27
5.5	Invasive Alien Species (IAS)	27
6.	IMPACT ASSESSMENT	28
6.1	Designated Sites	28
6.2	Habitat Loss	28
6.3	Habitat Fragmentation	28
6.4	Run-off of Pollutants	28
6.5	Hydrological Impact on Habitats	28
6.6	Displacement/Disturbance of Mammals	28
6.7	Impacts on Key Ecological Receptors	28
7.	MITIGATION	33
7.1	General Mitigation	33
7.2	Specific Mitigation Measures	33
7.3	Residual Impacts	39
8.	GREENWAY IAPS MANAGEMENT PLAN	40
8.1	Legislative Context	40
8.2	Brief Description of Greenway Management Plan	40
8.3	Management Options for Japanese Knotweed	41
8.4	Recommended Management Measures	42
8.5	Health and Safety	44
9.	CONCLUSIONS	45
10.	REFERENCES	46

APPENDIX A Badger Licence Application

APPENDIX B Habitat Maps

APPENDIX C Ecological Constraint Maps

1. INTRODUCTION

1.1 Background

Roughan & O'Donovan (ROD Environmental) were appointed by Kilkenny County Council to undertake an Ecological Impact Assessment (EclA) for the proposed Waterford to New Ross Greenway, hereafter referred to as "the Greenway", to inform a planning application under Part VIII: Section 179 of the Planning and Development Act, 2000. The Greenway consists of a 22 km shared cycling and pedestrian facility along the disused railway line between Waterford City and the town of New Ross, Co. Wexford, the majority of which is located in the south-east of Co. Kilkenny, as shown in Figure 1.

When preparing submissions for such a development, an EclA must be made available for public consultation. The aim of the EclA process is to ensure that projects that may potentially affect protected and/or ecologically sensitive sites, habitats and/or species are assessed in advance so that the competent authority is aware of what those effects are likely to be. To ensure that full consideration can be given to the impacts of the proposed development on strictly protected species listed on Annex IV of Council Directive 92/43/EEC (the Habitats Directive), and to avoid the possibility of delay to the project or the refusal of a derogation licence, which would prevent the works being carried out as planned, any application for such a derogation licence should be made in advance of seeking approval under Part VIII.

During the desk study for this EclA, the statutory consultee, the National Parks & Wildlife Service (NPWS) provided data on designations of habitats and species of nature conservation interest within the zone of influence of the Greenway. Of particular interest were potentially adverse direct, indirect or cumulative impacts on designated and non-designated areas of importance for biodiversity.

This EclA identifies, quantifies and evaluates the potential effects of the Greenway-related or other proposed actions on the ecology of the receiving environment surrounding the preferred route. It provides an assessment of the baseline ecological conditions in the area and of the nature, magnitude and significance of the Greenway's impacts. In addition, it proposes appropriate mitigation measures to eliminate those impacts or, where this has not been possible, to minimise their effects such that they can no longer be judged significant.

1.2 Requirement for an Ecological Impact Assessment (EclA)

Ireland's national biodiversity action plan *Actions for Biodiversity 2011–2016* (DAHG, 2011), in accordance with the Convention on Biological Diversity, is a framework for the conservation and protection of Ireland's biodiversity, with an overall objective to secure the conservation, including, where possible, the enhancement and sustainable use of biological diversity in Ireland and to contribute to collective efforts for conservation of biodiversity globally. The plan is implemented through legislation and statutory instruments concerned with nature conservation. The Planning and Development Acts, 2000–2015 and the European Communities (Environmental Impact Assessment) Regulations, 1989 (as amended) are particularly important in that regard and include a number of provisions directly concerned with the protection of natural heritage and biodiversity.

The Wildlife Acts, 1976–2012 are the principle mechanism for the legislative protection of wildlife in Ireland. They outline strict protection for species that have significant conservation value. In summary, the Wildlife Acts protect species from injury, disturbance and damage to breeding and resting sites. All species listed in the Wildlife Acts must, therefore, be a material consideration in the planning process. An important piece of national legislation for the protection wild flora, *i.e.* vascular plants, mosses, liverworts, lichens and stoneworts, is the Flora (Protection) Order, 2015, which makes it illegal to cut, uproot or damage a listed species in any way or to alter, damage or interfere in any way with their habitats. This protection applies wherever the species listed in the Schedules to the Order are found.

The European Communities (Birds and Natural Habitats) Regulations, 2011–2015 transpose into Irish law Directive 2009/147/EC (the Birds Directive) and the Habitats Directive, which list habitats and species of Community, *i.e.* European Union (EU), importance for conservation

and that require protection. This protection is afforded in part through the designation of areas that represent significant populations of listed species within a European context, *i.e.* Natura 2000 sites. An area designated for bird species is classed as a Special Protection Area (SPA), and an area designated for other protected species and habitats is classed as a Special Area of Conservation (SAC). Birds listed on Annex I of the Birds Directive in SPAs and habitats and species listed on Annexes I and II, respectively, of the Habitats Directive in SACs in which they are designated features have full European protection. Species listed on Annex IV of the Habitats Directive are strictly protected wherever they occur, whether inside or outside the Natura 2000 network. Annex I habitats outside of SACs are still considered to be of national and international importance and, under Article 27(4)(b) of the European Communities (Birds and Natural Habitats) Regulations, 2011, public authorities have a duty to strive to avoid the pollution or deterioration of Annex I habitats and habitats integral to the functioning of SPAs.

Sites of national importance for nature conservation are afforded protection under planning policy and the Wildlife Acts, 1976–2012. Natural Heritage Areas (NHAs) are sites that are designated under statute for the protection of flora, fauna, habitats and geological interest. Proposed NHAs (pNHAs) are published sites identified as of similar conservation interest but have not been statutorily proposed or designated.

The International Union for the Conservation of Nature and Natural Resources (IUCN) provides a global approach for evaluating the conservation status of species to inform and catalyse action for biodiversity conservation through the Red List of Threatened Species.

1.3 Approach and Objectives

A habitat is the environment in which an animal or plant lives, generally defined in terms of vegetation and physical structures. Features of ecological significance occurring or likely to occur within the zone of influence (ZOI) of the Greenway were classified as Key Ecological Receptors (KERs). Features of ecological significance are designations for nature conservation, *i.e.* habitats and species protected under the Habitats Directive, the Birds Directive, the Wildlife Acts, 1976–2012 and the Flora Protection Order 2015 and species subject to restrictions listed on the Third Schedule to the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended), *i.e.* invasive alien species (IAS). A KER can therefore be defined as any site, habitat, ecological feature, vegetative assemblage, community, species or individual:

- Occurring within the ZOI of the Greenway;
- Considered likely to be impacted upon by the Greenway; and,
- Requiring further survey in order to more accurately predict the nature, magnitude and significance of those impacts.

The ZOI was derived, reviewed and amended as the Project evolved through consultation with Ecological specialists, Project Engineers, Geologists, Hydrologists, Hydrogeologists and Landscape Architects on the basis of analysis of the possible interaction with Environmental Resources and Receptors that are likely to be affected by any biophysical changes caused by the Project. These included interactions between the Project and the Qualifying Interests (QI) of European Sites (Natura 2000), as appropriate, taking their sensitivities, ecological functions and processes that support them into account. In this regard, the ZOI for this Project includes the route corridor and a 1 km buffer. The study was defined as the route corridor and incorporated an additional 100m buffer (150m for Otter) where access allowed adhering to best practice guidelines (TII, 2009b; Smith *et al.*, 2011).

On completion of scoping, a desk study was undertaken to review all available published data on European and nationally designated sites for nature conservation, other ecologically sensitive sites and habitats and species of interest within the ZOI. Published data describing ecological conditions was then cross-referenced with publicly available maps and aerial orthophotography from Ordnance Survey Ireland (OSi), the NPWS and the Environmental Protection Agency (EPA) to identify important ecological features.

This EclA quantifies the potential impacts on KERs and identifies the mitigation measures required to avoid and reduce any likely significant impacts. The results of the ecological surveys informed the Greenway design, thereby addressing potential impacts on habitats and species of conservation interest.

Determining the ecological issues to be addressed in the EclA was informed by early engagement with relevant parties/stakeholders who were provided key information about the Greenway. During this scoping process, selected consultees were provided the opportunity to input into the scheme through preliminary discussions on ecological features that could be affected; potential strategies to avoid negative impacts; and, possible compensation or enhancement measures.

Following the scoping and desk study, multidisciplinary ecological walkover surveys were conducted along the entire preferred route option adhering to *Ecological Survey Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (TII, 2008c) and *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al.*, 2011). The walkovers classified habitats according to *A Guide to Habitats in Ireland* (Fossitt, 2000) and identified corresponding habitats listed on Annex I of the Habitats Directive. The findings of these habitat surveys are presented in contemporary thematic maps for ease of geospatial reference and interpretation (Appendix A). Multidisciplinary surveys also included watercourse assessments, Bat roost suitability assessments and Bat activity surveys, specialist non-volant terrestrial protected mammal surveys, e.g. for Otter and Badger. The surveys provided vital information regarding ecological conditions on the route corridor, identifying KERs and the need for specialist surveys, licensing and mitigation in specific locations.

Using the comprehensive assessment of the existing environment (baseline conditions), it has been possible to accurately predict the likely impacts of the Greenway on the KERs and correctly assign an ecological significance to them.

Where detrimental impacts have been identified, they have been examined and specific mitigation measures developed in accordance with the hierarchy of options suggested by the European Commission in Managing Natura 2000 sites: *The Provisions of Article 6 of the Habitats Directive 92/43/EEC* (EC, 2000). The adopted approach was:

- Avoid at source;
- Reduce at source;
- Abate on site; and, finally,
- Abate at receptor.

The information provided in this EclA accurately and comprehensively describes the baseline ecological environment, provides an accurate prediction of the likely ecological impacts of the Greenway, prescribes mitigation as necessary and describes the residual ecological impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate best practice guidelines for EclA, as described in Section 2.

1.4 Main Sources of Consultation

- NPWS (2007) *Circular Letter NPWS 2/07 Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 – strict protection of certain species/applications for derogation licences*. Department of the Environment, Heritage and Local Government;
- NPWS (2010) *Circular NPW 1/10 & PSSP 2/10 Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities*. Department of Environment, Heritage and Local Government;
- NPWS (2013) *The Status of EU Protected Habitats and Species in Ireland. Volume 2 & 3: Article 17 Assessments*. National Parks & Wildlife Service, Department of Arts, Heritage and Gaeltacht; and,
- Eionet (2015) *Reporting under Article 12 of the Birds Directive (Period 2008-2012)*. European Topic Centre on Biological Diversity.

2. SCOPING

2.1 Overview

The Irish Government policy entitled *Smarter Travel: A Sustainable Transport Future*, which runs from 2009 to 2020, identifies key goals and objectives to be met in order to introduce a national sustainable transport network. A National Cycle Policy (NCP) was implemented in conjunction with this policy. The NCP mission aims to “create a strong cycling culture in Ireland” while also “encouraging recreational cycling”. The NCP also outlines the importance of the National Cycle Network in attracting overseas tourists if the project is implemented.

The proposed Greenway will provide a safe recreational facility for tourists and local users to cycle from Waterford to New Ross along the disused railway. The Greenway aims to feed into the local and national tourism strategies and complement the existing natural, cultural and built heritage along the route. The Greenway does not form part of the National Cycling Plan Wexford to Tralee – Corridor No. 3 outlined in the Scoping Study of the same name in 2010. However, the Greenway has the potential to link to this corridor and join with other proposed schemes such as the proposed Red Bridge Walking and Cycling Trail, which loops from New Ross to Redbridge, Co. Wexford. The cycleway will, for the majority, of its length be segregated from vehicular traffic and will provide a safe alternative for cyclists compared to the N25, which carries significant amounts of traffic.

The route of the disused railway runs east from the dockyards in Waterford city along the northern quays at Abbey Junction, through a residential area on the edge of the city and then into open agricultural land. The route passes over and under several roadways, including the N29, after which it follows a northerly direction parallel to the N25 for c. 3 km, veering north-east towards the River Barrow and the town land of Carrigcloney. The railway line passes through the River Barrow and River Nore SAC for c. 1 km, where it bridges the Glenmore River. The route then continues north-west back towards the N25, running parallel to it before emerging near O'Hanrahan Bridge in New Ross (Figure 1).

The route for the Greenway passes between three Local Authority administrative areas: Waterford County Council, Kilkenny County Council and Wexford County Council.

A single Screening for Appropriate Assessment (AA) and Screening for Environmental Impact Assessment (EIA) has been carried out for the Greenway.

2.2 Existing Land-Use

The footprint of the proposed route is entirely along the route of the disused Waterford to New Ross railway line. The existing land-use along the route is predominantly agricultural. In the areas close to Waterford and New Ross there are built up areas including industrial sites, boat yards and residential developments. The route traverses the River Barrow and River Nore SAC. The route also has several at-grade road crossings.

2.3 Watercourses

A number of watercourses exist within the extents of the scheme and are located as follows:

River Barrow

The River Barrow rises in the Slieve Bloom Mountains in Co. Laois and flows for 192 km to St. Mullins in Co. Wexford where it becomes tidal. The river is navigable from St. Mullins to Athy with connections to Dublin and the River Shannon. The river is designated as the River Barrow and River Nore SAC. The proposed Greenway runs parallel at varying distances from the river and crosses two named tributaries of the River Barrow: the Glenmore River and the Oaklands River.

River Suir

The River Suir rises in the Slieve Bloom Mountains in Co. Tipperary and flows for 185 km to Waterford City. The river is navigable from Waterford City to Carrick-on-Suir and is designated as the Lower River Suir SAC. The proposed Greenway runs parallel at varying

distances from the river and crosses one named tributary of the River Suir: the Luffany River, which discharges into the River Suir close to its confluence with the River Barrow; and three unnamed streams which discharge into the River Suir north of Little Island, just downstream of Waterford City.

2.4 Material Assets

The proposed route is 22 km in length. The entire route of the Greenway is proposed within the footprint of the disused railway line. The existing railway tracks will be removed and a 3m wide bituminous surface will be constructed in its place for the entire length, with several at grade road crossings. The Greenway will make use of existing bridges, embankment and cutaways and will follow the line of the railway.

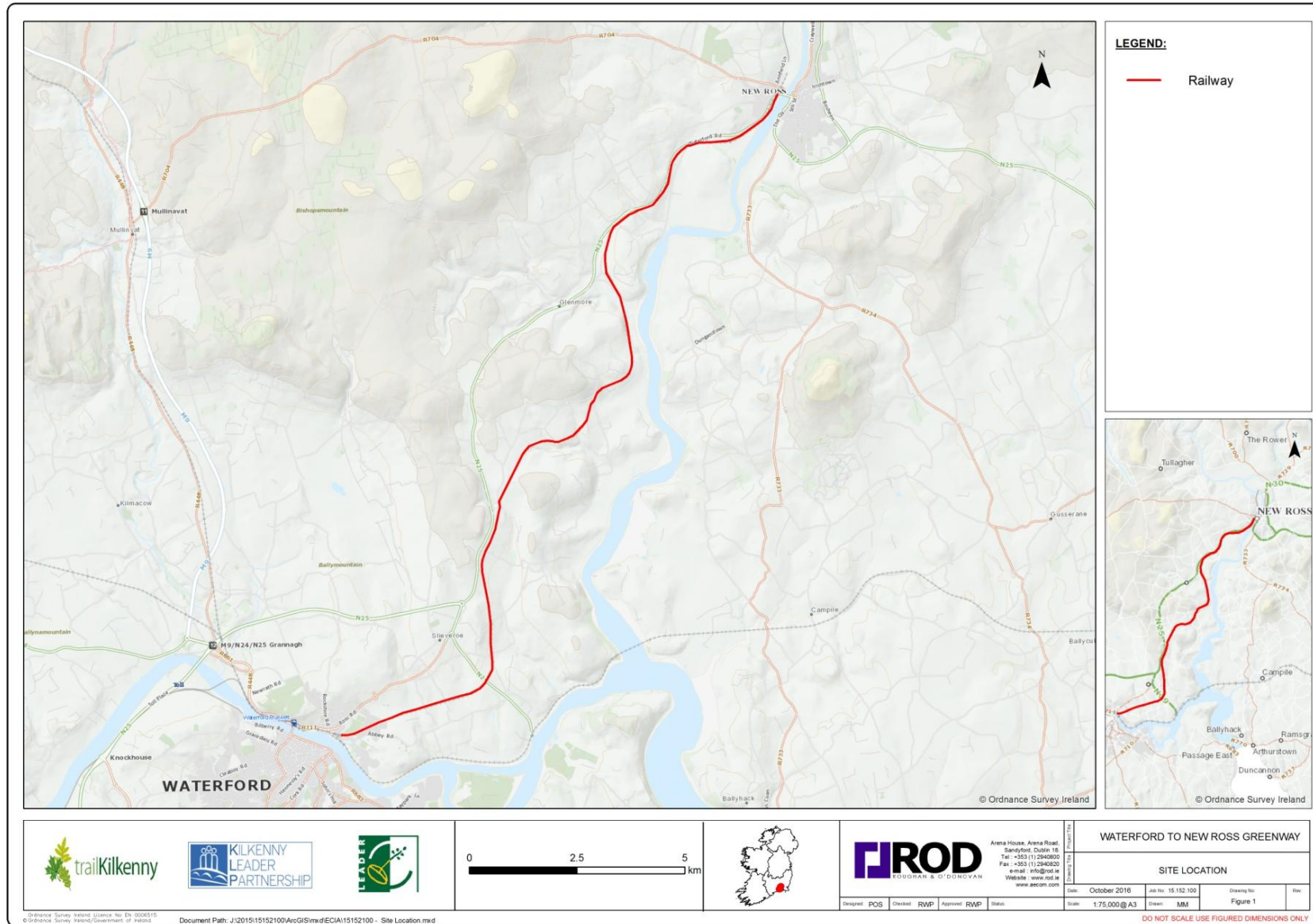


Figure 1. Location of the proposed Greenway.

3. ESTABLISHING THE BASELINE

This section describes the process of determining the ecological issues to be addressed in this EclA. Recognised guidelines were followed in relation to every aspect of the scoping, survey and assessment.

3.1 Scope of the Assessment

The assessment methodology is based primarily upon the Transport Infrastructure Ireland (TII), formerly National Roads Authority (NRA), *Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev. 2* (TII, 2009a). The survey methodology is based on the TII *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes* (TII, 2008c).

In addition, other recognised guidance in Environmental and Ecological Impact Assessment regard provided direction in the preparation of the scope, structure and content of the assessment:

- *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal* (CIEEM, 2016);
- *Draft Revised Guidelines on the information to be contained in Environmental Impact Statements* (EPA, 2015);
- *Design Manual for Roads and Bridges* (TII, 2013);
- *Project Management Guidelines* (TII, 2010a);
- *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (TII, 2009a); and,
- *Environmental Assessment and Construction Guidelines* (TII, 2006b).

3.2 Establishing the Zone of Influence

The key variables determining whether important ecological features will be subject to impacts through development are:

- The physical distance of the proposed development to the KERs identified by the desk study and multidisciplinary walkover surveys;
- The sensitivities of the any other ecological receptors within the receiving natural environment; and,
- The potential for in-combination effects.

The ZOI was derived, reviewed and amended as the route corridor evolved through consultation with public authorities and on the basis of identified potential ecological and biophysical changes caused by the construction and operation of the Greenway. For the purpose of this assessment, this is taken as 1 km from the works. This zone was also applied for the “likely zone of impact” used to inform the Screening for AA for the Greenway.

3.3 Consultation and Desk Study

A desktop study was carried out to collate information on the ecology of the area potentially impacted by the Greenway. Information on species listed on:

- Annex II of the Habitats Directive;
- The Wildlife Acts, 1976 to 2012;
- The Flora Protection Order, 2015;
- Annex I of the Birds Directive; and,
- The Third Schedule to the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended)

Data was sourced from the NPWS and the National Biodiversity Data Centre (NBDC). The NPWS online interactive map viewer provided information relating to designated sites of

conservation importance within the ZOI. The study area overlaps with three of the NPWS 10 km × 10 km grid squares (hectads): S61, S62 and S72. Spatial queries of these 10 km squares were undertaken using data provided by NBDC.

The desk study undertaken for the EclA included a thorough review of available ecological data including from the following sources:

- Online interactive web-mappers from the NPWS, the NBDC, Teagasc, the EPA, the Water Framework Directive (WFD), the Geological Survey of Ireland (GSI), Inland Fisheries Ireland (IFI) and the Irish Wetland Bird Survey (I-WeBS);
- Bird atlases: Sharrock (1976), Lack (1986), Gibbons *et al.* (1993) and Balmer *et al.* (2013); and, *Birds of Conservation Concern (BoCCI) in Ireland 2014–2019* (Colhoun & Cummins, 2013).

As with all desk studies, the data considered were only as good as the data supplied by the recorders and recording schemes. The recording schemes provide disclaimers in relation to the quality and quantity of the data they provide and these were considered when examining out-puts of the desk study.

3.4 Specific Ecological Methodologies

3.4.1 Multi-disciplinary Walkover Surveys

Multi-disciplinary ecological walkover surveys of the study area, which incorporated the footprint of the Greenway and a 100 m buffer, were undertaken in August 2015 and March 2016 by Ryan Wilson-Parr MCIEEM and Nick Marchant MCIEEM respectively. Both surveyors are suitably qualified and accredited ecologists with relevant academic qualifications and experience in ecological survey and assessment.

Habitats were identified in accordance with Fossitt (2000). Habitat mapping was undertaken with regard to guidance set out in Smith *et al.* (2011). Plant nomenclature for vascular plants followed *The Vegetative Key to the British Flora* (Poland & Clement, 2009), while mosses and liverworts nomenclature follows *Mosses and Liverworts of Britain and Ireland - a field guide* (Atherton *et al.*, (eds) 2010). The entire railway is largely secure with very few access points from existing public roads. Access along the railway on foot was restricted due to the extent of uniform scrub encroachment. Field surveys were conducted on short sections of the study area in August 2015 where access allowed. This established partial detail of the typical ecological conditions along the route. The remainder of the multidisciplinary survey was achieved in March 2016. The footprint of the Greenway is a 5 m wide corridor on an existing railway embankment and cutaway, which limits potential impacts on surrounding habitats. Habitats considered to be of ecological significance and, in particular, having the potential to correspond to those listed in Annex I of the Habitats Directive were identified during the walkover survey.

The walkover survey was designed to detect evidence, or likely presence of protected species. The survey included identification of suitable habitat for Badger and breeding or resting places, *e.g.* setts, natural and built features with potential to support a Bat roost and linear features likely to be of significance to foraging and commuting Bats and built and natural habitat features with potential to support other protected species likely to occur in the study area, *e.g.* Otter. Surveys were carried out in accordance best practice guidance (TII, 2008c). The following sections outline the methodologies followed when undertaking various specialist survey elements.

3.4.2 Watercourses

Larger watercourses within the study area, such as the River Barrow, are of ecological significance as they provide important habitat for a range of sensitive protected species, for example, species listed on Annex II of the Habitats Directive, *e.g.* Otter, White-clawed Crayfish and Atlantic Salmon, and species listed on Annex I of the Birds Directive, *e.g.* Kingfisher. In addition, watercourses often support a wide range of aquatic and riparian species of high conservation value. Watercourses can act as conduits for IAS and both a

pathway and receptor for pollutants to sensitive habitats/species located downstream of the Greenway.

Watercourse assessments were undertaken at locations where the Greenway traversed riparian habitat and details on the morphology, physical characteristics and potential of the river habitat to support protected flora and fauna were recorded. Information on the composition of riparian habitats, presence of aquatic macrophytes, and other relevant ecological information was also noted. These watercourses were also subject to a detailed Otter survey and Kingfisher suitability assessment.

3.5 Protected Mammal Surveys

Summary details of the methodologies utilised in the various detailed protected mammal surveys undertaken are presented below.

3.5.1 Otter (*Lutra lutra*)

The function of the Otter survey was to identify any sensitive features within the study area potentially of use to breeding, resting, foraging or commuting Otter and to establish presence or absence of Otter activity.

Otter are listed under Annex II and Annex IV of the Habitats Directive and protected under the Wildlife Acts, 1976–2012. Otter is evaluated as being Near Threatened in the most recent Red Data list for mammals (Kingston, 2012). This species is distributed throughout Ireland and can have a home range of up to 10 or 20 km (NPWS, 2013). As per the NPWS Article 17 Reporting, the range, population, habitat and future prospects for this species in Ireland have been assessed as favourable.

The Otter survey was conducted adhering to best practice guidance (TII, 2008b; 2008c) and involved a search of watercourses for physical evidence of Otter, e.g. spraints, prints, slides, trails, couches and holts. TII (2008b; 2008c) does not specify an extent or scope for an Otter survey other than an expectation that the derogation limit of 150 m is sufficiently covered. A survey of 150 m upstream and downstream of all main watercourse crossings with particular attention given to important riverine features was considered an appropriate survey corridor for Otter. The survey methodology was also cognisant of the recommendations in the Otter Threat Response Plan 2009–2011 (NPWS, 2009), which recognises the importance of the riparian buffer (10 m on both banks) for Otter and these areas were included in the survey corridor.

3.5.2 Badger (*Meles meles*)

The Badger survey was conducted in order to determine the presence or absence of Badger within the study area. Badgers occur throughout the island of Ireland and are afforded protection under the Wildlife Acts, 1976–2012. The proposed development may directly or indirectly impact on Badgers. Construction may result in death or injury to Badgers within setts, as well as the destruction of the setts themselves, loss of foraging habitat or dissection of their foraging areas. Construction works close to breeding setts can cause serious disturbance to Badgers and mortality of cubs.

The Badger survey was conducted adhering to best practice guidance (TII, 2006b; 2008c) and involved a systematic search of all fence lines, woodland and scrub habitats for physical evidence of Badger, e.g. setts, latrines, badger paths. The optimal period for Badger surveys is during seasonal peaks in territorial activity and when vegetation cover is at a minimum (February to April and less pronounced peak in October). Badger setts were classified as main, annex, subsidiary and outlier, as per the convention set out in TII (2006b) and levels of current usage were noted.

3.5.3 Bats

All nine resident breeding Bat species in Ireland are protected, wherever they occur. Their roost sites (whether in use or not) are strictly protected under both European and Irish legislation. Under the Wildlife Acts, 1976–2012, all Bat species occurring in Ireland are listed

in Schedule V to the Acts as a protected species. This legislation makes it illegal to kill or injure Bats in the wild and makes it an offence to wilfully interfere with, or to destroy, their breeding and resting places.

The Habitats Directive offers legal protection to all ten Bat species currently known to occur in Ireland and lists them under Annex IV of the Directive as species of Community interest in need of strict protection. Under the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended), it is an offence to deliberately capture or kill Bats in the wild, to deliberately disturb them particularly during the breeding, rearing, hibernation and migration seasons, or to cause the deterioration or destruction of their breeding and resting sites. Derogation licences can be issued to permit roost loss or disturbance and other potential offences to be committed providing the conservation status is unaffected and other tests within the legislation are met. Furthermore as a signatory to the European Bats Agreement (Agreement on the Conservation of Bats in Europe) 1993, Ireland is required to protect Bat habitats, requiring the identification and protection from damage or disturbance, of important feeding areas. All Irish Bat species are listed in Appendix II of the Bern Convention (1979), as species requiring strict protection.

Preliminary Bat Roost Suitability Assessment

The function of the Bat suitability assessment was to identify built or natural features within close proximity to the construction envelope (area in which construction or ground works will take place, *i.e.* direct/indirect physical or noise disturbance) of the Greenway and that could provide moderate to high potential to support a Bat roost.

The Bat suitability assessment was conducted adhering to best practice guidance (TII, 2006a; Collins (ed), 2016) and involved a visual assessment and categorisation of highly suitable features on buildings and trees capable of supporting roosting Bats. Suitable entry and exit points around eaves, soffits, flashing, under tiles were examined on buildings for physical evidence of use by Bats, *e.g.* Bat droppings and indicative staining and scratching at holes or cracks. External visual assessment was undertaken using binoculars and torches. Trees were assessed using the recognised criteria outlined in Collins (ed) (2016). The locations of trees with any natural holes, cracks/splints in major limbs, loose bark, hollows/cavities or dense epicormic growth that could provide moderate to high potential were recorded with high definition Geographical Positioning System (GPS). Linear landscape features *e.g.* mature treelines and hedgerows with potential to provide important foraging and commuting habitat for Bats, were also recorded and geospatially referenced.

Dusk/ Emergence and Dawn/ Re-entry Surveys

Following the preliminary Bat Roost Suitability Assessment, features identified as having the potential to support roosting bats were surveyed according to best practice guidelines detailed in Collins (ed) (2016). Dusk emergence and dawn re-entry surveys were undertaken at 19 structures in July 2016. Two surveyors were used to achieve maximum coverage of each structure. Surveys were conducted using Anabat Walkabout Bat Detectors or Song Meter EM3+ bat detectors from 15 minutes before sunset for two hours and from 90 minutes before sunrise until sunrise (or ten minutes after the last bat recording). For the duration of the surveys, surveyors watched potential roost features to determine the presence or absence of Bats and the need for further survey and/or mitigation. Following each survey, recordings (detections) were processed using Kaleidoscope Pro analysis software to extract information including sound recordings, sonograms, GPS coordinates, time, date and species identification confidence values. All validated detections were digitally geospatially referenced into ArcGIS Mapping Platform.

3.5.4 Additional Protected Species

During the multi-disciplinary ecological walkover surveys the potential for the study area to support additional protected mammals listed in the Wildlife Acts, 1976–2012, such as Irish Hare, Pine Marten, Red Squirrel, Pygmy Shrew, Irish Stoat, Hedgehog *etc.* was assessed and any physical evidence of presence recorded. Further detail on these species is provided

in the Results section where relevant. It is noted that the ZOI is outwith the known range of Marsh Fritillary (*Euphydryas aurinia*) and White-clawed Crayfish (*Austropotamobius pallipes*).

3.6 Fisheries

Detailed fish stock surveys were not conducted given that significant impacts to fisheries are not anticipated. This followed best practice guidance (TII, 2009a) which states that “*It will only be appropriate to undertake detailed surveys where significant impacts are anticipated on potentially valuable assemblages of fish, or important populations of a particular species.*” The main watercourses were, however, assessed with regard to fisheries potential during the detailed watercourse assessment conducted in March 2016.

A review of the EPA Q-value status and WFD surface water status for the watercourses was also undertaken. The EPA is the competent authority responsible for monitoring, protecting and improving the environment as a valuable asset within the Republic of Ireland.

3.7 Ecological Evaluation and Impact Assessment Methodology

Evaluation of Ecological Resources

The criteria used for assessment of the value of the ecological resources follows those set out in Section 3.3 of TII (2009a). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular site is of importance on the following scale:

- International;
- National;
- County;
- Local Importance (Higher Value); and,
- Local Importance (Lower Value).

This guidance clearly sets out the criteria by which each geographic level of importance can be assigned. For example, Locally Important (Lower Value) receptors contain habitats and species that are widespread and of low ecological significance and only of any importance in the local area. Conversely, Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected fauna.

All habitats and species within the ZOI and study area were assigned a level of significance on the above basis and KERs were established and classified on this basis.

Assessment of Impact Type and Magnitude

Reference is made to the following parameters wherever appropriate when characterising impacts (Section 5):

- Magnitude – the quantum of impact, e.g. number of individuals affected;
- Extent – the area over which the impact occurs (quantitative);
- Duration – the time during which the impact continues, until recovery or re-instatement;
- Reversibility – whether an impact is ecologically reversible;
- Timing of impacts in relation to important seasonal and/or life-cycle constraints; and,
- Frequency – how often an impact will be repeated.

The assessment of impact takes account of construction and operational phases; direct, indirect and synergistic impacts; and, those that are temporary, reversible and irreversible. The criteria for assessment of impact magnitude, type and significance are given in Table 2.1 and 2.2. The following terms are defined when quantifying duration (EPA, 2015):

- Temporary – up to 1 year;

- Short-term – 1 to 7 years;
- Medium term – 7 to 15 years;
- Long term – 15 to 60 years; and,
- Permanent – over 60 years.

Table 2.1 Criteria for assessing impact significance based on (EPA, 2015)

Impact Magnitude	Definition
No change	No discernible change in the ecology of the affected feature
Imperceptible Impact	An impact capable of measurement but without noticeable consequences
Slight Impact	An impact that causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Impact	An impact that alters the character of the environment that is consistent with existing and emerging trends
Significant Impact	An impact that, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment
Profound Impact	An impact that obliterates sensitive characteristics

Table 2.2 Criteria for assessing impact quality based on (EPA, 2015)

Impact Type	Criteria
Positive	A change that improves the quality of the environment, e.g. increasing species diversity, improving reproductive capacity of an ecosystem or removing nuisances
Neutral	A change that does not affect the quality of the environment
Negative	A change that reduces the quality of the environment, e.g. lessening species diversity or reducing the reproductive capacity of an ecosystem

Once the potential impacts are characterised, the significance of any such impacts on the identified KERs will be determined. An impact is considered to be ecologically significant if it results in a change in the conservation status of a KER.

Process of Assessing Significance

The significance of any identified impacts is determined whereby impacts are assigned significance empirically on the basis of an analysis of the factors which characterise them, irrespective of the value of the receptor. Significance is determined by effects on conservation status or integrity, regardless of geographical level at which these would be relevant.

If impacts are not found to be significant at the highest geographical level at which the resource has been valued, they may be significant at a lower level and this is determined sequentially. Similarly, impacts that do not affect the integrity of a site may, nevertheless, affect the conservation status of a valuable constituent habitat or species, at a lower geographic scale. An equivalent approach has been applied to mitigation measures prescribed, which may have a significant beneficial impact, but at a higher or lower geographic scale than the receptor to which they have been applied.

3.7.1 Mitigation

The Greenway largely utilises existing built surfaces and inherently avoids many potential impacts on sensitive habitats and species. The potential impacts of the Greenway are considered and assessed to ensure that all impacts on KERs are adequately addressed and no significant residual impacts remain following mitigation. Where significant impacts on KERs are predicted, mitigation has been prescribed to address such impacts. In addition, mitigation has been employed to ensure legislative and policy compliance and in some cases to result in

an enhancement of the biodiversity value of an area that is not among the identified KERs. Proposed mitigation measures are specifically set out and are realistic in terms of cost and practicality.

3.7.2 Survey Limitations

Standard survey methods were followed however, any biases or limitations associated with these methods could potentially affect the results collected. Furthermore, while every effort was made to provide a full assessment and comprehensive description of the site, it is unlikely that one survey can achieve full characterisation due to temporal variation.

The Fossitt habitat survey was conducted in March and would be considered a sub-optimal time of year for habitat surveys. The optimum time of year for broad habitat surveys is considered to be between May and September. It is recognised that whenever a survey is carried out within the defined season, it is a compromise, suitable for the vast majority of species, but possibly too early or too late for some species.

4. IMPORTANT ECOLOGICAL FEATURES

This section of the EclA presents the results of the Desk Study and provides a detailed description of the ecology of the existing environment within the Waterford to New Ross Greenway study area.

4.1 Designated Sites

The potential for the Greenway to impact on European sites within the ZOI was considered as part of this assessment. A review of all designated sites within a 1 km radius of the Waterford to New Ross railway line was undertaken to identify habitats and species of conservation importance within the wider area and to ensure that any designated features linked to these sites and that have potential to occur within the study area were a material consideration during the multi-disciplinary surveys.

Two Natura 2000 sites occur within 1 km of the proposed Greenway, namely the River Barrow and River Nore SAC and the Lower River Suir SAC. The proposed route passes through the River Barrow and River Nore SAC whilst the Lower River Suir SAC is located less than 10 m from the southern terminal point of the Greenway (Figure 2). Two pNHAs occur within 1 km of the proposed route, namely the Barrow River pNHA and the Oaklands Wood pNHA.

Table 4.1 Designated Sites within 1 km of the Greenway. The numbers in square brackets are the Natura 2000 site identifier codes.

Designated Site	Distance from the Greenway
Special Areas of Conservation (SAC)	
River Barrow and River Nore SAC [002162]	Immediately adjacent
Lower River Suir SAC [002137]	Less than 10 m
Proposed Natural Heritage Areas (pNHA)	
Barrow River Estuary pNHA	Immediately adjacent
Oaklands Wood pNHA	800 m

River Barrow and River Nore SAC

The SAC includes the River Barrow and River Nore from their sources in the Slieve Bloom Mountains to the tidal zone of the River Barrow. The site includes terrestrial, coastal and freshwater Annex I habitats. Good examples of alluvial woodlands, petrifying springs and old oak woodlands are found along both rivers. Floating river vegetation is well represented in the Barrow and in the many tributaries of the site. Dry heath at the site occurs in pockets along the steep valley sides of the rivers especially in the Barrow Valley and along the Barrow tributaries where they occur in the foothills of the Blackstairs Mountains. Salt meadows occur at the southern section of the site in old meadows where the embankment has been breached, along the tidal stretches of in-flowing rivers below Stokestown House, in a narrow band on the channel side of Common Reed (*Phragmites australis*) beds and in narrow fragmented strips along the open shoreline. Extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. Good quality intertidal sand and mudflats have developed on a linear shelf on the western side of Waterford Harbour, extending for over 6 km from north to south between Passage East and Creadaun Head, and are over 1 km wide in places. The site is very important for the presence of a number of Annex II animal species, including Freshwater Pearl Mussel (both *Margaritifera margaritifera* and *M. m. durrovensis*), White-clawed Crayfish, Salmon, Twaite Shad, three Lamprey species (Sea Lamprey, Brook Lamprey and River Lamprey), the Desmoulin's Whorl Snail and Otter. This is the only site in the world for the hard-water form of the Freshwater Pearl Mussel, *M. m. durrovensis*, and one of only a handful of spawning grounds in the country for Twaite Shad. The site is of ornithological importance for a number of Annex I bird species, including Greenland White-fronted Goose, Whooper Swan, Bewick's Swan, Bar-tailed Godwit, Peregrine Falcon and Kingfisher. Nationally important numbers of Golden Plover and Bar-tailed Godwit are found during the winter.

Lower River Suir SAC

Lower River Suir SAC consists of the freshwater stretches of the River Suir from immediately south of Thurles and its tidal area as far as the confluence with the Barrow/Nore immediately east of Cheekpoint, Co. Waterford, as well as many of its tributaries. Alluvial woodland is found on the islands just below Carrick-on-Suir and at Fiddown Island. Two stands of Yew (*Taxus baccata*) woods, a rare habitat in Ireland and the EU, occur within the site. These are on limestone ridges at Shanbally and Cahir Park. Floating river vegetation is evident in the freshwater stretches of the River Suir and along many of its tributaries. The best examples of old oak woodlands are seen in Portlaw Wood, which lies on both sides of the Clodiagh River. Salt meadows occur below Waterford City in old meadows where the embankment is absent, or has been breached, and along the tidal stretches of some of the inflowing rivers below Little Island. The Atlantic and Mediterranean sub-types are generally intermixed. There are very narrow, non-continuous bands of this habitat along both banks. The site is of particular conservation interest for the presence of a number of Annex II animal species, including Freshwater Pearl Mussel, White-clawed Crayfish, Salmon, Twaite Shad, three species of Lamprey (Sea Lamprey, Brook Lamprey and River Lamprey) and Otter. This is one of only three known spawning grounds in the country for Twaite Shad.

The SACs are designated for the following listed Qualifying Interests (QIs):

Table 3.2 Qualifying Interests (QIs) of the SACs within 1 km of the Greenway.

Designated Site	Site Code	Qualifying Interests (QIs)
River Barrow and River Nore SAC	002162	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] <i>Salicornia</i> and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (Cratoneurion) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]

Designated Site	Site Code	Qualifying Interests (QIs)
Lower River Suir SAC	002137	<p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritim</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] <i>Taxus baccata</i> woods of the British Isles [91J0] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twait Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]</p>

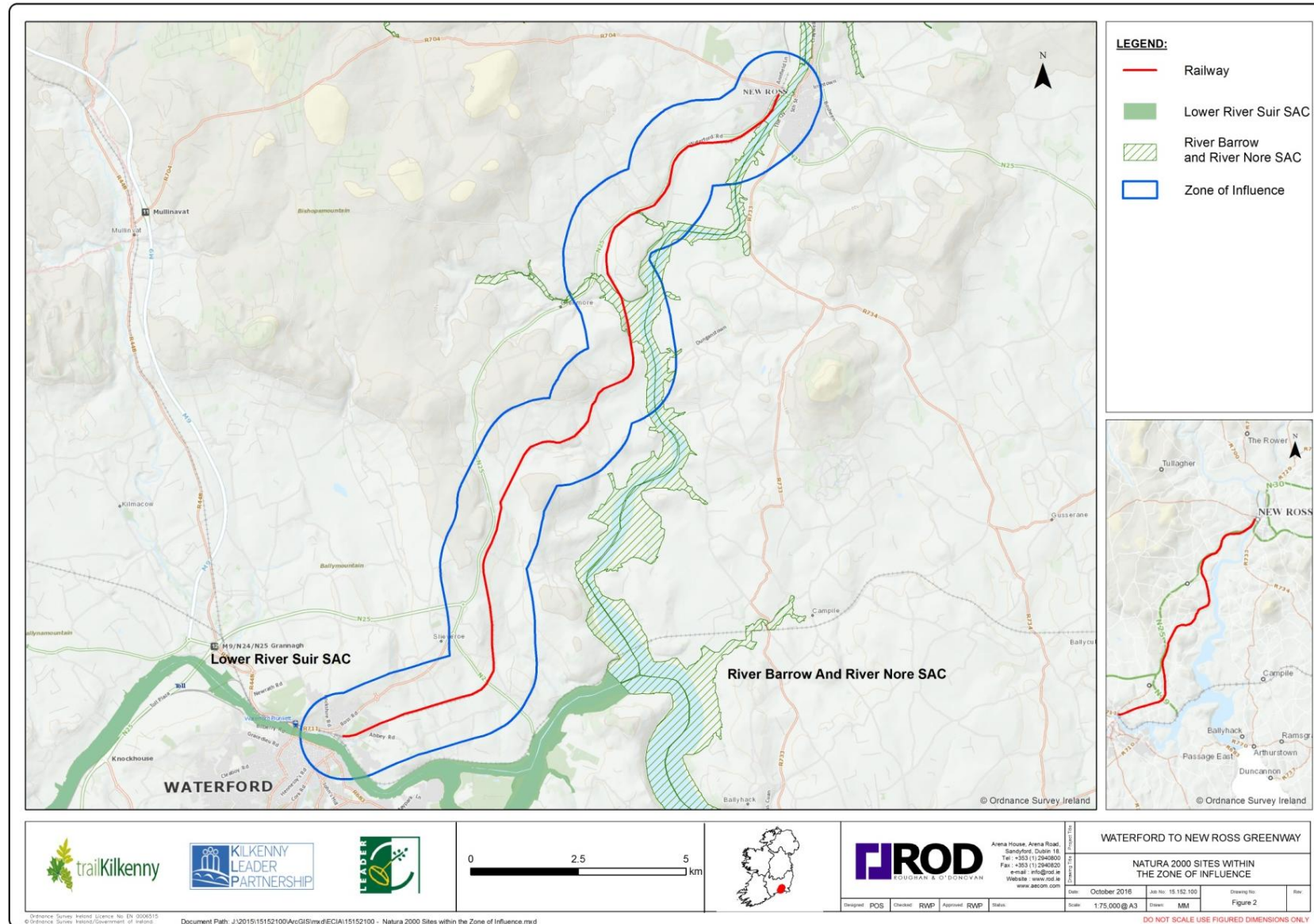


Figure 2. The ZOI of the Greenway and Natura 2000 sites.

4.2 Habitats

A description of the existing environment is provided in the following Sections. This provides information on the habitats and fauna encountered during field surveys. The general landscape is dominated by agricultural grassland pasture associated with hedgerows and treelines. Habitats within the study area were classified according to Fossitt (2000), the details of which are provided below:

Table 4.1 Habitats recorded in the study area. The habitat classifications and codes correspond to Fossitt (2000).

Habitat Name	Fossitt Code
Amenity Grassland	GA2
Buildings and Artificial Surfaces	BL3
Conifer Plantation	WD4
Depositing/Lowland River	FW2
Drainage Ditch	FW4
Dry Meadows and Grassy Verges	GS2
Earth banks	BL2
Hedgerow	WL1
Improved Agricultural Grassland	GA1
Marsh	GM1
Mixed Broadleaved Woodland	WD1
Mixed Broadleaved/conifer Woodland	WD2
Recolonising Bare Ground	ED3
Reed and Large Sedge Swamp	FS1
Scrub	WS1
Spoil and Bare Ground	ED2
Stone Walls and Other Stonework	BL1
Treeline	WL2
Wet Grassland	GS4
Wet Willow-Alder-Ash Woodland	WN6

4.2.1 Fossitt Habitat Descriptions

Amenity Grassland (GA2)

Amenity Grassland was most commonly associated with buildings such as domestic dwellings and was recorded in association with urban centres in the study area. This habitat was actively managed and was characterised by a low sward height and low species diversity. Species recorded from amenity grassland areas included Perennial Ryegrass (*Lolium perenne*), Meadow grasses (*Poa* spp.), Daisy (*Bellis perennis*), Dandelion (*Taraxacum* agg.), Rib-wort Plantain (*Plantago lanceolata*) and White Clover (*Trifolium repens*).

Buildings and Artificial Surfaces (BL3)

Throughout the study area the most common forms of this habitat type included domestic dwellings, abandoned buildings, agricultural sheds and yards, concrete bridges and tarmac roadways. Generally built habitats are not considered of high ecological significance and do not offer high quality floral or faunal habitat.

Conifer Plantation (WD4)

Commercial conifer plantation occurs occasionally in the study area. This habitat was dominated by Sitka Spruce (*Picea sitchensis*) with limited ground flora. In several areas, this habitat type was fringed by a narrow strip of Alder (*Alnus glutinosa*) and Oak (*Quercus patrea* and *Q. robur*). Forestry encountered during the site visit varied from recently planted areas to

mature plantations. Areas of conifer plantation were not subject to detailed woodland assessment.

Depositing/Lowland River (FW2)

The River Barrow and River Suir were classified as depositing/lowland rivers. These watercourses were identified as sensitive habitats and were subject to detailed surveys.

Drainage Ditch (FL1)

Ditches are an abundant feature along the base of railway embankments and link the edge of the study area to land parcel boundaries and adjacent areas of wet grassland, scrub and woodland. They are often associated with fields and field boundaries and lead into natural watercourses, which also form most of the main continuous corridors within the study area. The most diverse drainage channel flora are found on sites with extensive networks of drainage channels, a wide range of drainage channel types and a range of seral stages, representing habitats from open water to drainage channels choked with well established emergent vegetation. At the base of embankments with well established scrub or treelines, much of this emergent community is lacking.

Dry Meadows & Grassy Verges (GS2)

This habitat occurs in more exposed and open areas of the railway in the form of a later successional stage of colonising bare ground grading from and within a mosaic of scrub (WS1). This habitat also occurs in areas that are occasionally mown and where there is limited management or low intensity grazing regime. The development of grasslands with a high proportion of tall, coarse and tussocky grasses such as False Oat-grass (*Arrhenatherum elatius*) and Cock's-foot (*Dactylis glomerata*) is typical. Other grasses may include Yorkshire-fog (*Holcus lanatus*), Smooth Meadow-grass (*Poa pratensis*), Barren Brome (*Anisantha sterilis*) and Meadow Foxtail (*Alopecurus pratensis*). A broadleaved herb component is characterised by a range of species that either grow tall, such as Cow Parsley (*Anthriscus sylvestris*), Hogweed (*Heracleum sphondylium*), Goat's-beard (*Tragopogon pratensis*), Nettle (*Urtica dioica*) and Common Knapweed (*Centaurea nigra*), or climb the stems of others, as in the case of Bush Vetch (*Vicia sepium*) and Meadow Vetchling (*Lathyrus pratensis*). Grassy verges may support other smaller broadleaved herbs such as Pignut (*Conopodium majus*), Creeping Cinquefoil (*Potentilla reptans*) and Clovers (*Trifolium* spp.).

Earth Bank (BL2)

Earth banks are a common type of field boundary in many parts of Ireland. Constructed from local materials such as peat, earth, gravel or stone, these narrow linear ridges are often bordered by drainage ditches. Most are completely vegetated when intact and feature elements of a range of habitats, including grassland, heath, hedgerow and scrub. Earth banks usually support abundant grasses and a wide range of broadleaved herbs such as Foxglove (*Digitalis purpurea*), violets (*Viola* spp.), Yarrow (*Achillea millefolium*), Common Knapweed (*Centaurea nigra*), Wild Strawberry (*Fragaria vesca*) and Primrose (*Primula vulgaris*). Dwarf shrubs (*Calluna vulgaris*, *Vaccinium myrtillus*, *Erica* spp.), shrubs, ferns and Ivy (*Hedera helix*) may also be common. This habitat forms mosaics with Scrub (WS1)

Hedgerows (WL1)

Linear strips of shrubs, often with occasional trees, which typically form field or property boundaries. Within the Greenway route, this classification grades with extensive scrub (WS1) along embankments and in large sections forms contiguous and seamless succession throughout the corridor. Hedgerows are also a dominant natural feature within the study area within improved agricultural grassland.

Improved Agricultural Grassland (GA1)

This category is used for intensively managed or highly modified agricultural grassland that has been reseeded and/or regularly fertilized and is now heavily grazed and/or used for silage making. It includes regularly-reseeded monoculture grasslands and rye-grass leys that are planted as part of an arable rotation. These differ significantly from areas of permanent grassland. Improved agricultural grassland is typically species-poor. As agriculture is the

predominant land use of the area, the majority of the land surrounding the study area is classified as Improved Agricultural Grassland.

Marsh (GM1)

Marsh is found on level ground near river banks, lakeshores, and in other places where mineral or shallow peaty soils are waterlogged, and where the water table is close to ground level for most of the year. Unlike swamps, standing water is not a characteristic feature except, perhaps, during very wet periods or in winter months. Marsh is comparatively species-rich and supports a high proportion of wetland species in addition to the typical dominants: rushes (*Juncus* spp.), sedges (*Carex* spp.) and Meadowsweet (*Filipendula ulmaria*). Grasses such as Creeping Bent (*Agrostis stolonifera*), Tall Fescue (*Festuca arundinacea*) and Purple Moor-grass (*Molinia caerulea*) may be present but not abundant. To be considered as Marsh, the proportion of sedges and grasses should not exceed 50%. Marsh occurs infrequently in the study area, associated with field margins.

(Mixed) Broadleaved Woodland (WD1)

This general category includes woodland areas with 75–100% cover of broadleaved trees and 0–25% cover of conifers. It should be used in situations where woodland stands cannot be classified as semi-natural on the basis of the criteria outlined above. Trees may include native and non-native species. Plantations of broadleaved trees are included if the canopy height is greater than 5 m, or 4 m in the case of wetland areas. This classification borders the trackway intermittently grading into WL1 and WS1 at the railway corridor boundary and embankments.

(Mixed) Broadleaved/Conifer Woodland (WD2)

This category includes woodland areas with mixed stands of broadleaved trees and conifers, where both types have a minimum cover of 25% and a maximum cover of 75%. Trees may be either native or non-native species. Mixed broadleaved/conifer plantations are included if the canopy height is greater than 5 m, or 4 m in the case of wetland areas. This classification borders the trackway intermittently grading into WL1 and WS1 at the railway corridor boundary and embankments.

Recolonising Bare Ground (ED3)

This category is used for any areas where bare or disturbed ground, derelict sites or artificial surfaces of tarmac, concrete or hard core have been invaded by herbaceous plants. This classification is recorded along the edge of the track at Carrickcloney and more exposed areas of the route.

Reed and Large Sedge Swamp (FS1)

This category includes species-poor stands of herbaceous vegetation that are dominated by reeds *Phragmites* and other large grasses *Glyceria* or large, tussock-forming sedges. Most reed and large sedge swamps are overwhelmingly dominated by one or a small number of species, as in the case of reedbeds. Stands of vegetation can range from very dense to open. The broadleaved herb component is minor. Vegetation typically lacks stratification as there is little or no development of an understory. This habitat is found in intermittent narrow strips along the verge of the embankments in very few sections. Only at the location of the crossing of the Glenmore River does this habitat form a large contiguous area.

Rich Fen and Flush (PF1)

Rich fens and flushes are fed by groundwater or flowing surface waters that are at least mildly base-rich or calcareous, and are usually found over areas of limestone bedrock. The substratum is waterlogged peat (except in the case of some flushes) and this usually has a high mineral content. Vegetation is typically dominated by Black Bog-rush (*Schoenus nigricans*) and/or small to medium sedges such as *Carex viridula*, *C. nigra*, *C. dioica* and *C. panicea*. Other prominent components of the vegetation include rushes, particularly Blunt-flowered Rush (*Juncus subnodulosus*), Purple Moor-grass (*Molinia caerulea*), Marsh Pennywort (*Hydrocotyle vulgaris*), Lesser Spearwort (*Ranunculus flammula*), Water Mint (*Mentha aquatica*), Common Marsh-bedstraw (*Galium palustre*), Grass-of-Parnassus (*Parnassia palustris*), Common Butterwort (*Pinguicula vulgaris*) and Devil's-bit Scabious

(*Succisa pratensis*). Rich fen and flush can be important for orchids such as *Epipactis palustris* and *Dactylorhiza* spp.

Scrub (WS1)

This broad category includes areas that are dominated by at least 50% cover of shrubs, stunted trees or brambles. The canopy height is generally less than 5 m, or 4 m in the case of wetland areas. Scrub frequently develops as a precursor to woodland and is often found in inaccessible locations, or on abandoned or marginal farmland. In the absence of grazing and mowing, scrub can expand to replace grassland or heath vegetation. Trees are included as components of scrub if their growth is stunted as a result of exposure, poor soils or waterlogging. If tall trees are present, these should have a scattered distribution and should not form a distinct canopy. This classification occurs along the entire study area on the tracks and on the embankments. The scrub component in these areas is predominantly Bramble (*Rubus fruticosus* agg.), Nettle (*Urtica dioica*) and Gorse (*Ulex*).

Spoil and Bare Ground (ED2)

This category includes spoil and rubble and other areas of bare ground that are transient or persist for longer due to ongoing disturbance or maintenance. Spoil is generally associated with excavation or construction of roads/buildings or with drainage/dredging activities. Once the disturbance ends, spoil is readily colonised by plants. Unconsolidated material associated with ongoing mining or quarrying activity are excluded. Bare ground can include land that has recently been cleared for agriculture (but not yet tilled) or construction and other areas with unconsolidated surfaces that are largely unvegetated as they are heavily trampled or regularly driven over or maintained. Examples of the latter can include unpaved forestry roads, paths and car parks and derelict land in urban areas. If disturbance or maintenance ceased, these areas would readily be invaded by plants. Vegetation cover should not exceed 50%.

Stone Walls and Other Stonework (BL1)

This category includes stone walls and most other built stone structures in both rural and urban settings, except intact buildings and coastal constructions. Modern/intact buildings are excluded, as are any structures made of brick, cement blocks or mass concrete. Plant species commonly associated with BL1 include mosses, lichens and ferns, Ivy (*Hedera helix*) and other creepers, grasses, stonecrops (*Sedum* spp.), Herb-robert (*Geranium robertianum*) and Navelwort (*Umbilicus rupestris*).

Treelines (WL2)

A treeline is a narrow row or single line of trees that is greater than 5 m in height and typically occurs along field or property boundaries. This category includes tree-lined roads or avenues, narrow shelter belts with no more than a single line of trees, and overgrown hedgerows that are dominated by trees. Most treelines are planted and trees are often regularly spaced. This habitat occurs in Carrickcloney, close to River Barrow and River Nore SAC boundary, along the edge of the track.

Wet Grassland (GS4)

Wet Grassland areas supported species such as Soft Rush (*Juncus effusus*), Marsh Foxtail (*Alopecurus geniculatus*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Creeping Bent (*Agrostis stolonifera*), Silverweed (*Potentilla anserina*), Common Bent (*Agrostis capillaris*), Yorkshire Fog (*Holcus lanatus*), Devil's-bit Scabious (*Succisa pratensis*), Water Mint (*Mentha aquatica*), Rib-wort Plantain (*Plantago lanceolata*), Meadow Buttercup (*Ranunculus acris*), Creeping Buttercup (*Ranunculus repens*) and Lesser Spearwort (*Ranunculus flammula*).

Wet Willow-Alder-Ash Woodland (WN6)

This broad category includes woodlands of permanently waterlogged sites that are dominated by willows (*Salix* spp.), Alder (*Alnus glutinosa*) or Ash (*Fraxinus excelsior*), or by various combinations of some or all of these trees. It includes woodlands of lakeshores, stagnant waters and fens, known as carr, in addition to woodlands of spring-fed or flushed sites.

4.3 Annex 1 Habitats

Atlantic Salt Meadows [1330]/Mediterranean Salt Meadows [1410]

Atlantic and Mediterranean Salt Meadows as well as intermediate salt meadows are found in the lower reaches of the River Barrow and River Suir. They are found where the embankment has been breached and in a non-continuous band along the edge of the estuaries. The closest examples of these habitats to the proposed Greenway are approximately 80 m south of the southern end of the route and on the eastern bank of the River Barrow where the Greenway crosses the Glenmore River.

Mudflats and sandflats not covered by seawater at low tide [1140]

Intertidal sand and mudflats are a qualifying interest of both SACs within the ZOI. They have developed on a linear shelf on the western side of Waterford Harbour, extending over 6 km from north to south between Passage East and Creadaun Head, and are over 1 km wide in places. The sediments are mostly firm sands, though grade into muddy sands towards the upper shore. The closest example of this habitat to the proposed Greenway is approximately 100 m east of the railway bridge that crosses the Glenmore River.

Estuaries [1130]

Estuary is considered to be the Transitional Water Body area as defined by the EPA under the WFD. In the case of the River Barrow and River Nore SAC, it includes the tidal waters from Passage East at the mouth of Waterford Harbour up to Inistioge and Saint Mullins. The closest example of this habitat to the proposed Greenway is approximately 100 m east of the railway bridge that crosses the Glenmore River.

4.4 Flora Overview

The three 10km grid squares that the Greenway crosses contain three species covered by the Flora Protection Order 1999 which are of nature conservation concern.

4.4.1 Vascular Plants

Meadow Saffron/Autumn Crocus (Colchicum autumnale)

Meadow Saffron (*C. autumnale*), also known as Autumn Crocus, is listed on the Irish Red Data Book as Critically Endangered (Curtis & McGough, 2005) and is protected under the Flora (Protection) Order, 2015. The plant is a perennial of damp meadows. It flowers from August to October and each plant has a single purple flower with six orange stamens. It has been recorded in hectad S72.

Meadow Barley (Hordeum secalinum)

Meadow Barley (*H. secalinum*) is listed on the Irish Red Data Book as Vulnerable (Curtis & McGough, 2005) and is protected under the Flora (Protection) Order, 2015. The plant is a perennial found in old meadows, pastures, roadsides and river valley floodplains. It shows a strong preference for sticky clay soils. In coastal areas it is frequently abundant in grazing marsh grasslands and on earthen sea walls. It has been recorded in hectads S61, S62 and S72.

Betony (Stachys officinalis)

Betony (*S. officinalis*) is listed on the Irish Red Data Book as Vulnerable (Curtis & McGough, 2005) and is protected under the Flora (Protection) Order, 2015. The plant is a perennial of grassland, woodland edges and heaths. It flowers from June to October. It has been recorded in hectads S61 and S72.

Borrer's Saltmarsh-grass (Puccinellia fasciculata)

Borrer's Saltmarsh-grass (*P. Fasciculata*) is listed on the Irish Red Data Book as 'Vulnerable' (Curtis & McGough, 2005) and is protected under the Flora (Protection) Order, 2015. It is a perennial grass found in the drier areas of saltmarshes and beside dykes and sea walls. It has been recorded in hectad S61.

Opposite-leaved Pondweed (Groenlandia densa)

Opposite-leaved Pondweed (*G. densa*) is listed on the Irish Red Data Book as 'Endangered' (Curtis & McGough, 2005) and is protected under the Flora (Protection) Order, 2015. It is found in base-rich streams, canals and ponds and also in lakes and rivers. It has been recorded in hectad S61.

4.5 Protected Fauna

The following sections give an overview of the desk study sources consulted and results obtained during the detailed assessment.

Online Sources of Data

NPWS provided details on rare and protected species records from the hectads which overlap with the study area. The NBDC was also accessed prior to conducting the multi-disciplinary walkover surveys and was rechecked for updates on the 24th of October 2016. Tables 3.2 to 3.4, inclusive, list the rare and protected species recorded within the hectads pertaining to the current study area.

Table 4.2 Annexed records for Rare and Protected Species

Common Name	Scientific Name	Status	Grid Square
Otter	<i>Lutra lutra</i>	Annex II,IV HD; WA 1976/2012	S61, S62, S72
Daubenton's Bat	<i>Myotis daubentonii</i>	Annex IV HD; WA 1976/2012	S61, S62, S72
Natterer's Bat	<i>Myotis nattereri</i>	Annex IV HD; WA 1976/2012	S61, S62,
Leisler's Bat	<i>Nyctalus leisleri</i>	Annex IV HD; WA 1976/2012	S61, S62
Common Pipistrelle	<i>Pipistrellus pipistrellus sensu lato</i>	Annex IV HD; WA 1976/2012	S61, S62
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	Annex IV HD; WA 1976/2012	S61, S62
Brown Long-eared Bat	<i>Plecotus auritus</i>	Annex IV HD; WA 1976/2012	S61, S62
Common Porpoise	<i>Phocoena phocoena</i>	Annex II,IV HD; WA 1976/2012	S72
Grey Seal	<i>Halichoerus grypus</i>	Annex II,IV HD; WA 1976/2012	S72
Peregrine Falcon	<i>Falco peregrinus</i>	Annex I BD; WA 1976/2012	S61
Common Frog	<i>Rana temporaria</i>	Annex V HD; WA 1976/2012	S61

*Key: Annex II, IV, V HB (Relevant Annexes of Habitats Directive); Annex I BD (Birds Directive) WA (Wildlife Act).

Table 4.3 Other Species Protected under the Wildlife Acts, 1976 to 2012

Common Name	Scientific Name	Grid Square
Irish Stoat	<i>Mustela ermine</i> subsp. <i>hibernica</i>	S62
Eurasian Badger	<i>Meles meles</i>	S61, S62, S72
Red Squirrel	<i>Sciurus vulgaris</i>	S61, S62
Smooth Newt	<i>Lissotriton vulgaris</i>	S61
Barn Owl	<i>Tyto alba</i>	S62
Common Kestrel	<i>Falco tinnunculus</i>	S61, S72
Viparious Lizard	<i>Zootoca vivipara</i>	S61, S72

4.6 Invasive Alien Species (IAS)

Publicly available NBDC invasive species data was accessed to identify invasive species in the three hectads in which the Greenway is located. The 12 species listed below are subject to restrictions (Third Schedule) under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011.

Table 4.4 Invasive Alien Species (IAS) subject to statutory restrictions recorded in the study area.

Common Name	Scientific Name	Grid Square
Japanese Knotweed	<i>Fallopia japonica</i>	S61, S62, S72
Giant Knotweed	<i>Fallopia sachalinensis</i>	S61
Himalayan Balsam	<i>Impatiens glandulifera</i>	S61, S62, S72
Giant Rhubarb	<i>Gunnera manicata</i>	S61
Common Cordgrass	<i>Spartina anglica</i>	S61, S62
Rhododendron	<i>Rhododendron ponticum</i>	S61, S62, S72
Water Fern	<i>Azolla filiculoides</i>	S61
Brown Rat	<i>Rattus norvegicus</i>	S72 S61
Chinese Mitten Crab	<i>Eriocheir sinensis</i>	S61
Dace	<i>Leuciscus leuciscus</i>	S72
Grey Squirrel	<i>Sciurus carolinensis</i>	S72 S61
Mink	<i>Neovison vison</i>	S62, S72

5. FIELD SURVEY RESULTS

This section of the EclA presents the results of the Field Surveys and provides a detailed description of the flora and fauna obtained during the multi-disciplinary walkover surveys. The results of the fauna and invasive species surveys are provided in Appendix C.

5.1 General Description and Context

The footprint of the disused railway consists of the original corridor with track and sleepers in place. There are a number of at-grade level crossings along the scheme. The original boundaries are generally well defined throughout by hedgerows, treelines, fence-lines, cutaways and embankments. The railway itself is dominated by scrub and grassland. Detailed habitat maps are provided in Appendix B.

5.2 Protected Mammal Survey

5.2.1 Otter

During dedicated surveys for this species, Otter activity or visual accounts were recorded along the route. Evidence of Otter activity included spraints and prints. No potential holts or couches were identified within the study area. It is, however, considered that the species is likely to utilise all watercourses within proximity to Greenway. This species is likely to be impacted upon and has been included among the KERs of the Greenway.

5.2.2 Badger

Badger activity was observed throughout the study area. Evidence recorded included active setts, latrines, prints, trails and snuffle holes. Seven Badger setts were recorded within the study area during the multi-disciplinary walkover, two main setts, one annex sett and four outlier setts. The main and annex setts are confirmed active and occur within the 50 m derogation limit of the construction works for the Greenway. Further monitoring of the main and annex setts confirmed badger in the immediate area. The four outlier setts (intermittent/sporadic use; future use could occur at any time) were also recorded within the 50 m derogation limit. Construction of the Greenway may result in death, injury or disturbance to badgers within setts, the destruction of setts and loss of foraging habitat (TII, 2006c). All setts will be subject to disturbance due to impacts of construction/operation of the Greenway and Badger has been included among the KERs of the Greenway. The Badger setts and their descriptions can be found in Table 5.1 below.

Table 5.1 Badger Survey Results

Sett ID	Easting (ITM)	Northing (ITM)	Sett Type	Notes
MN1	670414	626652	Main (Active)	Main sett with at least six entrances. All but one entrance seemed inactive. Latrine with four dung pits with fresh dung. A well used badger path runs along the embankment Camera trap deployed for four nights in July 2016 and seven nights in October 2016. Badger were picked up exiting the sett and in one shot two badgers exited one entrance.
MN2	664762	617278	Main (Active)	Main sett with nine entrances and moderate spoil heaps. Located at the top of the embankment in dense vegetation on the edge of a field. At least five entrances were active at the time of survey, and the intervening paths were well-worn. Camera trap deployed for seven nights in October.
OU1	664777	615677	Outlier (Inactive)	Possible Badger sett or Fox earth with four entrances and small spoil heaps. Three entrances are inactive and quite small, but one is larger and freshly dug, possibly by a Fox that has taken over an old Badger sett or Rabbit warren.
OU2	661950	613029	Outlier (Inactive)	Possible outlier sett, single entrance, small spoil heap. Entrance is filled with rubbish. Inactive.

OU3	667485	620940	Outlier (Inactive)	Possible outlier sett with single entrance and small spoil heap. Larger than a rabbit hole, but still quite small for a Badger. Entrance is taller than wide, so may be a Fox earth. The entrance was inactive, with some leaves in the entrance
OU4	667192	620641	Outlier (Inactive)	Outlier, single entrance, moderate spoil heap. Inactive at time of survey, with leaves in the entrance
AX1	664757	617256	Annex (Active)	An annex sett, with seven entrances and moderate spoil heaps. May be part of sett MN2, but the clusters of entrances appear to be distinct, so it has been recorded as an individual sett. Located in a patch of dense bracken, and along the top of the alignment. Most entrances were active at the time of survey, the intervening paths were well-worn, and a latrine had some fresh droppings. Camera trap deployed for four nights in July 2016 and seven nights in October 2016. One recording of a badger was made however the dense bracken reduced the efficacy of the survey.

5.2.3 Bats

A Bat roost suitability assessment of 39 structures was undertaken during the multi-disciplinary survey walkover. Of these, 19 bridges, stone-built culverts and buildings were identified as being of moderate to high potential. In July 2016, dusk emergence/dawn re-entry surveys and static activity surveys were undertaken. The presence of railway tracks and dense vegetation made transect surveys unfeasible. The linear route and tall scrub vegetation provides excellent commuting and foraging habitat for bats. In total, four species of Bat were recorded during the activity surveys. Soprano and Common Pipistrelles were the most common species recorded. Leisler's Bat was widespread along the route corridor and, occasionally, Bats of the genus *Myotis* were recorded. One Soprano Pipistrelle roost was identified during the surveys. Two dawn re-entry and one dusk emergence were undertaken at a complex of disused farm buildings approximately 40 m east of the railway line. Two Pipistrelle Bats were seen exiting through a doorway. A dawn survey two days later recorded two Bats re-entering the same doorway. The building was in disrepair and could not be entered to locate the roost entrance. The distance between the Greenway and the roost as well as the current movement of farming machinery in the vicinity means the roost will not be impacted by construction and operational activities to the Greenway.

The linear route of the disused railway and its associated hedgerows, treelines, grassland and scrub vegetation provide excellent foraging and commuting and foraging for Bats and the use of lighting along the Greenway and its potential effects on Bats will need assessed when lighting design options are drafted. Bats could be negatively impacted by the removal of vegetation and linear features and have therefore been included among the KERs of the Greenway.

5.2.4 Irish Stoat/Pygmy Shrew

The multi-disciplinary survey identified one structure with potential to support either Irish Stoat or Pygmy Shrew. Irish Stoat and Pygmy Shrew are protected species under the Wildlife Acts, 1976 to 2012 and have a widespread distribution in Ireland. The structure consists of an overgrown stone wall along the side of the railway alignment with many features (accessible gaps and cracks of suitable size). Although no physical evidence of presence was detected this structure should be retained.

5.3 Reptiles and Amphibians

It is considered that suitable wet fields, ditches and drains are extremely widespread in the study area and that Common Frog is likely to be present. However, no suitable permanent ponds likely to support significant breeding populations of Common Frog were identified in the study area and no waterbodies are required to be physically damaged, drained or in-filled

during site preparation or construction for the Greenway. It is considered that the Greenway will not result in an overall loss of suitable habitat for this species. No further study of this species was deemed necessary.

No suitable permanent ponds exist within the study area with potential to support Smooth Newt and no individuals were encountered during field surveys. No shallow unshaded ditches with limited flow and good diversity of submerged or emergent vegetation, which are favoured by this species, were recorded during the multidisciplinary walkover survey. On the basis of lack of high quality habitat for the species encountered, no requirement for further survey was identified.

The desk study revealed two records for Viviparous Lizard within the relevant hectads. Both records, from 1970 and 1972, are > 5 km from the study area. No Viviparous Lizards were recorded during the surveys and it is likely that most of the habitat is unsuitable. It is considered that the Greenway will have no impact on this species. No further survey is required.

5.4 Barn Owl

There is suitable habitat within the surrounding landscape for Barn Owl and potential structures (barns, ruins etc.) within line of sight or close proximity of the proposed Greenway were systematically assessed during the multi-disciplinary walkover survey. A small number of derelict buildings were assessed and checked for their suitability to support breeding and wintering Barn Owl. Of the limited number of structures inspected, no physical evidence of occupancy was recorded. No further survey is required.

5.5 Invasive Alien Species (IAS)

Five stands of Japanese Knotweed (*Fallopia japonica*) occur within the construction envelope of the Greenway. The five stands occur within an 800 m stretch of railway near New Ross. Japanese knotweed is subject to restrictions under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011. Japanese Knotweed is included among the KERS of the Greenway.

An IAS Management Plan will be prepared in relation to the treatment of the identified stands of Knotweed. The management plan shall follow the guidance outlined in the following documents:

- TII (2010b) *Guidelines on management of noxious weeds and non-native invasive plant species on national roads*. National Roads Authority, Dublin; and,
- EA (2013) *The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3)*. Environment Agency, London.

6. IMPACT ASSESSMENT

General impacts on flora and fauna that are typical of a Greenway scheme are described in this section where they occur in areas that have not been identified as KERs. The majority of the Greenway footprint has been identified as being of Local Importance (Higher Value) from an ecological perspective.

6.1 Designated Sites

The Greenway traverses the River Barrow and River Nore SAC and is approximately 80 m from the Lower River Suir SAC. The potential for indirect impacts on the Natura 2000 site has been fully assessed in the Appropriate Assessment (AA) Screening report. This AA Screening report objectively concluded that the Greenway would not be likely to have significant effects on the Conservation Objectives or ecological integrity of any European site.

6.2 Habitat Loss

The construction of the Greenway will result in the complete loss of habitats within the land-take area of the scheme. In this case, the development is approximately 22 km of existing dismantled railway line, with small localised areas subsumed into the surrounding landscape. The habitat within the land-take is generally similar to the surrounding habitat. The most common habitat within the land take is Scrub (WS1).

The permanent loss of Scrub is not considered to be of ecological significance as these habitats are relatively species poor, support limited biodiversity and are widespread. Scrub on the railway embankments will be maintained.

6.3 Habitat Fragmentation

The Greenway will result in no habitat fragmentation. The existing embankment and roads on which much of the development will be constructed will minimise the habitat fragmentation as a direct result of the Greenway.

6.4 Run-off of Pollutants

Best practice control measures have been incorporated into the design of the scheme to avoid the run off of pollutants to the wider environment outside the construction footprint. No significant impacts are predicted in this regard on the habitats surrounding the route.

6.5 Hydrological Impact on Habitats

The proposed Greenway will maintain a neutral drainage situation, *i.e.* it will not result in any hydrological changes to the area surrounding the proposed development due to drainage or waterlogging.

6.6 Displacement/Disturbance of Mammals

The Greenway will result in disturbance and/or displacement of certain species that reside along the disused railway. Where mammals of particular ecological significance or potential habitat exist, these were included as KERs and are described in Table 6.1 and the sections below. Other Mammal species such as Hedgehog and Irish Hare are not considered likely to be impacted significantly given the small scale of the Greenway and the widespread suitable habitat in the surrounding area. In addition, they are considered to be receptors of Local Importance (Lower Value) and are not considered to be KERs.

6.7 Impacts on Key Ecological Receptors

Impacts on the Key Ecological Receptors as defined in the preceding sections are described below in Table 6.1.

Table 6.1 Impact characterisation for key ecological receptors based on TII (2009a)

Key Ecological Receptor	Construction phase impacts	Operational phase Impacts	Ecological Significance if Unmitigated
Badger	<p>Six Badger setts were recorded within 30 m of the railway line. They are two main setts, one annex sett and four outlier setts. All of the setts occur within 30 m of the Greenway, generally on the cutaway embankments associated with the railway.</p> <p>Construction of the Greenway may result in the disturbance of setts including death or injury to Badgers within setts. There will be some loss of foraging and commuting habitat directly within the 5 m carriageway.</p>	<p>Operation of the Greenway may result in sett abandonment as a result of disturbance.</p> <p>No direct impacts are likely to be associated with the operation of the Greenway.</p>	<p>The disturbance of active setts within the land-take boundary, primarily the two main setts and annex sett, are considered to be a Short-term Slight Negative Impact. The main and annex setts are likely to be used for breeding.</p> <p>Four outlier setts were recorded outside the land take at varying distances. Setts within 30m may be subject to disturbance during construction.</p> <p>In terms of indirect impacts, the Greenway will allow access for Badgers both along and across the carriageway. In this regard the development will not cause the fragmentation of territories. It is considered that impacts could be reversible through appropriate design and mitigation.</p> <p>Given the nature and scale of the Greenway, disturbance impacts are not considered likely to be significant.</p> <p>It is considered that the Greenway does not have the potential to result in significant impacts on this KER at the National or County level.</p>

Key Ecological Receptor	Construction phase impacts	Operational phase Impacts	Ecological Significance if Unmitigated
<p>Otter</p>	<p>No confirmed or potential holts were recorded during the surveys. However, it is likely that there are breeding holts within the wider area. Otter can have a home range of 18 km (NPWS, 2009) and has a widespread distribution and favourable range throughout the country (NPWS, 2013). It is considered unlikely that there will be any significant direct impact on Otter as a result of the Greenway as none of the habitat at the crossing points of the rivers was considered to be of particular significance to Otter.</p>	<p>No direct or indirect impacts are likely to be associated with the operation of the Greenway.</p>	<p>No significant direct impacts are anticipated on this species given the nature of the habitats at the crossing points and given that no confirmed breeding or resting sites were recorded. In terms of indirect impacts, the Greenway will allow access for Otter both along and across the carriageway. In this regard the development will not cause the fragmentation of territories or habitat. The potential for pollution of watercourses during the construction phase is considered to constitute a potential Temporary Moderate-Significant Negative Impact as it has the potential to alter a sensitive receptor over a short period of time and over a far wider area than the site itself. It is considered that impacts could be reversible through appropriate design and mitigation. Construction of the development may lead to disturbance related impacts. This is considered to be a Potential Short-term Moderate Negative impact at the local scale. Given the nature of the habitats recorded and lack of active shelters, disturbance impacts are not considered likely to be significant. It is considered that the Greenway does not have the potential to result in significant impacts on this KER at the National or County level.</p>

Key Ecological Receptor	Construction phase impacts	Operational phase Impacts	Ecological Significance if Unmitigated
	<p>Indirect impacts may include fragmentation of habitat, barrier effect, disturbance, deterioration of habitat quality (water quality and loss of in-stream fishery habitat) and potential death by collision</p>		<p>Construction of the development may lead to disturbance-related impacts. This is considered to be a Potential Short-term Moderate Negative impact at the local scale.</p> <p>Given the nature of the habitats recorded and lack of active shelters, disturbance impacts are not considered likely to be significant.</p> <p>It is considered that the Greenway does not have the potential to result in significant impacts on this KER at the National or County level.</p>
<p>Bats</p>	<p>Bat species are considered to be a KER of Local Importance (Higher Value) as the study area is widely used by a range of species.</p> <p>One bat roost was identified although it is outside the derogation limit of the Greenway and there will not be any significant impacts on the roost as a result of construction.</p> <p>Indirect impacts may include deterioration of habitat quality following vegetation clearance of the footprint.</p>	<p>No direct or indirect impacts are likely to be associated with the operation of the Greenway.</p>	<p>Construction of the development may lead to impacts as a result of a reduction in habitat quality. This is considered to be a Potential Short-term Moderate Negative impact at the local scale.</p> <p>Given the abundance of quality habitat in the surrounding area, this disturbance impact is not considered likely to be significant.</p> <p>It is considered that the Greenway does not have the potential to result in significant impacts on this KER at the National or County level.</p>

Key Ecological Receptor	Construction phase impacts	Operational phase Impacts	Ecological Significance if Unmitigated
Japanese Knotweed	<p>Japanese Knotweed is subject to restrictions under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011. It was found at five locations within the construction envelope of the Greenway. IAS may be inadvertently spread during the construction of the Greenway through the movement of contaminated soil to, from or within the site.</p>	<p>The operation of the Greenway is considered unlikely to facilitate the spread of IAS.</p>	<p>Construction of the development may lead to the spread of Japanese Knotweed. This is considered to be a Long-term Severe Negative impact at a local scale.</p> <p>An Invasive Species Management Plan, which will seek to eradicate Japanese Knotweed from the site prior to works, will be developed as part of the Part VIII application.</p> <p>Impacts as a result of Japanese Knotweed at National or County Level is not anticipated.</p>

7. MITIGATION

This section describes the measures that will be put in place to mitigate against negative impacts associated with the Greenway and the identified KERs as described in the preceding sections. General mitigation measures included within the design of the Greenway are described first, with more specific measures to prevent or minimise impacts on the individual receptors provided subsequently.

7.1 General Mitigation

Mitigation by Avoidance

The disused railway is intact and includes embankments and cutaways and several at-grade level crossings. This inherently avoids ecologically sensitive areas. The design has followed the basic principles outlined below to eliminate the potential for ecological impacts on KERs where possible and to minimise such impacts where total elimination is not possible.

- The AA Screening report concluded that the Greenway would not be likely to have significant effects on the Conservation Objectives of the River Barrow and River Nore SAC or the Lower River Suir SAC.
- The potential for impacts on NHAs and pNHAs was also considered and the potential for direct or indirect impacts and was discounted.
- Indirect impacts on any designated sites have also been avoided with a full assessment of the potential for significant effects on the integrity of these sites provided in the AA Screening report. There will be no direct impacts on Annex I habitats resulting from this development. The construction of the Greenway will maintain a neutral drainage situation. Thus, there will be no indirect impacts on sensitive habitats.

Through the implementation of generic mitigation, direct or indirect impacts on receptors of International and National importance will be avoided. In addition, the proposed alignment minimises the potential for impacts on receptors of Local Importance (Higher Value).

Mitigation by Design

The Greenway will be designed in accordance with the Design Manual for Roads and Bridges (DMRB), the TII Environmental Assessment and Construction Guidelines, and other best practice guidelines and Irish and European legislation. The following is an overview of general design measures that will be employed throughout the entire length of the scheme to minimise and avoid negative impacts on the ecology of the footprint of the Greenway and the wider environment. More specific measures are described in relation to individual receptor types in Section 7.2.

- The land-take associated with the proposed Greenway will be temporarily fenced off at the outset of the construction phase of the project and will avoid the potential for unnecessary loss of habitat outside of the construction footprint;
- The watercourse crossings will utilise existing bridges; and,
- An erosion and sediment control plan will be prepared in respect of the construction phase. The potential for run-off of pollutants during the construction phase of the Greenway will be fully managed with impacts on significant receptors avoided.

7.2 Specific Mitigation Measures

Watercourses

There are six watercourses that will be crossed by the Greenway. Crossing will be over existing bridges where possible. This mitigation is provided to ensure that the Greenway does not impact significantly on the water quality within any watercourse upstream, downstream or at the crossing point. Whilst no significant habitat for any of the species listed as KERs above was recorded at the crossing point of any of the watercourses, the following mitigation will ensure that there is no significant impact on habitat for these species.

All works in proximity to watercourses shall follow the generic best practice guidance outlined in the following documents:

- *Guidelines for the crossing of Watercourses During Construction of National Road Schemes* (TII, 2008a);
- *Protection and Conservation of Fisheries Habitat with Particular reference to Road Construction* (Shannon Regional Fisheries Board (SRFB), 2009);
- *Protection of fisheries habitat during Construction and Development Works at River Sites* (Eastern Regional Fisheries Board (ERFB), 2004); and,
- *Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters* (IFI, 2016).

No Net Loss (SRFB, 2009)

The no net loss principle is fundamental to the habitat conservation goal. The principle takes into consideration the habitat and water quality requirements of fish, in the context of site-specific evaluations, in order to avoid losses of habitats or habitat components that can limit the production of fisheries resources.

There must be no net loss of fish habitat or in the ability or potential for the fisheries and aquatic habitat to maintain fish stocks or the food of fish.

Watercourse Crossings

Prior to construction, the contractor shall prepare detailed method statements for maintaining at all times the free passage of fish in any fish-bearing waters likely to be affected by the works. These shall be submitted to the Greenway engineer and IFI for approval in advance of works.

No in-stream works are to be carried out between 1st October and 30th June (IFI, 2016) and only then with the approval IFI.

Pollution of Watercourses

This proposed development has the potential to cause pollution of the surrounding environment. Pollution could take a number of forms and occur during a number of the operations involved in the construction process. Listed below are the activities during which pollution may arise and the type of pollution that may occur along with prescribed mitigation measures.

Earthworks

Construction of the Greenway will involve excavation of soil. This creates the potential for sediment and/or nutrient run-off, especially if soil is stored in an unconsolidated state for a period of time. Suspended solids or nutrients resulting from the decomposition of organic material could potentially enter downstream natural habitats via existing drainage features. It is considered unlikely that this would happen to a significant degree.

- Prior to the outset of any excavation works, the works area will be assessed and clearly delineated with temporary fencing. The minimum area necessary will be identified as part of the works area and there will be no access to works vehicles outside the fenced off areas.
- All storage of plant, excavated material/topsoil and other materials required for construction/landscaping, will be held within the fenced area.
- Any excavated rock will be used as infill to replace excavated soil.
- Excavations will be carried out using a suitably sized excavator.
- No washing of plant, vehicles or equipment will be completed within 50 m of a watercourse. Site foreman will ensure that all deliveries are required to complete wash out at their own company base, not on site.

- In all circumstances, excavation depths and volumes will be minimised and excavated material will be re-used where possible.

A Construction Erosion and Sediment Control Plan (CESCP) will be prepared for the development and the measures outlined in the document shall be strictly adhered to during the construction and operational phase.

Hydrocarbon Usage

The use of hydrocarbons during the construction process leads to the potential for pollution to enter the wider environment, including drainage ditches and natural watercourses. Leaks in poorly maintained plant and machinery could lead to hydrocarbon dispersal over works areas. Leaks in fuel storage tanks and spillages during refueling operations could lead to larger releases of hydrocarbons into the environment.

The use of machinery carries the potential for accidental hydrocarbon contamination of works areas by fuel spillages or oil leaks for example. The works will be carried out in accordance with the following measures to avoid such impacts:

- It is likely that all machinery will be refueled from mobile tankers on the local/access roads. No refueling is to take place within 50 m of any watercourse.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned.
- When not in use, all valves and fuel trigger guns from fuel storage containers will be locked.
- All plant refueling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refueling operations. Plant refueling will take place as far as practicable from watercourses. A spill kit and drip tray shall be on site at all times and available for all refueling operations. Equipment shall not be left unattended during refueling. All pipework from containers to pump nozzles will have anti-siphon valves fitted.
- Strict procedures for plant inspection, maintenance and repairs shall be detailed in the contractor's method statements and machinery shall be checked for leaks before arrival on-site.
- All site plant will be inspected at the beginning of each day prior to use. Defective plant shall not be used until the defect is satisfactorily fixed.
- All major repair and maintenance operations will take place off-site.
- Care will be taken at all times to avoid contamination of the environment with contaminants other than hydrocarbons, such as uncured concrete or other chemicals.
- Specific measures to offset potential impacts relating to surface water run-off, during the operation of the road, have been incorporated into the design of the scheme. These include the use of hydrocarbon interceptors and attenuation systems.

Hydrologically Sensitive Habitats

The Greenway passes within close proximity to a number of hydrologically sensitive habitats. In each of these areas, direct and indirect impacts will be avoided. The nature of the work, the existence of the railway embankment and the mitigation listed above means that the likelihood of significant impacts to the hydrology of sensitive habitats is minimal.

Badger

Badgers were recorded at several locations along the proposed route and are included as a KER. Impacts include the disturbance of two main setts, one annex sett and four outlier setts. Indirect impacts that may occur in all areas include the loss of foraging habitat and disturbance. The vehicle-free nature of the Greenway means that there is no risk of collision. Mitigation measures that are in place to minimise the potential for impacts follow TII (2006b) and are described in the following sub-sections below.

Pre-construction Badger survey

Prior to any works being carried out, a pre-construction Badger survey will be undertaken to ensure that Badger has not taken up residence within or close to the land-take and that the supporting information submitted in the Part 8 application and respective disturbance licensing is still accurate. This survey will reassess the status of the setts recorded during the multidisciplinary walkover survey in order to establish any change during the intervening period between planning and construction.

Disturbance of Badgers

Works within 30 m of a Badger sett (50 m during the breeding season) will be supervised by an Ecological Clerk of Works (ECoW) and will be undertaken under licence from NPWS (Appendix A).

Any excavations over 1 m deep will be securely covered at night or a ramp provided to enable animals to escape should they fall in. Works will be programmed to occur during the hours of daylight only. Works involving noisy plant and machinery located near Badger protection zones will cease at least two hours before sunset (SNH, 2012).

Existing vegetation around Badger setts will be left intact, as far as practicable. Additional screening will be provided to reduce acoustic disturbance from the construction and operation of the Greenway.

No fencing will be used that would inhibit access for Badger across the Greenway. Lighting design will be sensitive to areas with Badger setts. As a result of the small land-take by the Greenway, it has not been considered necessary to provide additional foraging or setting habitat specifically targeted at Badgers. However, areas of additional planting have been proposed as part of the general ecological enhancement strategy which will reduce both visual and acoustic disturbance and well as providing cover for Badgers.

With the mitigation in place the badger population will be maintained and there are no residual effects anticipated for badgers in the vicinity of the Waterford to New Ross Greenway.

Exclusion of Badgers

Should any active setts be recorded within the development footprint during the pre-construction survey, the procedure outlined below will be followed under licence from NPWS.

Exclusion of Badgers from currently active setts will only be carried out from July to November, inclusive, in order to avoid the Badger breeding season and on provision of appropriate licensing from NPWS. Exclusion of Badgers from disused or currently inactive setts may be completed throughout the year. Should active setts be encountered prior to construction, TII (2006c) will be followed for the exclusion of active setts.

The destruction of a main sett requires the provision of an artificial sett within 100 m of the original. One-way gates should be installed on all entrances of active setts to allow badgers to exit but not re-enter. These gates should be tied open for the first three days. Once no badger activity is observed for a period of 21 days, the sett should be destroyed. If the gates are left in place for long periods of time Badgers may attempt to dig around them or to create new entrances. Therefore, setts should be destroyed as soon as the 21 day period has elapsed.

Disused setts are considered to be unused by Badgers. Further survey work will be required to ensure the setts are inactive at the time of construction. In the case of disused setts, initial exclusion involves lightly blocking entrances with vegetation and a light application of soil, *i.e.* soft-blocked. Soft blocking confirms the absence or presence of Badgers. If all entrances remain undisturbed for 5 days, setts should be destroyed immediately under licence and supervision from the NPWS. If it is not possible to destroy the sett immediately, the entrance should be hard-blocked using buried fencing material and compacted soil and destroyed as soon as possible.

Otter

No Otter signs or shelters were recorded within the study area. However, Otter are presumed to be present on all watercourses and on some of the larger drainage ditches. The guidance followed in the summary of mitigation measures for Otter is

- *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes* (TII, 2005); and,
- *Guidelines for the treatment of otters prior to the construction of National Road Schemes* (TII, 2006).

The guidelines recommend the following mitigation measures:

Pre-construction Otter survey

Prior to any works being carried out, a pre-construction Otter survey will be undertaken to ensure that Otter have not taken up residence within or close to the Greenway footprint.

Exclusion

It is not anticipated that any Otter holts or couches will require exclusion as part of this Greenway. However, should any holt or couch be encountered within the footprint during the pre-construction surveys, it will be subject to exclusion procedures as outlined in TII (2006c).

Treatment of Otters at Watercourse crossings

The welfare of Otters will be ensured primarily through the provision of continued safe access throughout their ranges. Adequate provision for Otters at affected watercourse crossings is required to allow the species to retain continued access to their foraging areas. It is anticipated that all watercourse crossings will take place on existing former railway bridges, thereby limiting the disturbance to Otter.

Bats

The guidance followed in the summary of mitigation measures for Bats is:

- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes* (TII 2005);
- *Guidelines for the treatment of bats during the construction of National Road Schemes* (TII, 2006a); and,
- *NPWS Irish Wildlife Manuals, No. 25: Bat Mitigation Guidelines for Ireland* (Kelleher & Marnell, 2006).

Tree-felling and Hedgerow Removal

Vegetated cover will be lost in order to facilitate earthworks and construction. This will include scrub, grassland and single trees. The original boundaries of the railway line are generally well-defined throughout by hedgerows, fence-lines and embankments. These habitats are important for commuting and foraging Bat species. The scheme involves specific prescriptions for tree planting to ensure that habitat quality and connectivity is not reduced by the Greenway. Proposals include:

- Tree planting and/or maintaining trees to provide commuting habitat along the Greenway and to guide Bats to other linking treelines, hedges, woodlands or bridges.
- Planting will utilize native species as these have a greater range of insects associated with them that provide an additional source of food for Bat species.

While no trees were positively identified as having very high potential to support significant Bat roosts, pre-construction Bat surveys will be required by suitably qualified Bat ecologists prior to any works being undertaken. Although no felling of trees with Bat potential is anticipated, works will have the potential to cause disturbance to roosting Bats. Should any tree roosts be identified, a derogation licence from the NPWS will be required to fell or undertake works in close proximity these trees.

When felling mature trees in areas that have been identified as having higher potential for roosting Bats within trees, the following TII (2006a) will be followed:

- Immediately prior to felling, trees should be inspected for the presence of Bats and/or other Bat activity by a suitably qualified Bat ecologist during daylight hours and night-time using a Bat detector. This survey should be carried out from dusk through the night until dawn to ensure Bats do not re-enter the tree;
- Where examination of the tree has shown that Bats have not emerged or returned to a tree, felling may proceed the following day. Should a delay in felling be encountered, resurveying is required;
- In areas where Bat activity has been recorded, tree-felling must not be conducted in June to early August; and,
- Felling during winter months should be avoided as this increases risk to hibernating Bats.

Lighting

Lighting design will be sensitive to Bats.

Structures

Identified roosting sites will not be directly impacted upon by the Greenway. Nineteen structures including bridges and farm buildings should be subject to pre-construction surveys (as per TII, 2006a) prior to works to ensure Bats have not taken up residence. Should any roosts be identified in buildings, a derogation licence from NPWS will be required to undertake works in close proximity to the buildings.

Birds

Breeding birds were not identified as KERs of this development with no significant populations were recorded as likely to be impacted by the proposed works. The Greenway will result in the loss of habitat for breeding birds in the form of grassland and scrub. The protection of bird breeding habitats during the breeding season (1st March to 31st August, inclusive), are set out in the Wildlife Acts, 1976-2012. Exemptions in this legislation for road construction are acknowledged. However, it is recommended that breeding bird habitat will be removed outside the bird nesting season. The loss of habitat for birds is not considered significant based on habitat availability in the surrounding area.

7.3 Residual Impacts

Table 7.1 Assessment of the Construction Phase Residual Impacts scale and significance, based on EPA (2015) and TII (2009a).

Key Ecological Receptor	Description	Pre-Mitigation Impacts	Ecological Significance if Mitigated
Badger	Badger signs were located at a number of locations along the route along with both active and inactive setts.	It is considered that the Greenway does not have the potential to result in significant impacts on this KER either at the National or County level. The Greenway does have the potential to result in significant impacts at the Local level.	No significant residual impact on this KER.
Otter	Signs of this species were recorded along the majority of the larger watercourses that were identified along the route in the form of prints, spraints and couch areas. No holts were recorded during the dedicated Otter surveys undertaken. It is assumed (despite lack of evidence) that Otter are present to some extent on all watercourses within the study area.	It is considered that the Greenway does not have the potential to result in significant impacts on this KER either at the National or County level. The Greenway does have the potential to result in significant impacts at the Local level.	No significant residual impact on this KER.
Bats	Bat species are considered to be a KER of Local Significance (Higher Value) and the study area is likely to be frequently by a range of bat species.	It is considered that the Greenway does not have the potential to result in significant impacts on this KER either at the National, County level. The Greenway does have the potential to result in significant impacts at the Local level.	No significant residual impact on this KER.
IAS	IAS subject to restrictions under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011 were found at a number of locations within the construction envelope of the Greenway. Of particular concern is Japanese Knotweed.	The Greenway does have the potential to result in significant spread of IAS at least the County and Local level.	No significant residual impact on this KER.

8. GREENWAY IAPS MANAGEMENT PLAN

8.1 Legislative Context

In the course of devising and implementing the most effective eradication methods, the IAPS Management Plan must comply with all legislation regulating the treatment and management of IAPS. The relevant standards and legislation that will dictate how eradication is undertaken include:

- European Communities (Plant Protection Products) Regulations, 2012 (SI No. 159/2012);
- European Communities (Sustainable Use of Pesticides) Regulations, 2012 (SI No. 155/2012);
- Waste Management Acts, 1996 to 2013, and related legislation;
- Safety, Health and Welfare at Work Act, 2005;
- Safety, Health and Welfare at Work (Construction) Regulations, 2013;
- Safety, Health and Welfare at Work (General Application) Regulations, 2007;
- Safety, Health and Welfare at Work (Chemical Agents) Regulations, 2001;
- European Communities (Birds and Natural Habitats) Regulations, 2011 to 2015; and,
- Wildlife Acts 1976-2012.

To comply with Sustainable Use of Pesticides Legislation, the application of herbicide should only be undertaken by registered professional users. Only a Registered Pesticide Advisor (RPA) should approve procedures prior to Works commencing. All professional users should demonstrate proper use, ensuring only authorised products are used and all treatments are catalogued and documented pursuant to the requirement of Plant Protection Products Regulations.

In scenarios where disturbance, movement and disposal of IAPS material is required, the RPA will review applications submitted to the relevant licensing authorities prior to the commencement of such disturbance, movement and disposal.

8.2 Brief Description of Greenway Management Plan

The measures to be implemented in the management plan are based on *The Knotweed Code of Practice: Managing Japanese knotweed on development sites* (EA, 2013), *Best Practice Management Guidelines for Japanese Knotweed* (Kelly et al., 2008) and *Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads* (TII, 2010b). These documents provide very detailed information on the control of Japanese Knotweed, including methodology for chemical treatment as well as non-chemical control. They have been developed by experts in the control of IAPS and informed by the successes and failures of hundreds of IAPS management plans and are widely accepted to represent the current best practice in the treatment of IAPS.

The *Knotweed Code of Practice* provides some general guidance on the preferred treatment options that should be used, and some excerpts are reproduced below:

“Unless an area of Japanese Knotweed is likely to have a direct impact on the development, you should control it in its original location with herbicide over a suitable period of time, usually two - five years.

You should only consider excavating Japanese Knotweed as a last resort, and if so you should keep the amount of knotweed excavated to a minimum.

Soil containing Japanese Knotweed material may be buried on the site where it is produced to ensure that you completely kill it. In this case, you must bury material at least 5m deep, or at 2m if enclosed in a root barrier membrane

Where local conditions mean you cannot use burial as an option, it may be possible to create a Japanese Knotweed bund. The purpose of the bund is to move the Japanese Knotweed to an area of the site that is not used. This 'buys time' for treatment that would not be possible where the Japanese Knotweed was originally located.

Sometimes, due to shortage of time and location, landfill is the only reliable option, but it should be treated as a last resort. Landfill is very expensive for the development industry, and needs haulage, which increases the risk of Japanese Knotweed spreading.

When you transport soil infested with Japanese Knotweed to landfill, it is essential to carry out strict hygiene measures. If you do not follow these standards, this may lead to Japanese Knotweed spreading. Japanese Knotweed is a particular problem along transport corridors, where it interferes with the line of vision and can cause accidents."

This section contains a description of the most suitable control measures for Japanese Knotweed. As part of the Management Plan different methods can be used for each species, the most appropriate available measures for each species are outlined below.

8.3 Management Options for Japanese Knotweed

Main options for Japanese Knotweed control:

- Chemical control;
- Excavation and burying;
- Excavation and disposal to licensed landfill/incinerator; and,
- Bunding and treatment.

The appropriate management strategy will be determined by site conditions and in consultation with Kilkenny County Council, Trail Kilkenny and the Kilkenny LEADER Partnership and the NPWS in terms of the most suitable management strategy from a programme and cost perspective. There are a number of issues that will affect the management strategy on the site, including the following:

- Accessibility and space available;
- Transboundary (local planning authority) issues;
- Proximity to open water;
- Proximity to designated sites and environmentally sensitive areas; and,
- Proximity to areas used by the general public and/or defined vulnerable groups.

Chemical Control Option

This option involves application of herbicides *in situ* until there is no re-growth of plant material. This may take c. 3-5 years and would require repeated survey and re-treatment each year until the Japanese Knotweed has been eradicated from the route. If highly persistent herbicides are used, it may be possible to eradicate the plant within one or two years. However, since this will not be appropriate given the ecological significance of the wider area, the use of less-persistent herbicides, e.g. glyphosate, will be necessary to re-treat regularly in years two and three, and then to conduct annual spot-checks in May/June of subsequent years to identify and retreat any re-growth.

The current most widely recommended chemical for Japanese Knotweed control is glyphosate, which breaks down in the soil relatively quickly. Glyphosate is potentially damaging to non-target plants. Great care is therefore necessary during application of this herbicide and should be used in compliance with the product label in accordance with Good Plant Protection Practice as prescribed in the European Communities (Authorization, Placing on the Market, Use and Control of Plant Protection Products) Regulations, 2003 (SI No. 83/2003).

As the majority of herbicides rely on the presence of living foliage for them to be effective, it is important to consider whether the Japanese Knotweed is in leaf or is dormant when choosing

a suitable herbicide. As the majority of herbicides are not effective during the winter dormant stage, the most effective time to apply a non-persistent herbicide is between May and September, when the plant is in leaf. This will stunt the growth of the plant, consequently reducing the amount of viable above ground material and the height of the stand.

For infestations, products containing 2,4-D amine can be used. 2,4-D amine has the advantage of being selective and specific to broadleaved plants. However, in general, it has a greater persistency when compared to glyphosate. Products containing 2,4-D amine should be applied in May, with a follow up treatment in late September or early October. Care is required in the selection of the appropriate product and method of application.

In making the selection of which herbicide to use, regard should be had to, *inter alia*, the abundance of the Japanese Knotweed, the location of the stand(s), the proximity and nature of sensitive receptors and the season.

Non-Chemical Control

These options are applied in situations where eradication is required within a short space of time. Non-chemical methods typically involve excavation and disposal of infected top soils and/or plant material via a licensed landfill and the use of both vertical and horizontal root barrier membranes. The best practice management recommendations for a corridor-wide long-term IAPS management plan should, therefore, involve *in-situ* treatment.

Limitations and Threats to Control Measures

The primary site management objective is to eradicate and prevent the spread of the IAPS as a result of the construction of the Greenway. The primary risk is during the site preparation and construction phases when the excavation of materials and movement of vehicles potentially transporting contaminated material can facilitate the spread of IAPS. The presence of Japanese Knotweed may result in limitations to overall site management objectives during the construction process, in particular, through the following:

- Delays in scheduling of works, due to treatment of identified locations;
- Structural damage or future potential damage caused by the plant; and,
- Potential for spread of Japanese Knotweed from within and outside the site boundary, e.g. within the site or from adjacent land.

The type of herbicide applied and the timing of treatment should be cognisant of members of the public and animals in the vicinity. The Japanese Knotweed should be treated with a non-persistent herbicide (certain plant protection products containing glyphosate are non-persistent). It is important to note that certain plant protection products have a specified period of activity, which will be described on the product label and which will dictate when the product can be applied.

8.4 Recommended Management Measures

Herbicide should be applied to the above ground stems *in situ* using a herbicide approved for use near water. The most effective time to apply herbicides is from July to October (or before cold weather causes leaves to discolour and fall). Spring treatment is acceptable, but less effective.

Stem injection is recognised as an effective treatment method for Japanese Knotweed in environmentally sensitive areas, *i.e.* within protected sites or where risks of spray drift to horticultural crops, amenity plantings, gardens and waterbodies are identified. This method can only be undertaken with a registered product consistent with its label. At present Barclay Gallup Biograde 450 (PCS No. 02434) and Glyphos Supreme (PCS No. 02832) are products that make provision for this application technique and this method should be implemented within this Management Plan.

Following treatment, dead canes should be cut and removed during winter for subsequent incineration or disposal off site. It will be necessary to ensure that the removed canes are

carefully set aside on a suitable membrane surface until they have dried to a deep brown colour and are certain to be dead. Alternatively, in the case where disposal is an option, the canes can be double-bagged and disposed of at a licensed waste facility where (a) the facility have been informed in advance of the nature of the waste material, (b) the facility is licensed to accept this material and (c) the facility is prepared to accept the material. Herbicide application must follow the manufacturer's guidelines. Checks should be made for new growth at 4-6 week intervals after treatment and growth should be retreated accordingly.

While glyphosate does not absorb easily through the skin, it is good practice to use gloves, protective eye wear and appropriate water resistant work clothing during application. To prevent accidental ingestion, glyphosate should be stored in its original labelled container and, when not in use, should be stored under lock and key under conditions specified by the manufacturer. Hands should always be thoroughly washed before eating or smoking to prevent ingestion. As it takes approximately 6 hours for glyphosate to be taken up by plants, children and animals can touch and accidentally ingest glyphosate.

While using glyphosate, it is paramount that clearly visible signs stating the use of pesticide and its risk to children and animals are in place until treated plants are dry. Symptoms of ingestion by humans and animals consist of burns to the mouth and throat, salivating, nausea, vomiting and diarrhoea. Animals may also go off food and appear sleepy. If pesticide ingestion is suspected medical treatment should be sought immediately.

Glyphosate has a low known toxic effect on aquatic life. However, water for mixing of a 10% solution should be sourced from a private source (pre-collected and stored).

It is very important that the Safety, Health and Welfare at Work (Chemical Agents) Regulations, 2001 as well as the European Communities (Authorisation, Placing on the Market, Use and Control of Plant Protection Products) Regulations, 2003 are consulted.

The success of the management plan will be based on the initial reduction in area IAPS ascertained from annual pre-treatment monitoring followed by the complete eradication from the site within 5 years.

To comply with the Quality Control procedures for Sustainable Use of Pesticides Legislation, the application of herbicide can only ever be undertaken by registered professional users. Registered Pesticide Advisors (RPA) can provide Quality Control by approving procedures prior to works. Professional users will also demonstrate proper use, ensuring only authorised products are used and all Works are catalogued and documented pursuant to the requirement of Plant Protection Products Regulations. These documents and practices will also need to be reviewed by the RPA.

It is advised that the developer/contractor should refer to the following documents, which provides detailed recommendations for the control of invasive species and noxious weeds:

- Chapter 6 and Appendix 3 of the TII Publication *The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads* (TII, 2010b);
- *Invasive Species Ireland Best Practice Management Guidelines for Japanese Knotweed* <<http://invasivespeciesireland.com/toolkit/invasive-plant-management>>; and,
- *The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites* (EA, 2013).

These documents include measures to aid the identification of relevant species, with details for the timing, chemicals and methodology for chemical control and for measures to avoid environmental damage during the use of herbicides. It is recommended that all contractors should prepare a specific plan in accordance with the relevant guidelines.

8.5 Health and Safety

An appropriate risk assessment, which includes Health & Safety considerations, should be carried out before any control or survey work is undertaken. Protective clothing must be worn when attempting control. All works to be compliant with the Safety, Health and Welfare at Work Act, 2005 as well as the Safety, Health and Welfare at Work (General Application) Regulations, 2007.

Chainsaws should only be used by those with appropriate training and skill. The use of chainsaws should adhere to the *Guide to Safe Working with Timber and Chainsaws*. Chainsaws and equipment should be maintained and correct protective equipment should be used at all times (HSA, 2010).

9. CONCLUSIONS

Following consideration of the residual (post-mitigation) impacts, it is noted that the Greenway will not result in any significant impacts on any of the identified Key Ecological Receptors (KERs). In the case of the four KERs, the potential for impacts was eliminated altogether through the use of appropriate and robust design and mitigation. No potential for impacts on receptors of International Importance were identified following mitigation.

The potential for impacts on the European designated sites that were identified is fully described in the Screening for Appropriate Assessment. This concluded, in view of best scientific knowledge and on the basis of objective information, that the Greenway, either individually or in combination with other plans or projects, would not be likely to have significant effects on designated sites. No NHAs or pNHAs were identified as KERs.

Other than the identified KERs, the ecological impacts on floral and faunal receptors of Local Importance (Lower Value) are not considered to be significant in the medium to long term.

Provided that the Greenway is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, the impact of the Greenway on ecology will not result in significant impacts in the long term.

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APPENDIX A
SUPPORTING INFORMATION FOR A LICENCE APPLICATION TO
DISTURB BADGER (*Meles meles*) SETTS FOR THE
PURPOSES OF DEVELOPMENT

Waterford to New Ross Greenway

Supporting Information for a Licence Application to Disturb
Badger (*Meles meles*) Setts for the Purposes of Development

NOVEMBER 2016



Waterford to New Ross Greenway

Supporting Information for a Licence Application to Disturb Badger (*Meles meles*) Setts for the Purposes of Development

TABLE OF CONTENTS

1. INTRODUCTION	3
1.1 Background	3
1.2 Badgers and Development.....	3
2. DESCRIPTION OF PROPOSED DEVELOPMENT	4
2.1 Overview.....	4
2.2 Location	5
2.3 General Layout	7
2.4 Construction Sequence.....	7
3. AIMS AND SURVEY METHODOLOGY	8
3.1 Aims	8
3.2 Survey Methodology	8
3.3 Survey Constraints.....	8
4. SURVEY RESULTS	10
5. DISCUSSION	12
6. MITIGATION REQUIREMENTS	13
7. SUMMARY	15
8. REFERENCES	16

1. INTRODUCTION

1.1 Background

Roughan & O'Donovan (ROD) Environmental was commissioned by Trail Kilkenny and the Kilkenny LEADER Partnership to undertake a badger survey and mitigation design to inform a planning application for the proposed Waterford to New Ross Greenway, hereafter referred to as "the Project". The Waterford to New Ross Greenway consists of a 22km shared cycle and pedestrian facility along an existing disused railway line between Waterford City and the town of New Ross, Co. Wexford. The majority of the development is located in the south east of Kilkenny, as presented in Figure 1.

The disused railway line is an important ecological corridor providing habitat connectivity. The destruction and disturbance of badger setts constitutes an offense under Section 23 of the Wildlife Acts 1976-2012.

A dedicated badger survey was conducted in March 2016 along the route of the proposed greenway. The purpose of the survey was to identify and record the present status of badger setts and to assess its impact on the badger population within the study area in accordance with the National Roads Authority (NRA)/Transport Infrastructure Ireland (TII) publication; Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (2006).

This document provides information to the National Parks and Wildlife Service (NPWS) to support an application for a licence under Section 23 of the Wildlife Acts 1976-2012 to allow for the disturbance of badger setts to facilitate works associated with the Waterford to New Ross Greenway Project.

1.2 Badgers and Development

Badgers and their setts are protected under the provisions of the Wildlife Acts 1976-2012. It is an offence to intentionally kill or injure a protected species or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. It is standard best practice to ensure that mitigation measures are taken to limit impacts on badgers. On road or greenway schemes, such measures might include removal of badgers from affected setts and provision of fencing to control either the movement of badger in relation to construction and associated works; or, control access of recreational users in sensitive areas important for badger during operational phases of development. Where significant badger setts have to be physically damaged or removed, alternative artificial setts may need to be created. This will involve land owner engagement and in most cases land acquisition, creation, design and monitoring of artificial setts and relevant licensing. Exclusion of badgers should only be considered where development unavoidably destroys a badger sett; its immediate surroundings; or, where operational phase of development makes it unsuitable for continued occupancy.

The removal of badgers from affected setts and subsequent destruction of these setts must be conducted under licence by suitably qualified Ecologists. The National Parks and Wildlife Service (NPWS) grant licences to the specific individual Ecologist undertaking the badger operations and not to the **developer or contractor**. It is normal practice to impose seasonal constraints e.g. that breeding setts are not interfered with or disturbed during the badger breeding season (December to June inclusive). No active sett should be interfered with or disturbed during the breeding

season as any sett may contain cubs. Conversely, closure of setts during the breeding season would require monitoring to demonstrate no sett activity.

2. DESCRIPTION OF PROPOSED DEVELOPMENT

2.1 Overview

The Irish Government policy entitled 'Smarter Travel: A Sustainable Transport Future' which runs from 2009 to 2020 identifies certain key goals and objectives to be met in order to introduce a national sustainable transport network. A National Cycle Policy (NCP) was implemented in conjunction with the 'Smarter Travel: A Sustainable Transport Future' policy. The NCP mission aims to 'create a strong cycling culture in Ireland' while also 'encouraging recreational cycling'. The NCP also outlines the importance of the National Cycle Network in attracting overseas tourists if the project is implemented.

The proposed Greenway will provide a safe recreational facility for tourists and local users to cycle from Waterford to New Ross along the old disused railway. The Greenway aims to feed into the local and national tourism strategy and complement the existing natural, cultural and built heritage along the route. The Greenway does not form part of the National Cycling Plan Wexford to Tralee – Corridor No.3, outlined in the Scoping Study of the same name in 2010; however, the Greenway has the potential to link to this corridor and join with other proposed schemes such as the proposed Red Bridge Walking and Cycling Trail, which loops from New Ross to Redbridge in County Wexford. The cycleway will for the majority of its length be segregated from vehicular traffic and will provide a safe alternative for cyclists compared to the N25, which carries significant amounts of traffic.

The proposed Greenway will be located along the disused railway line between Waterford City and the bridge crossing in New Ross town. The route of the disused railway runs east from the dockyards in Waterford city along the northern quays at Abbey Junction, through a residential area on the edge of the city and then into open agricultural land. The route passes over and under several roadways, including the N29, after which it follows a northerly direction parallel to the N25 for c.3km veering north east towards the River Barrow and the town land of Carrigcloney. The railway line passes through the River Barrow and River Nore SAC for c.1km where it bridges the Glenmore River. The route then continues north-west back towards the N25 running parallel until it emerges near the O' Hanrahan bridge in New Ross town (see Figure 1).

The route for the Greenway passes between three Local Authority administrative areas: Waterford County Council, Kilkenny County Council and Wexford County Council.

An Ecological Impact Assessment, Screening for Appropriate Assessment (AA) and Screening for Environmental Impact Assessment have been carried out.

2.2 Location

The Waterford to New Ross Greenway is to be located along a disused railway for its entire length. The proposed upgrading of this part of the disused railway to a cycleway runs for approximately 22km from just east of the Waterford City docks to New Ross town in County Wexford.

The route of the disused railway runs east from the dockyards along the northern quays at Abbey Junction in Waterford City, through a residential area on the edge of the city and then into open countryside. It passes both over and under several roadways, including the N29 after which it turns in a northerly direction and runs parallel to the N25 for approximately 3km before taking a north easterly route through mainly agricultural land towards the River Barrow and the town land of Carrigcloney. At this point the existing disused railway line passes through the River Barrow and River Nore candidate Special Area of Conservation (cSAC) for approximately 1km where it bridges the Glenmore River. The route then takes a north-westerly turn back upwards towards the N25 again and runs parallel to this route until it reaches the bridge at New Ross town.

The location of the proposed route is shown in Figure 1.

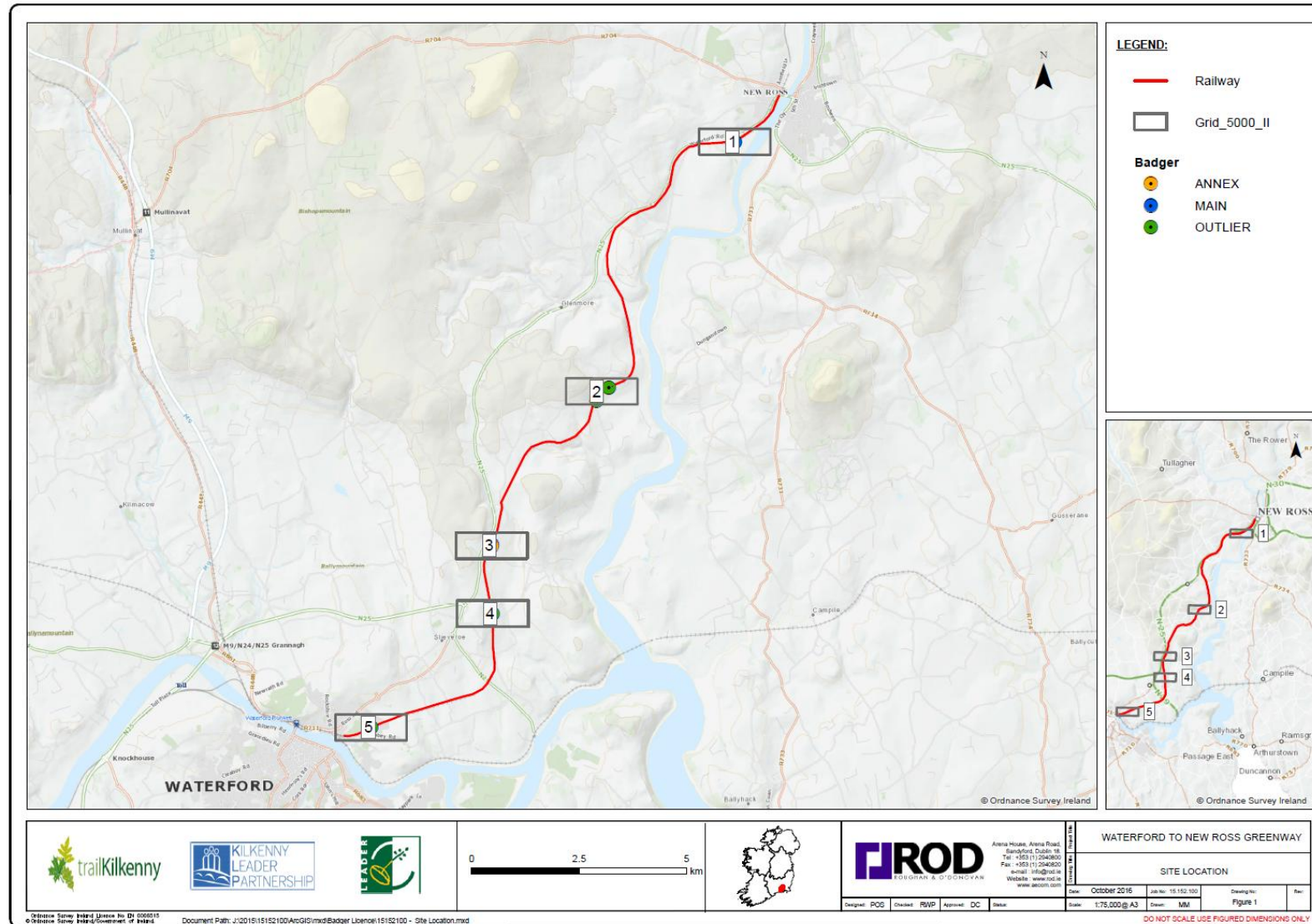


Figure 1-Location of Project

2.3 General Layout

The proposed route is 22km in length. The entire route of the Greenway is proposed within the footprint of the disused railway line.

The existing railway tracks will be removed, and a 3m wide bituminous surface will be constructed in its place for the entire length, with several at grade road crossings. The Greenway will make use of existing bridges, embankment and cutaways and will follow the line of the railway

2.4 Construction Sequence

The railway corridor was constructed to accommodate a single track. This track is generally located in the centre of the corridor but does move in position on approaches to bends in the alignment. It is proposed to remove the railway track and locate the Greenway in its place. The Greenway is to be 3m wide, made up of 40mm bituminous surface laid on 150 – 200mm base of Clause 804 (graded crushed rock or standard graded stone). A number of existing bridges where the disused railway passes over local roads will require a full structural survey to be carried out to determine the condition of each bridge deck and bridge parapet. The works to upgrade bridge decks will include routine maintenance and/or the provision of a new concrete deck. Additional works such as parapets, fencing and other ancillary works will be required to bring the existing bridges up to a sufficient standard to accommodate the Greenway. The sequence and timing for the works will be structured to allow environmental factors to be accommodated at appropriate stages.

3. AIMS AND SURVEY METHODOLOGY

3.1 Aims

In March 2016, badger surveys were undertaken. The study area comprised the proposed route of the Greenway including a 50m buffer, hereafter referred to as the 'Site'.

The aim of the survey was to understand the following:

- To gain an up to date understanding of badger presence and their ecology along the proposed route;
- Determine the likely impacts of the Project on each Social Group identified;
- Design a mitigation and compensation strategy to ensure long term viability of any social group affected and account for badger welfare, and;
- Provide evidence for a derogation licence compliant with Section 23 of the Wildlife Acts 1976-2012.

3.2 Survey Methodology

The badger surveys were informed by the following report:

- Waterford to New Ross Greenway Interim Ecological Survey Report ROD, 2015.

The following list outlines the methodology used to locate badger setts:

- A walkover survey was undertaken in March 2016 to identify any setts or other signs of badger activity within the Site. This ensured that all setts which would be impacted by the Waterford to New Ross Greenway were found in advance of works.
- The walkover survey was carried out following best practice guidelines and methods as described in the Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (NRA/TII, 2006). Hedgerows and other linear features, woodland and scrub, were thoroughly searched for evidence of badger activity. Where badger setts were identified, these were classified as active or inactive and assigned to a category of main sett, annex sett, subsidiary sett or outlier sett according to the scheme outlined by Harris et al. (1989).
- Each sett was given a unique code. Notes were taken on the type of sett; the number of holes located and the level of activity as well as the presence of any field signs including dung, latrines, hair and bedding.
- Badger monitoring was undertaken in July and October 2016. Camera traps were deployed outside or as close as possible to main and annex setts to confirm usage by badger.

3.3 Survey Constraints

Some areas were not visible because of scrub and dense bracken which reduced the efficacy of surveys. In such situations, surveyors searched for badger field signs

around the perimeter of the scrub noting the location and direction of any badger paths that appeared to enter it. It is therefore considered that the survey constraints did not undermine the surveys and therefore all data and conclusions derived thereof are considered to be robust.

Sett monitoring using camera traps at two of the setts was hindered by the sett entrances being under dense scrub and bracken. In these situations the cameras were positioned with a wide view over the general area to understand the level of badger activity in the area.

4. SURVEY RESULTS

The survey identified the presence of 7 Badger setts (Appendix 1 Figure 2.1-2.3). The classification and status of the setts was defined using the definitions detailed Harris et al (1989). All of the setts are within 30m of the construction footprint and will be subject to disturbance through construction and operation of the Project. These setts comprised of:

- Two Main Setts;
- One Annex Sett;
- Four Outlier Setts;

Further details, including grid references, notes and other recorded field signs of each sett identified during the 2016 surveys are presented in Table 1. The level of impact associated with each sett is indicated.

Table 1: Badger Survey Results and Predicted Impact.

Sett ID	Easting	Northing	Sett Type	Notes
MN1	670414	626653	Main (Active)	Main sett with at least six entrances. All but one entrance seemed inactive. Latrine with four dung pits with fresh dung. A well used badger path runs along the embankment Camera trap deployed for four nights in July and seven nights in October. Badger were picked up exiting the sett and in one shot two badgers exited one entrance.
MN2	664763	617279	Main (Active)	Main sett with nine entrances and moderate spoil heaps. Located at the top of the embankment in dense vegetation on the edge of a field. At least five entrances were active at the time of survey, and the intervening paths were well-worn. Camera trap deployed for seven nights in October.
OU1	664778	615677	Outlier (Inactive)	Possible badger sett / fox earth, with four entrances and small spoil heaps. Three entrances are inactive and quite small, but one is larger and freshly dug, possibly by a fox that has taken over an old badger sett or rabbit warren.
OU2	661951	613030	Outlier (Inactive)	Outlier sett, single entrance, small spoil heap. Entrance is filled with rubbish, inactive
OU3	667486	620941	Outlier (Inactive)	Outlier sett with single entrance and small spoil heap. Larger than a rabbit hole, but still quite small for a badger. Entrance is taller than wide, so may be a fox earth. The entrance was inactive, with some leaves in the entrance
OU4	667192	620642	Outlier (Inactive)	Outlier sett, single entrance, moderate spoil heap. Inactive at time of survey, with leaves in the entrance
AX1	664757	617256	Annex (Active)	An annex sett, with seven entrances and moderate spoil heaps. May be part of sett MN2, but the clusters of entrances appear to be distinct, so it has been recorded as an individual sett. Located in a patch of dense bracken, and along the top of the alignment. Most entrances were active at the time of survey, the intervening paths were well-worn, and a latrine had some fresh droppings. Camera trap deployed for four nights in July and seven nights in October. One recording of a badger was made however the dense bracken reduced the efficacy of the survey.

5. DISCUSSION

The 2016 walkover surveys identified 7 setts; two main setts, one annex sett, and four outlier setts. All of the setts identified in 2016 will be subject to disturbance as a result of the construction and operation of the Waterford to New Ross Greenway.

Badgers will be subject to disturbance as a result of increased human presence and noise associated with the works. However, this impact will be temporary in nature. In addition, as badgers are nocturnal and will be most active outside of the period during the day when works will be carried out and would be expected to habituate to the disturbance and continue to use adjacent habitats for foraging.

The route of the proposed greenway includes areas of dense scrub and hedgerow which likely provide important setting and foraging habitat for badgers in area. Given the locations of the setts away from the footprint of the Greenway no setts will be lost as a result of the Project. The Waterford to New Ross Greenway will not include fencing that would prevent badger crossing it. There will be a permanent loss of foraging habitat, however this is considered to be insignificant. It is considered that the disturbance associated with construction and operation is reversible through appropriate design and mitigation.

There are not expected to be any long-term significant impacts on badger populations in the area.

6. MITIGATION REQUIREMENTS

Prior to any works being carried out, a pre-construction Badger survey will be undertaken to ensure badger has not taken up residence within or close to the land take. This survey will also reassess the status of the setts recorded during the multidisciplinary walk-over survey in order to record any change in status in the intervening period between planning and construction.

Mitigation measures are required to prevent, reduce and offset the impacts of sett disturbance and habitat loss as a result of the Waterford to New Ross Greenway and to comply with the requirements of the Wildlife Act 1976-2000. These measures have been developed based on the NRA guidance (NRA, 2006).

The principal impact to be mitigated is disturbance to two main, one annex and 4 outlier setts. Due to their locations, as shown Appendix 1 Figure 2.1- 2.3, the disturbance is unavoidable but can be mitigated through the adoption of a mitigation strategy.

Construction disturbance associated with the Waterford to New Ross Greenway will be minimised through appropriate mitigation. Works within 30m of a badger sett (50m during the breeding season) will be supervised by an Ecological Clerk of Works (ECoW).

Any excavations over one metre deep will be securely covered at night or a ramp provided to enable animals to escape should they fall in. Works within badger protection zones will be programmed to occur during the hours of daylight only; commencing 2 hours after sunrise and ending one hour before sunset in summer (April to September), and 1 hour after sunrise to end 1 hour before sunset in winter (October to March).

Existing vegetation around Badger setts will be left intact as far as practicable. Additional screening will be provided to reduce acoustic disturbance from the construction and operation of the Greenway.

No fencing will be used which would inhibit access to badger across the Greenway. Lighting design will be sensitive to areas with badger setts. As a result of the small land-take by the Project it has not been considered necessary to provide additional foraging or setting habitat specifically targeted at badgers, however areas of additional planting have been proposed as part of the general ecological enhancement strategy which will reduce both visual and acoustic disturbance and well as providing cover for badgers.

Should any active setts be recorded within the development footprint during the pre-construction survey, the procedure outlined below will be followed under licence from NPWS.

Exclusion of Badgers from currently active setts will only be carried out from July to November inclusive in order to avoid the Badger breeding season. Exclusion of Badgers from disused or currently inactive setts may be completed throughout the year. Should active setts be encountered prior to construction, the NRA guidelines (2006) will be followed for the exclusion of active setts.

The destruction of a main sett requires the provision of an artificial sett within 100m of the original. One-way gates should be installed on all entrances of active setts to allow badgers to exit but not re-enter. These gates should be tied open for the first three days. Once no badger activity is observed for a period of 21 days, the sett should be destroyed. If the gates are left in place for long periods of time Badgers may attempt to dig around them or to create new entrances. Therefore, setts should be destroyed as soon as the 21 day period has elapsed.

Disused setts are considered to be unused by Badgers. Further survey work will be required to ensure the setts are inactive at the time of construction. In the case of disused setts, initial exclusion involves lightly blocking entrances with vegetation and a light application of soil (i.e. soft blocking). Soft blocking confirms the absence or presence of Badgers. If all entrances remain undisturbed for five days, setts should be destroyed immediately under licence and supervision from National Parks and Wildlife Service (NPWS). If it is not possible to destroy the sett immediately, the entrance should be hard-blocked using buried fencing material and compacted soil and destroyed as soon as possible.

With the mitigation in place the badger population will be maintained and there are no residual effects anticipated for badgers in the vicinity of the Waterford to New Ross Greenway.

7. SUMMARY

Badgers in the along the proposed route will be subject to temporary disturbance associated with construction of the Waterford to New Ross Greenway. This document supports an application under Section 23 of the Wildlife Acts 1976-2012 to disturb badger.

Seven badger setts along the route corridor may be subject to disturbance as a result of works associated with the Waterford to New Ross Greenway.

All works pertaining to this licence will be undertaken according to NRA/TII guidance (NRA/TII, 2006) and will be supervised by an ECoW. These works include activities which may injure or disturb badgers during vegetation clearance and fence-line construction.

If the disturbance is mitigated for, there will likely be no reduction in the viability of the Site for badger.

8. REFERENCES

Harris, S., Cresswell, P. and Jefferies, D. (1989). Surveying Badgers. The Mammal Society, Occasional Publication No.9. The Mammal Society.

Scottish Natural Heritage (2012). Badgers: Best Practice. Available from: <http://www.snh.gov.uk/about-scotlands-nature/wildlife-and-you/Badgers/best-practice/> [Accessed 30/08/2015]

National Roads Authority (2006) Guidelines for the treatment of Badgers Prior to National Road Schemes. Available from: <http://www.tii.ie/technical-services/environment/construction/Guidelines-for-the-Treatment-of-Badgers-prior-to-the-Construction-of-a-National-Road-Scheme.pdf> [Accessed 30/08/2016].

ROD (2015). Waterford to New Ross Greenway Interim Ecological Survey Report .

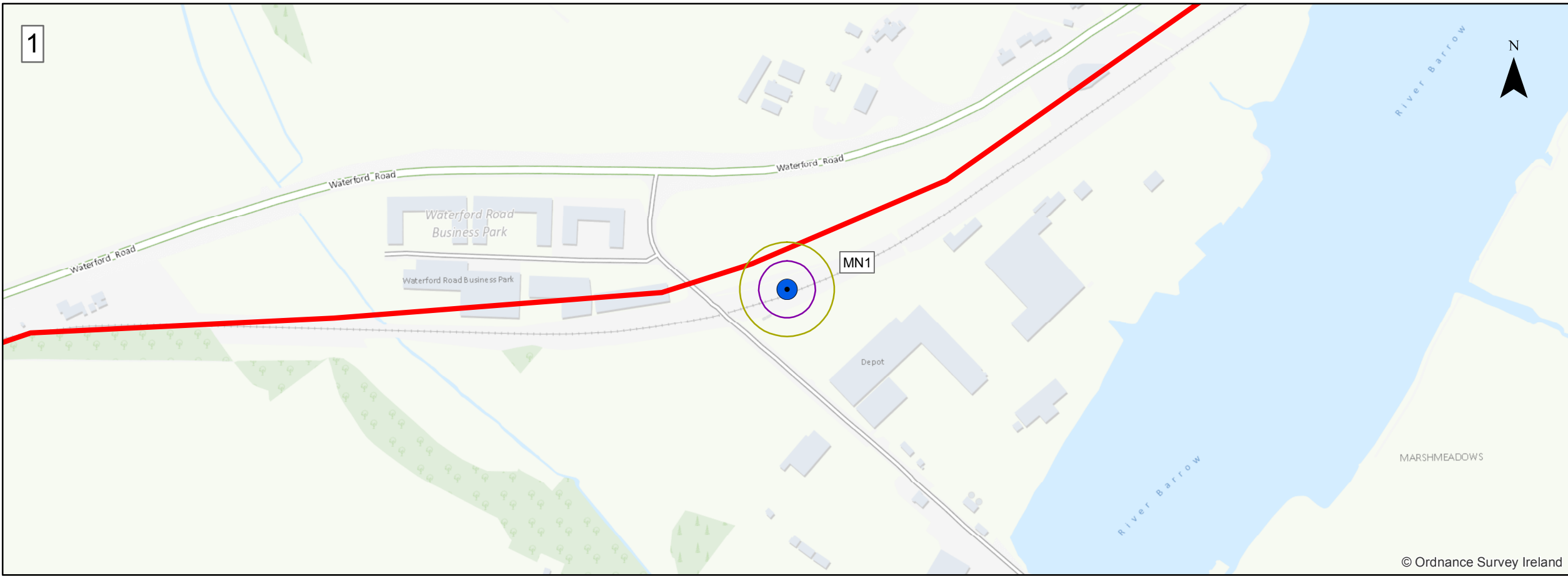
Wildlife Act, 1976, No. 39 of 1976.

Wildlife Act, 1976 (Protection of Wild Animals) Regulations, 1990, SI No. 112/1990.

Wildlife (Amendment) Act, 2000, No. 38 of 2000.

Wildlife (Amendment) Act, 2012, No 29 of 2012.

APPENDIX A. Figures

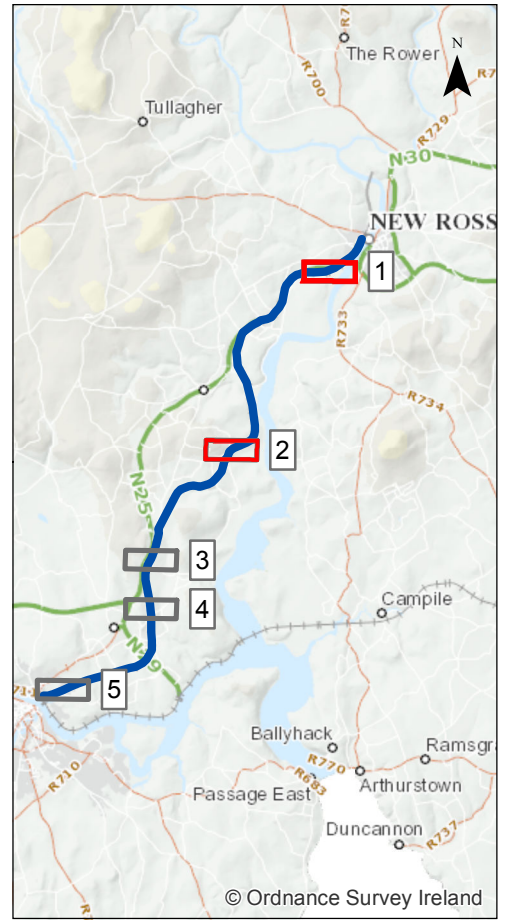
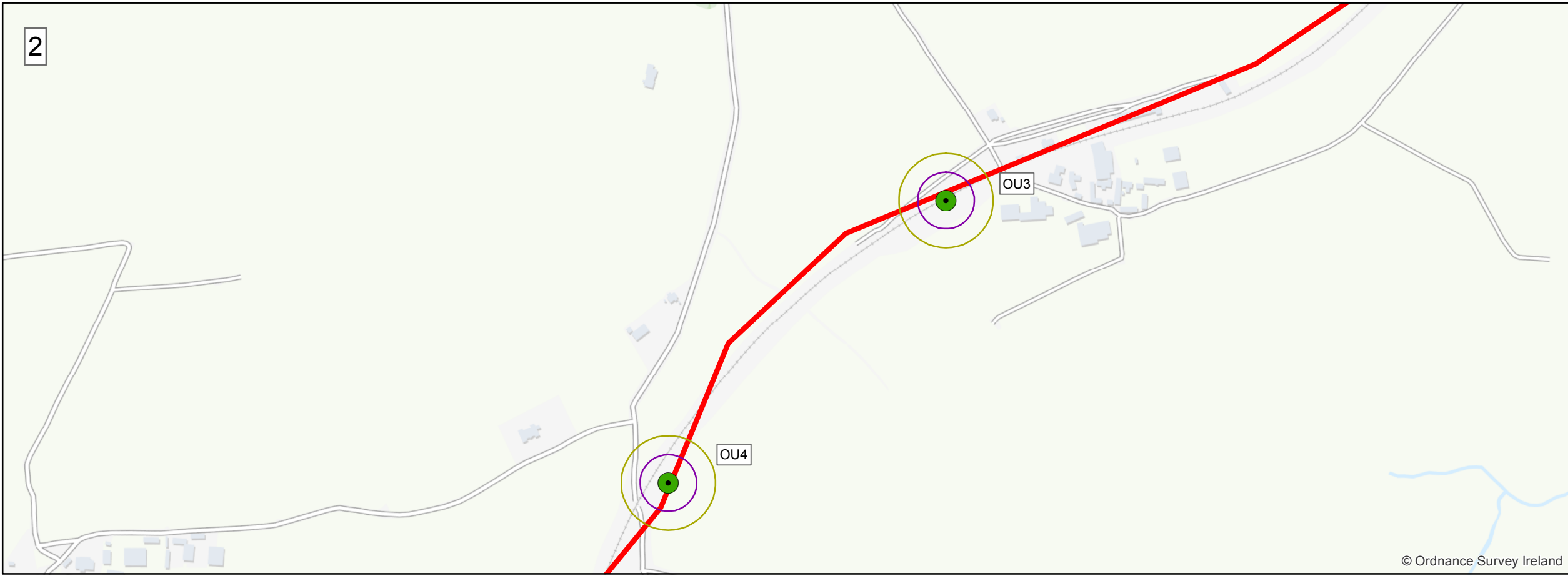
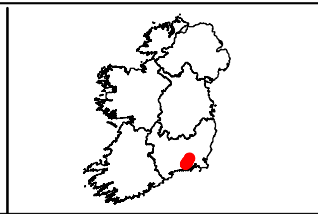
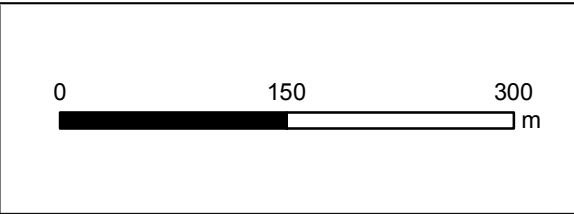


LEGEND:

- Railway
- 30m Buffer
- 50m Buffer

Badger

- ANNEX
- MAIN
- OUTLIER

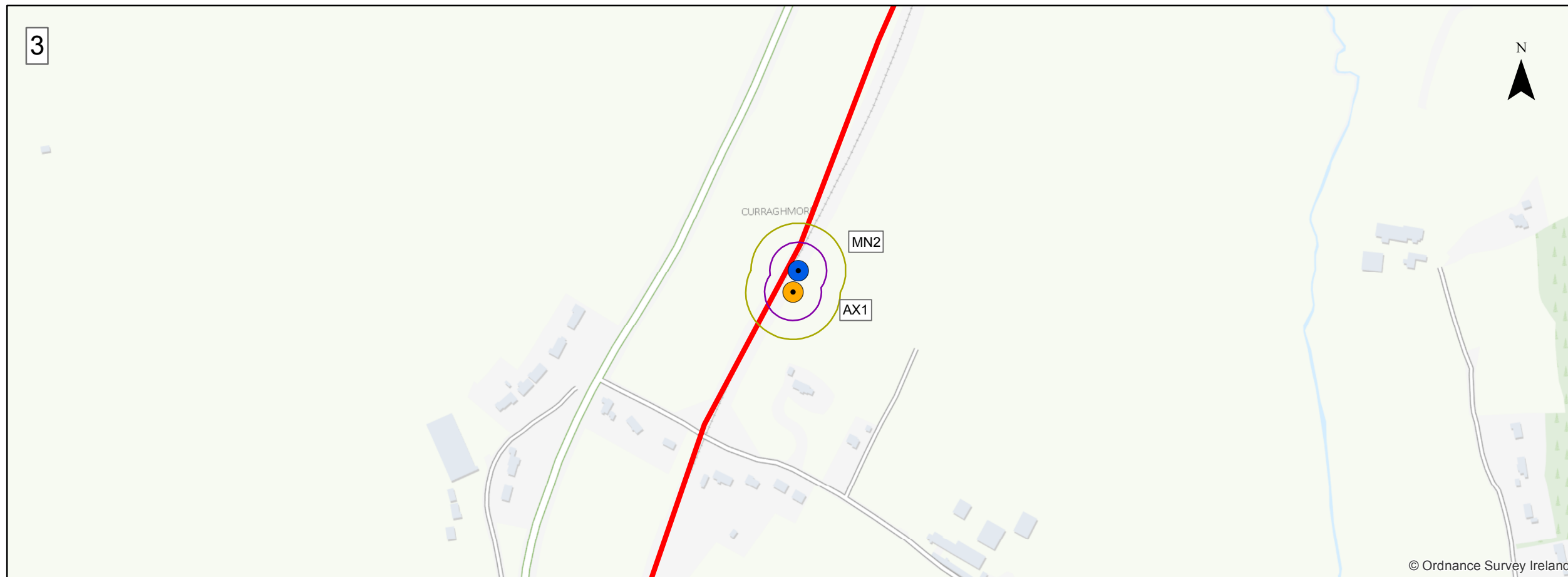
ROD
ROUGHAN & O'DONOVAN

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Website : www.rod.ie
www.aecom.com

Designed: POS Checked: RWP Approved: DC Status:




WATERFORD TO NEW ROSS GREENWAY			
LOCATION OF BADGER			
SHEET 1 of 3			
Date: October 2016	Job No: 15.152.100	Drawing No:	Rev:
Scale: 1:5,000 @ A3	Drawn: MM	Figure 2.1	

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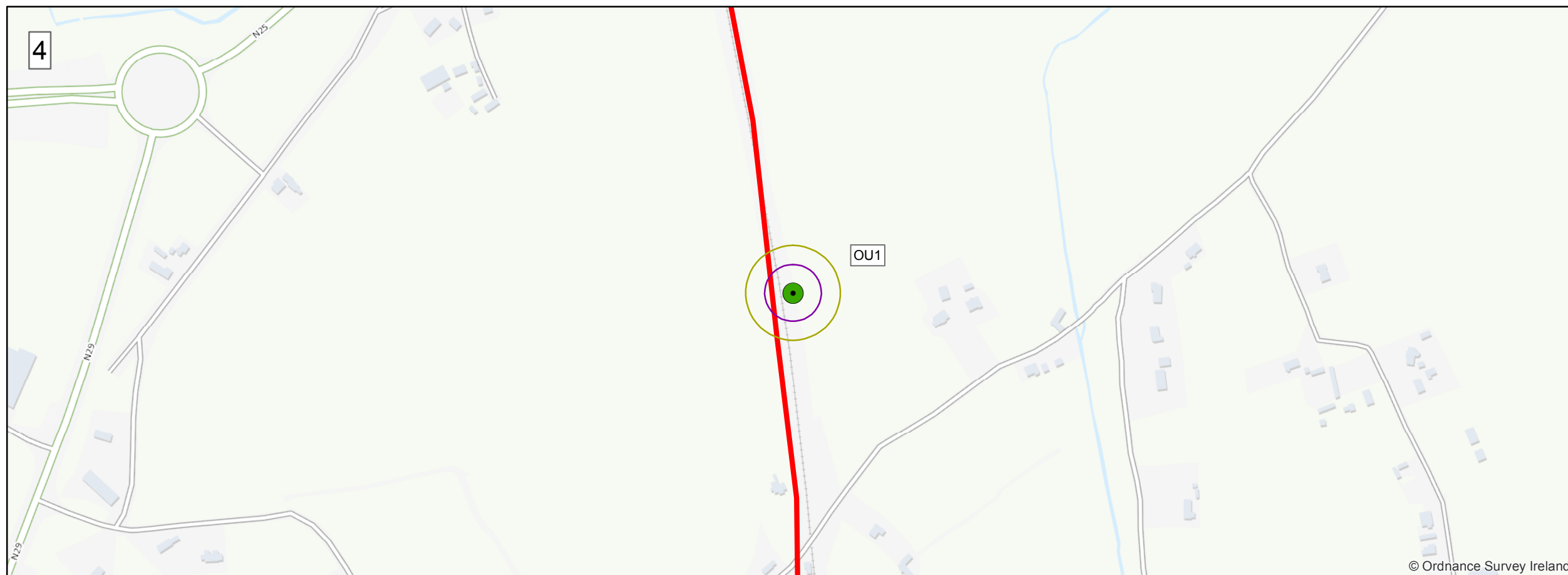


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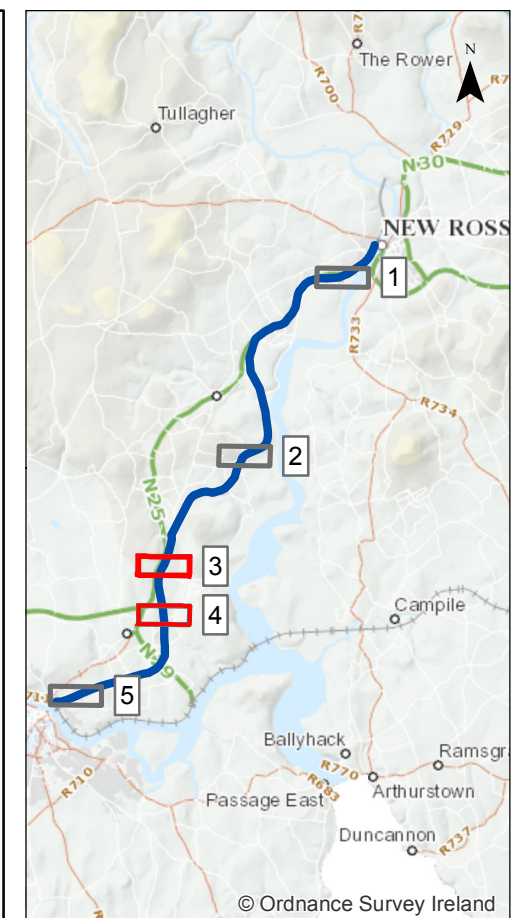
LEGEND:

-  Railway
-  30m Buffer
-  50m Buffer
- Badger**
-  ANNEX
-  MAIN
-  OUTLIER

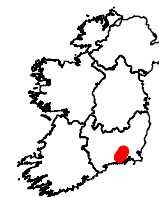
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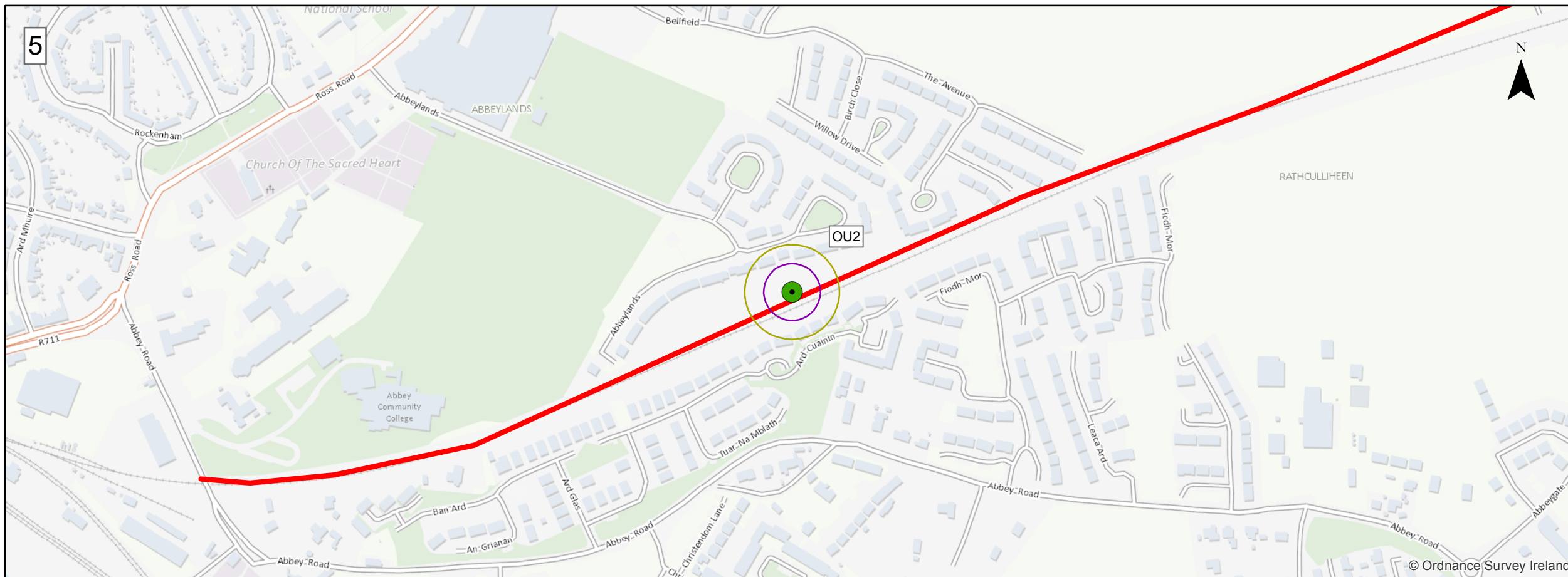
Arena House, Arena Road,
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e-mail : info@rod.ie
Website : www.rod.ie
www.aecom.com

WATERFORD TO NEW ROSS GREENWAY

LOCATION OF BADGER
SHEET 2 of 3

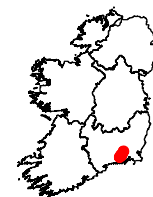
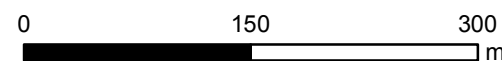
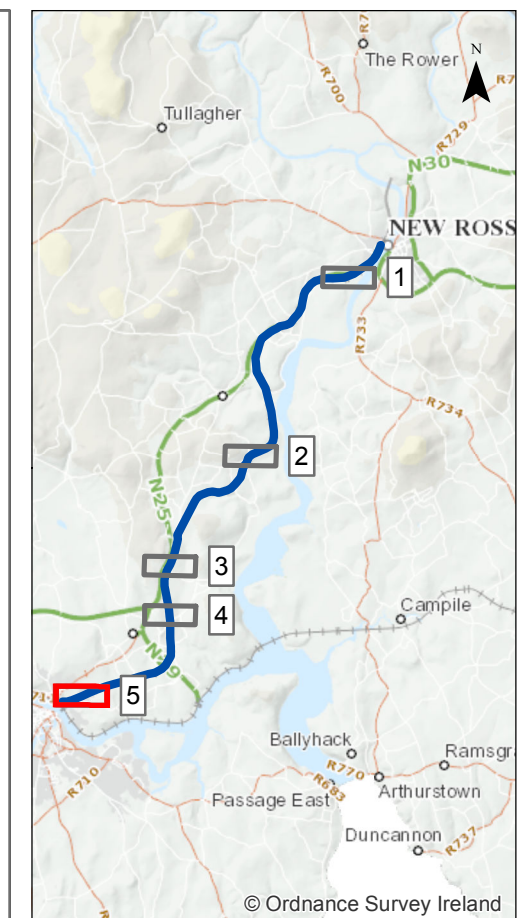
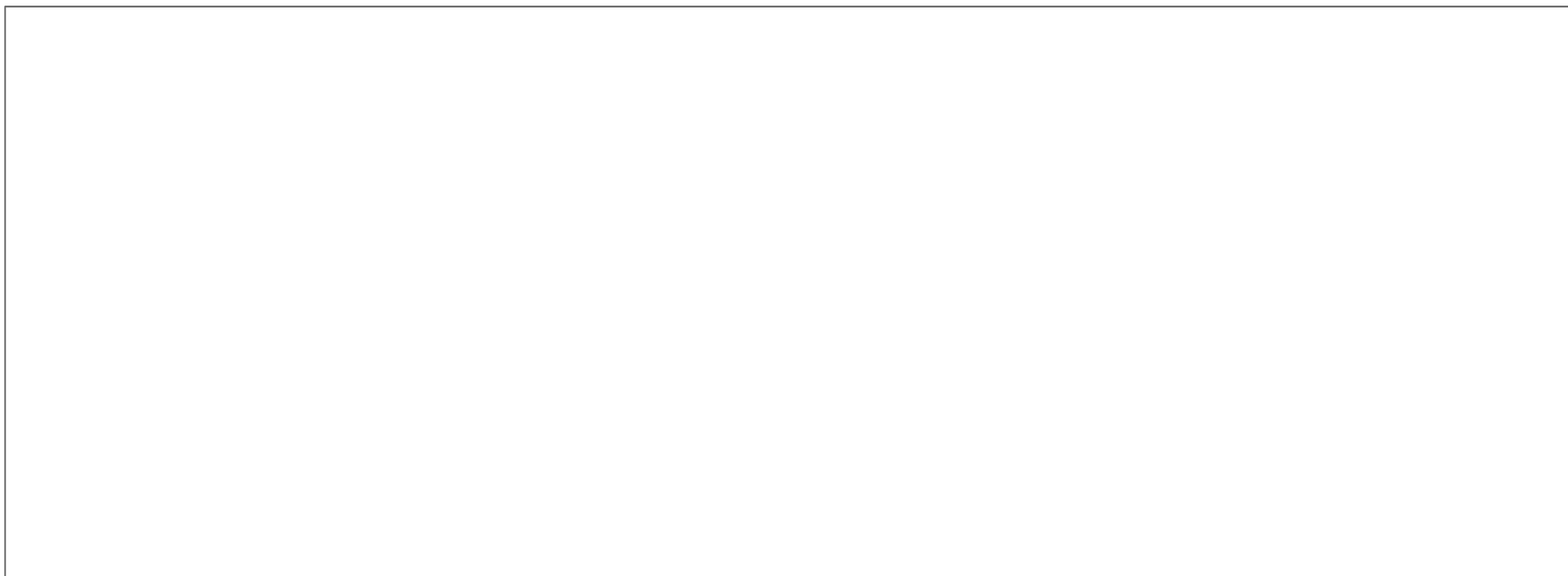
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Date: October 2016 Job No: 15.152.100 Drawing No: Rev:
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LEGEND:

-  Railway
-  30m Buffer
-  50m Buffer
- Badger**
-  ANNEX
-  MAIN
-  OUTLIER



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WATERFORD TO NEW ROSS GREENWAY

LOCATION OF BADGER
SHEET 3 of 3

Date: October 2016	Job No: 15.152.100	Drawing No: Figure 2.3	Rev:
Scale: 1:5,000 @ A3	Drawn: MM		

Designed: POS Checked: RWP Approved: DC Status:

APPENDIX B. PHOTOGRAPHS



Main Sett 1



Main Sett 2



Outlier Sett 1



Outlier Sett 2



Outlier Sett 3



Sett OU4



Sett AN1

Wildlife Licensing Unit,
National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,
7 Ely Place,
Dublin 2

Date: 4th November 2016
Ref: 15152.100
Re: Waterford to New Ross Greenway
Subject: Application for Licence to Disturb Badger Setts

Dear Sir/Madam,

Please find attached an Application Form and Supporting Information to inform an application under Section 23 of the Wildlife Acts 1976-2012 to disturb badger (*Meles meles*) setts during works associated with the Waterford to New Ross Greenway.

Yours sincerely,

Patrick O'Shea ACIEEM

Ecologist

Roughan & O'Donovan | *consulting engineers*

Arena House, Arena Road, Sandyford, Dublin 18, Ireland

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www.rod.ie

WILDLIFE ACTS 1976 TO 2012 – SECTIONS 23 AND 34

APPLICATION FOR LICENCE TO CAPTURE AND/OR HUMANELY KILL A PROTECTED WILD ANIMAL FOR EDUCATIONAL, SCIENTIFIC OR OTHER PURPOSES

1. Name of applicant:	PATRICK O' SHEA
Address:	ROUGHAN AND O'DONOVAN, ARENA HOUSE, ARENA ROAD, SANDYFORD, DUBLIN 18, D18 V8P6
[BLOCK LETTERS]	
Email Address:	PATRICK.O'SHEA@ROD.IE
Telephone No.:	01 294 0800
2. Species Name: (Common & Scientific)	Badger (<i>Meles meles</i>)
3. Number to be captured or killed:	N/A
(please specify whether capture or killing)	
4. Purpose of capture or killing:	N/A
5. Area(s) in which applicant will operate:	The route of the Waterford to New Ross Greenway follows the route of the disused Waterford to New Ross Railway Line from the north quays in Waterford City to O'Hanrahan Bridge in New Ross. Its passes through Co. Waterford, Co. Kilkenny and Co. Wexford.
(e.g. county and townland)	
6. Means of capture or killing:	N/A
7. Type of trap snare or net (if appropriate)	N/A

8. Qualifications/experience in this field of activity

Patrick is an ecologist with 4 years experience in consultancy and research. He has a thorough knowledge of ecological requirements on infrastructure and development projects. He has experience in undertaking surveys, monitoring and data analysis for badger. He also has extensive experience as an ecological clerk of works (ECoW) for archaeology, tree felling, ground investigation and hydrological testing works in badger sensitive areas under licence. He has also supervised the construction of artificial setts. On the Aberdeen Western Peripheral Route Patrick undertook three years of surveys and monitoring badger activity including bait marking and soft blocking of setts. He was a licensed agent of the project badger licence for the destruction of nine main setts and the disturbance of two others as well as the destruction of approx 100 outlier setts.

9. Organisation to which applicant is affiliated:

Roughan & O'Donovan Consulting Engineers

10. Period for which licence is required:

July to November 2017

11. Number of previous licence (if any) and date of expiry:

1- Scottish Natural Heritage licence listed agent for the Aberdeen Western Peripheral Route. Project is ongoing although I am not working on it anymore.

I declare that the above particulars are, to the best of my knowledge and belief, true and correct.

Signature:

Date:

Please return completed application form to:
Wildlife Licensing Unit
National Parks and Wildlife Service
7 Ely Place
Dublin 2 D02 TW98



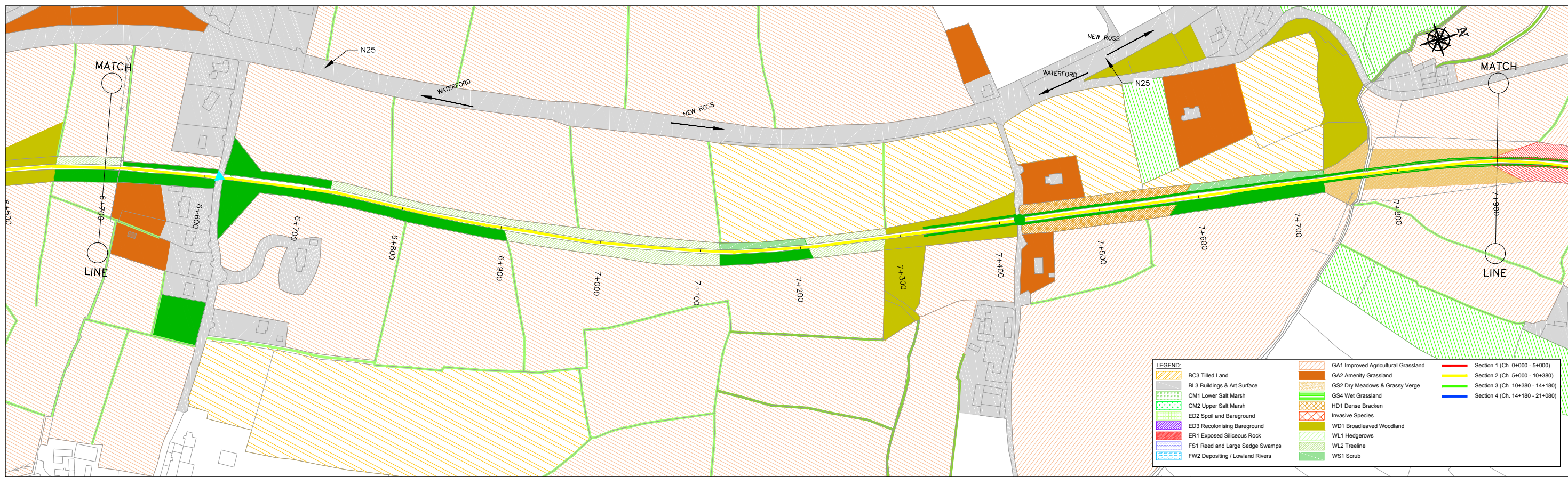
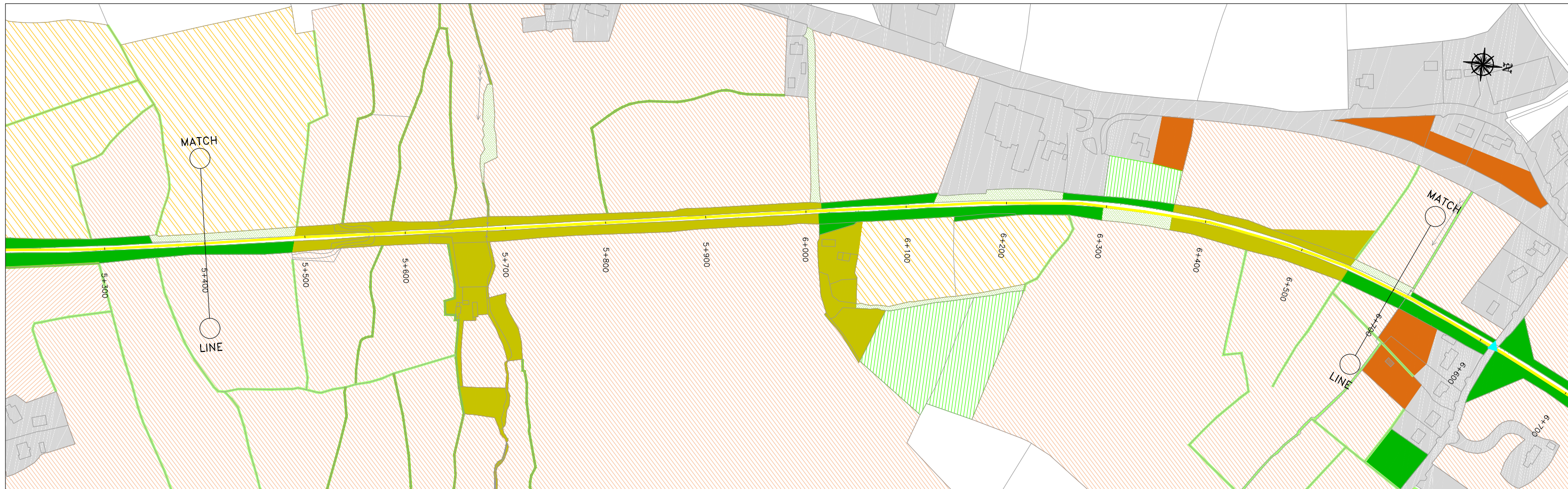
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Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs

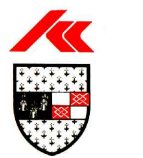
Tel.: (01) 888 3242
Email: wildlifelicence@ahg.gov.ie

END

APPENDIX B
Habitat Maps



LEGEND:	
	BC3 Tilled Land
	BL3 Buildings & Art Surface
	CM1 Lower Salt Marsh
	CM2 Upper Salt Marsh
	ED2 Spoil and Bareground
	ED3 Recolonising Bareground
	ER1 Exposed Siliceous Rock
	FS1 Reed and Large Sedge Swamps
	FW2 Depositing / Lowland Rivers
	GA1 Improved Agricultural Grassland
	GA2 Amenity Grassland
	GS2 Dry Meadows & Grassy Verge
	GS4 Wet Grassland
	HD1 Dense Bracken
	Invasive Species
	WD1 Broadleaved Woodland
	WL1 Hedgerows
	WL2 Treeline
	WS1 Scrub
	Section 1 (Ch. 0+000 - 5+000)
	Section 2 (Ch. 5+000 - 10+380)
	Section 3 (Ch. 10+380 - 14+180)
	Section 4 (Ch. 14+180 - 21+080)



"This project was part funded by Kilkenny LEADER Partnership through the European Agricultural Fund for Rural Development: Europe investing in Rural Areas"

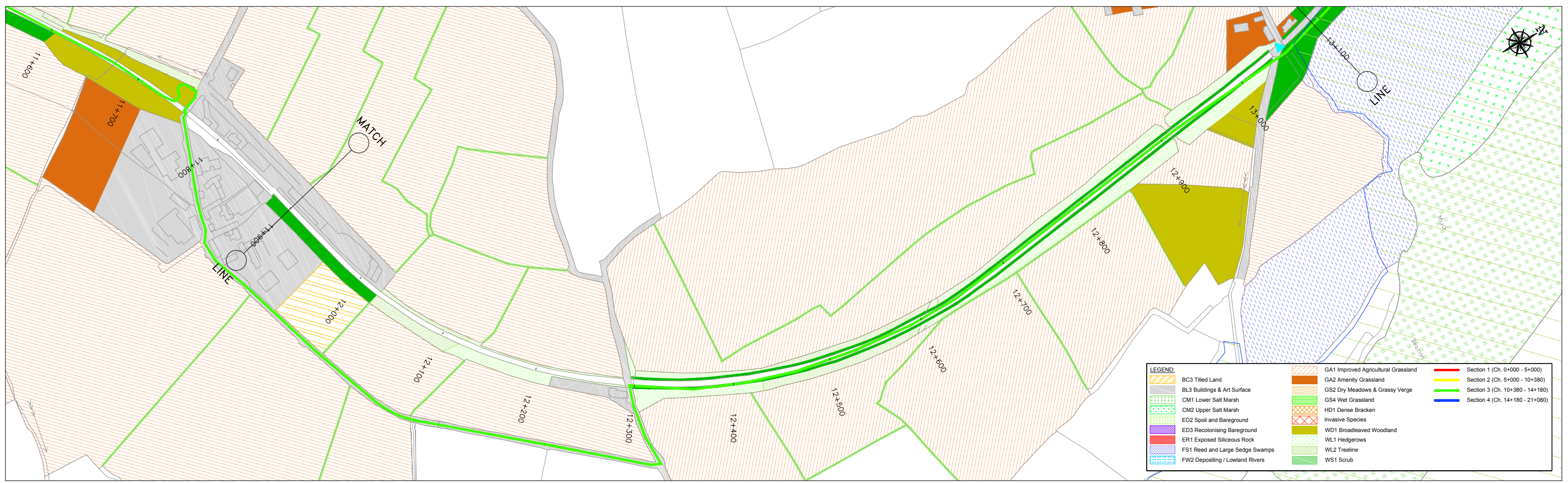
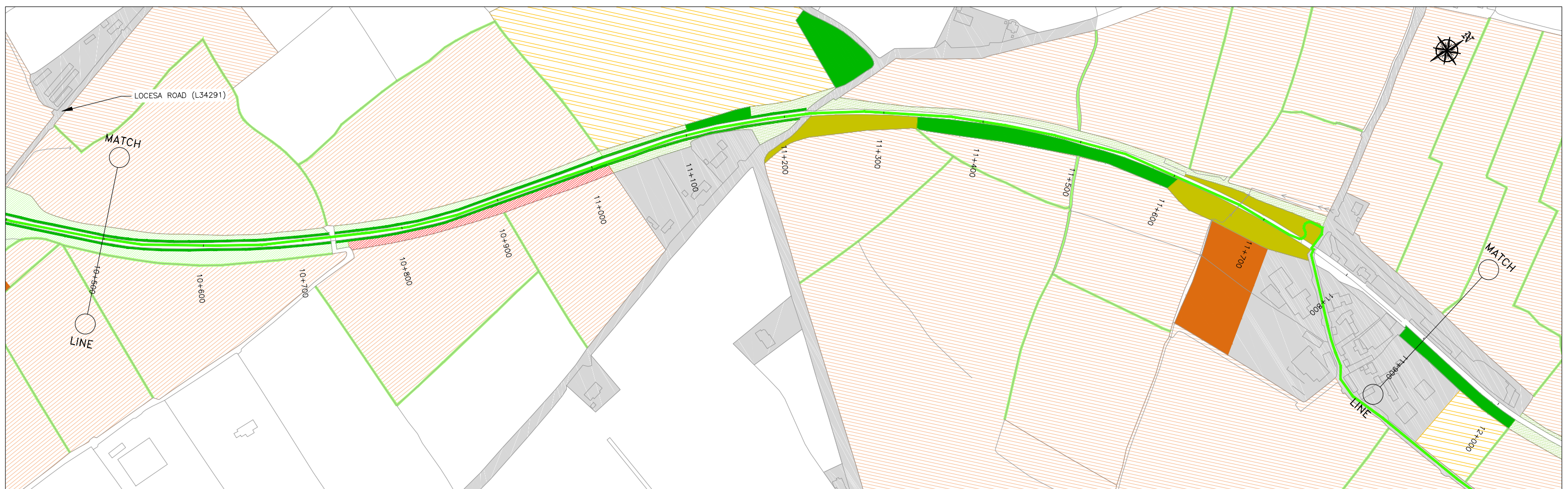
No.	Revision	Date	By	Chk'd	App'd
	Stage				

PRELIMINARY
APPROVAL
TENDER
CONSTRUCTION

Roughan & O'Donovan
Consulting Engineers
Civil - Structural - Transportation - Environmental

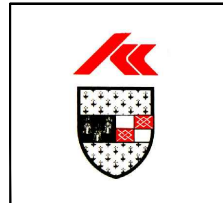
Arena House, Arena Road,
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e-mail : info@rod.ie
Website : www.rod.ie

Project Title		WATERFORD TO NEW ROSS GREENWAY	
Drawing Title		HABITAT MAPPING SHEET 3 OF 8	
Drawn:	MM	Job No:	15.152.100
Scale:	1:2000	Date:	MAY 2015
Drawing No:	HAB-103	Rev:	-



LEGEND:

BC3 Tilled Land	GA1 Improved Agricultural Grassland	Section 1 (Ch. 0+000 - 5+000)
BL3 Buildings & Art Surface	GA2 Amenity Grassland	Section 2 (Ch. 5+000 - 10+380)
CM1 Lower Salt Marsh	GS2 Dry Meadows & Grassy Verge	Section 3 (Ch. 10+380 - 14+180)
CM2 Upper Salt Marsh	GS4 Wet Grassland	Section 4 (Ch. 14+180 - 21+080)
ED2 Spoil and Bareground	HD1 Dense Bracken	
ED3 Recolonising Bareground	Invasive Species	
ER1 Exposed Siliceous Rock	WD1 Broadleaved Woodland	
FS1 Reed and Large Sedge Swamps	WL1 Hedgerows	
FW2 Depositing / Lowland Rivers	WL2 Treeline	
	WS1 Scrub	



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No.	Revision	Date	By	Chk'd	App'd
	Stage				

PRELIMINARY
APPROVAL
TENDER
CONSTRUCTION

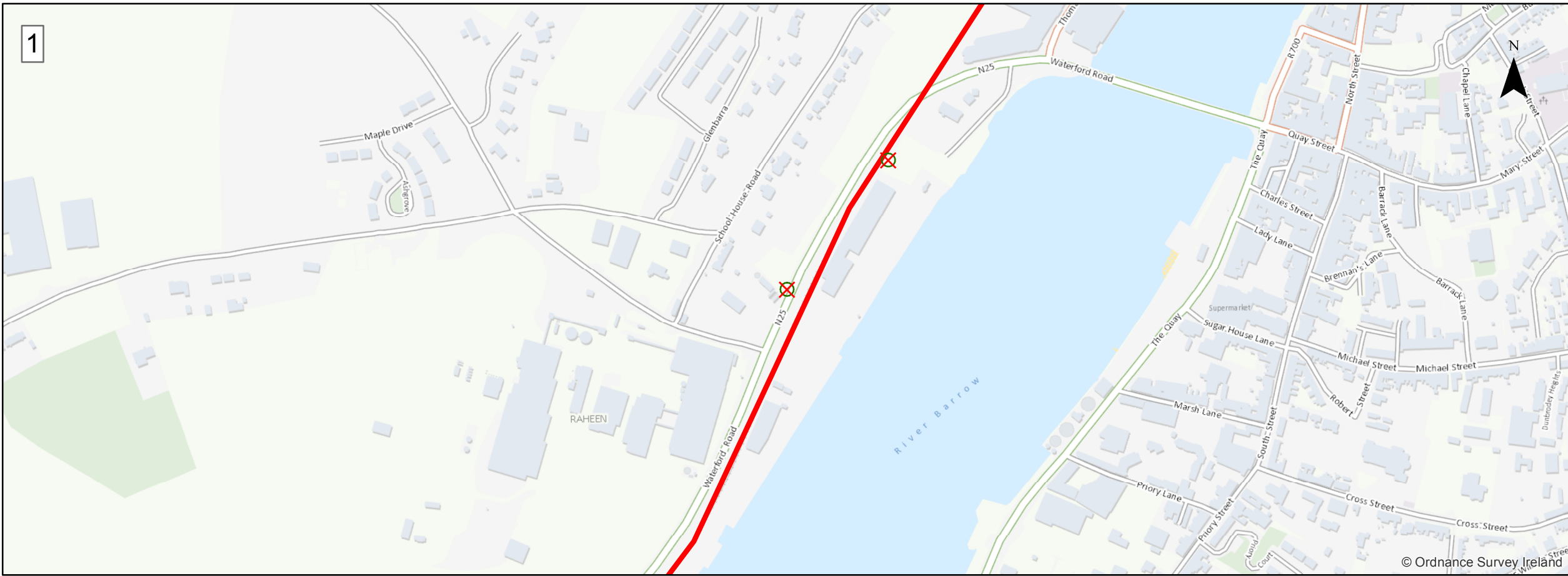
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Project Title		WATERFORD TO NEW ROSS GREENWAY	
Drawing Title		HABITAT MAPPING SHEET 5 OF 8	
Drawn: MM	Job No: 15.152.100	Drawing No: HAB-105	Rev: -
Scale: (A1) 1:2000	Date: MAY 2015		

APPENDIX C

Ecological Constraint Maps

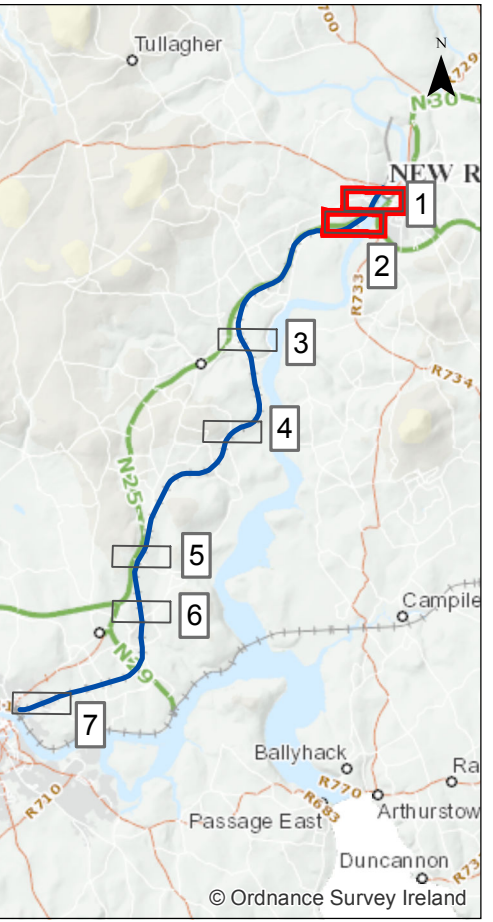
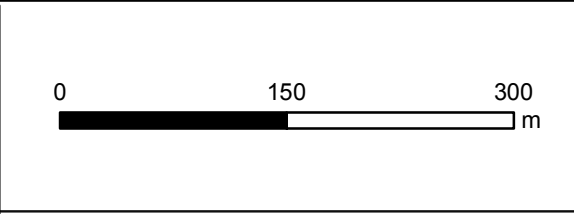


LEGEND:

- Railway
- Bat Roost
- × Japanese knotweed
- 7m Buffer

Badger

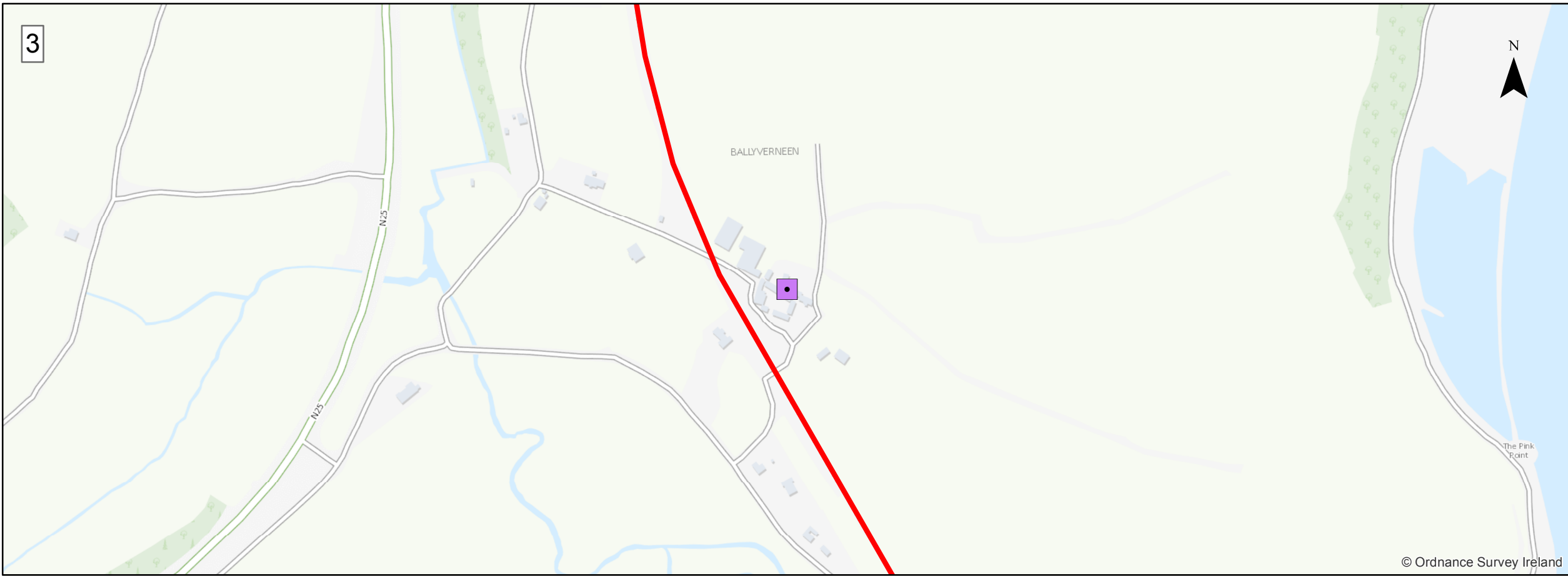
- ANNEX
- MAIN
- OUTLIER
- 30m Buffer
- 50m Buffer

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Designed: POS Checked: RWP Approved: DC Status:

WATERFORD TO NEW ROSS GREENWAY			
ECOLOGICAL CONSTRAINTS			
SHEET 1 of 4			
Date: October 2016	Job No: 15.152.100	Drawing No: Appendix A	Rev:
Scale: 1:5,000 @ A3	Drawn: MM		

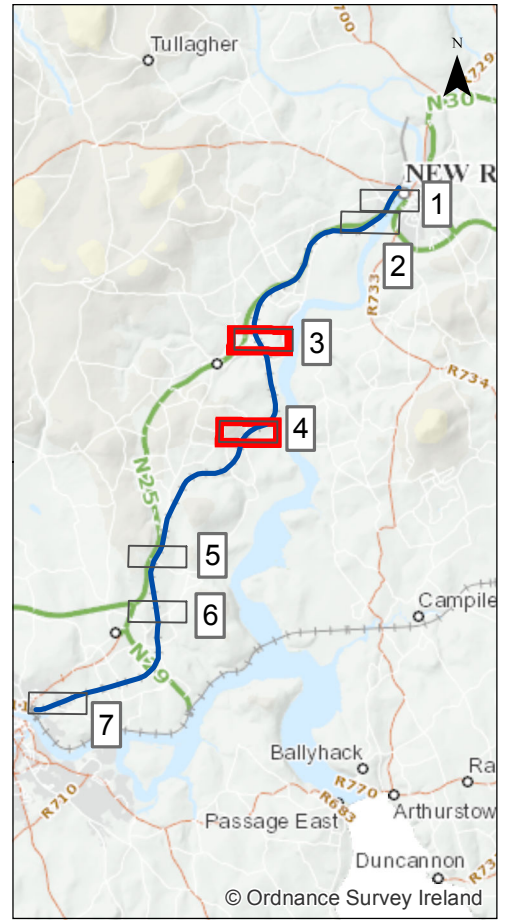
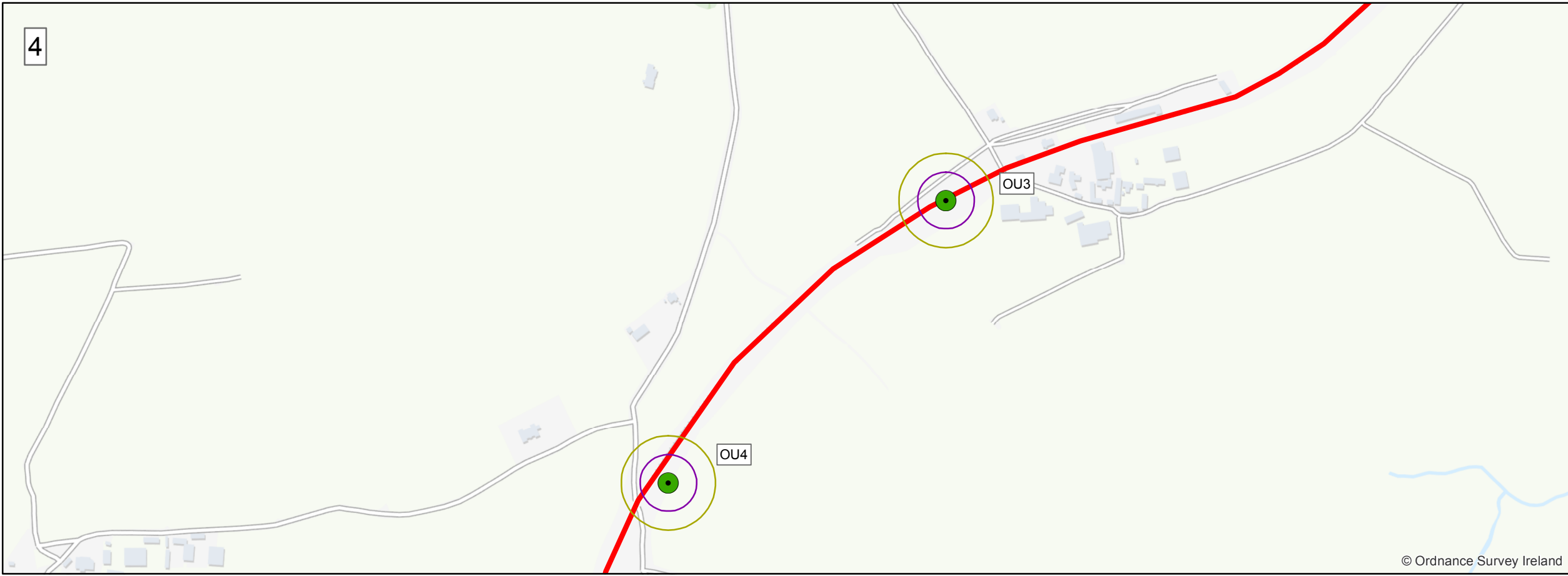


LEGEND:

- Railway
- Bat Roost
- Japanese knotweed
- 7m Buffer

Badger

- ANNEX
- MAIN
- OUTLIER
- 30m Buffer
- 50m Buffer

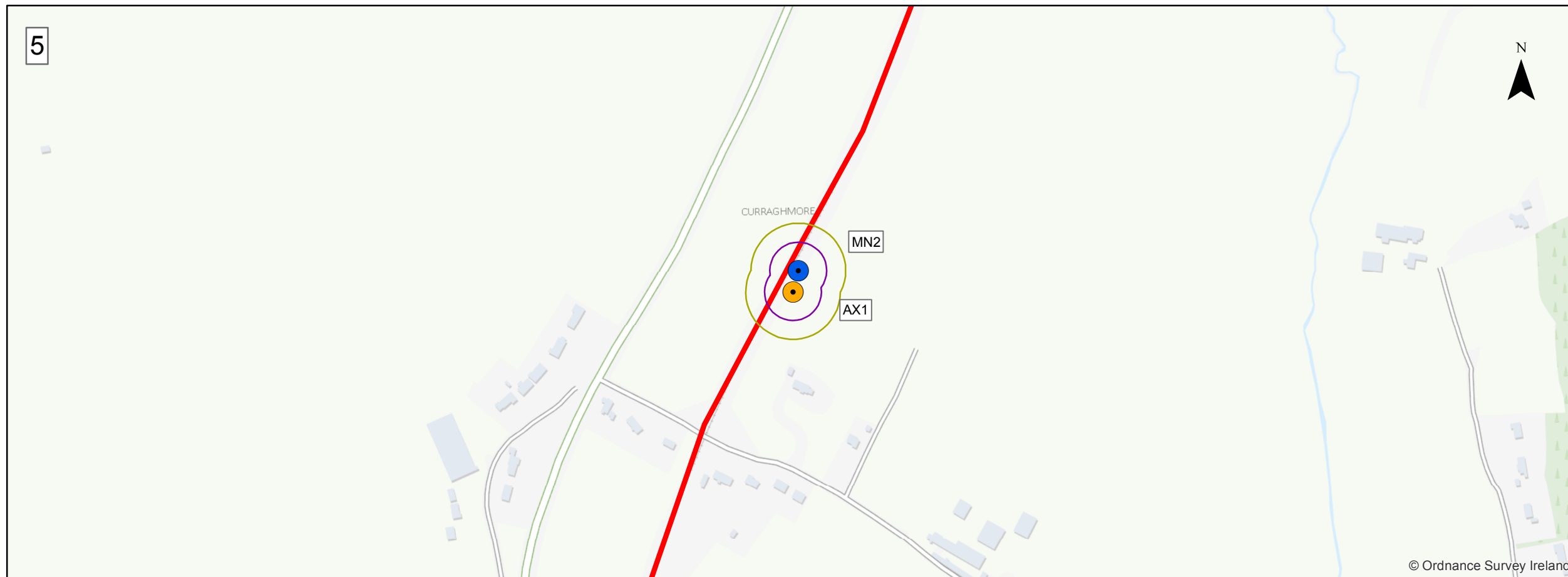



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ECOLOGICAL CONSTRAINTS			
SHEET 2 of 4			
Date: October 2016	Job No: 15.152.100	Drawing No: Appendix A	Rev:
Scale: 1:5,000 @ A3	Drawn: MM		

5

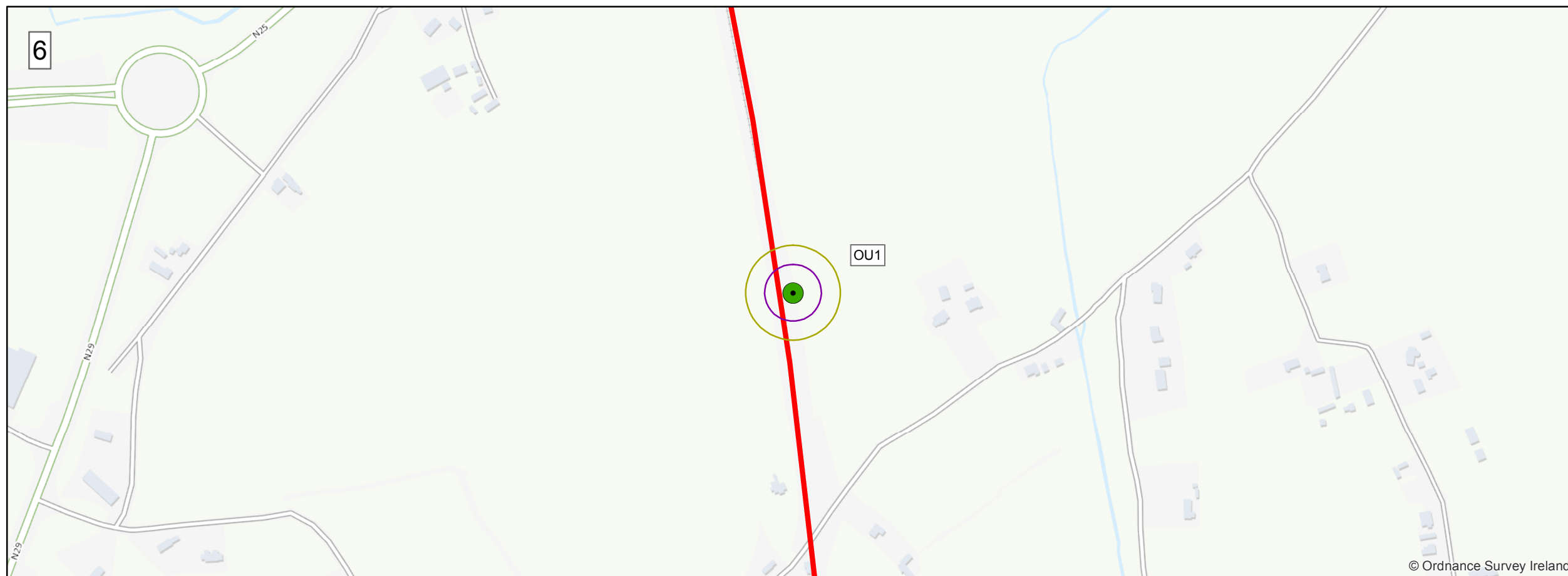


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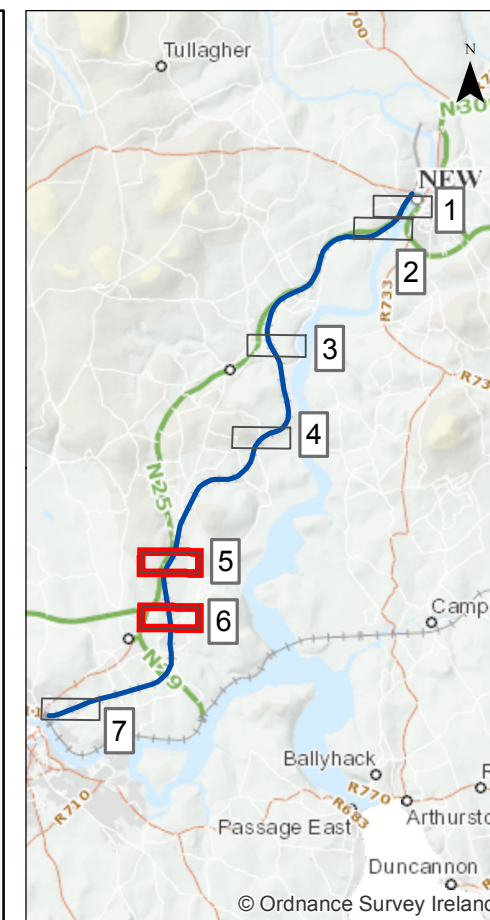
-  Railway
-  Bat Roost
-  Japanese knotweed
-  7m Buffer
-  ANNEX
-  MAIN
-  OUTLIER
-  30m Buffer
-  50m Buffer

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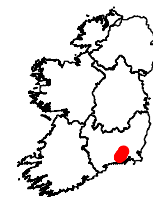
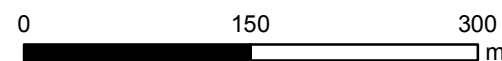
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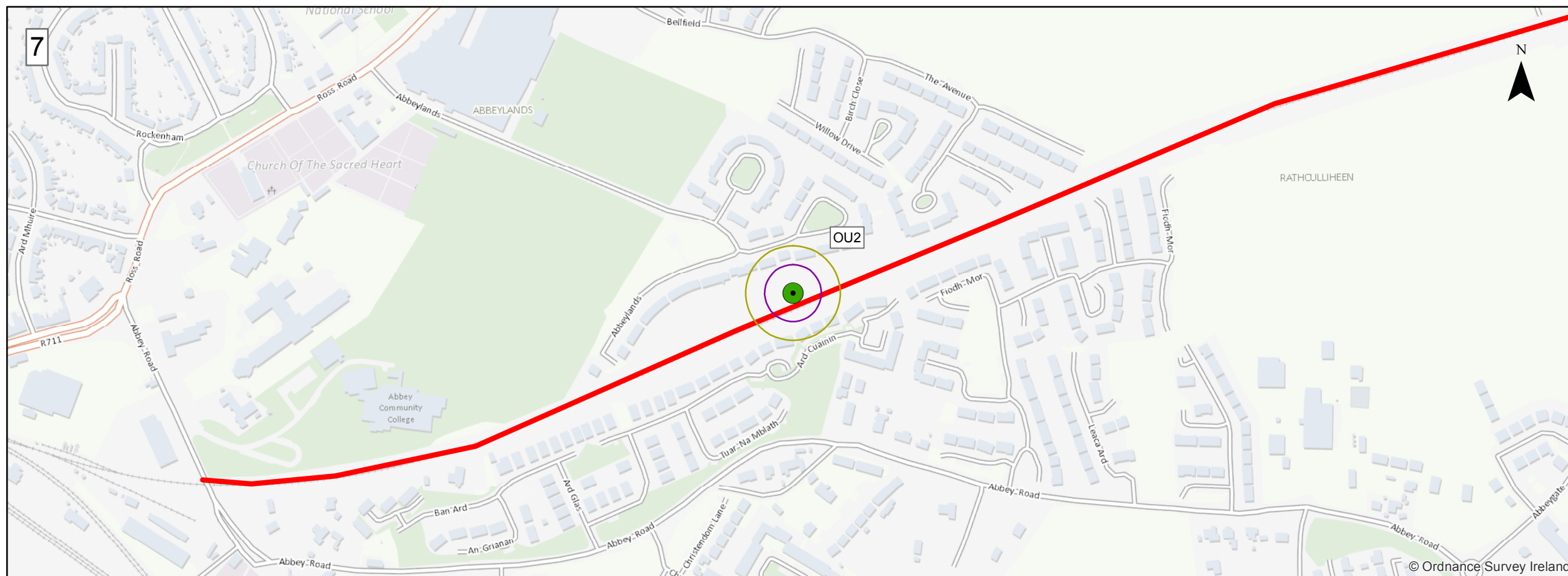
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WATERFORD TO NEW ROSS GREENWAY

ECOLOGICAL CONSTRAINTS
SHEET 3 of 4

Date: October 2016 Job No: 15.152.100 Drawing No: Appendix A Rev:
Scale: 1:5,000 @ A3 Drawn: MM

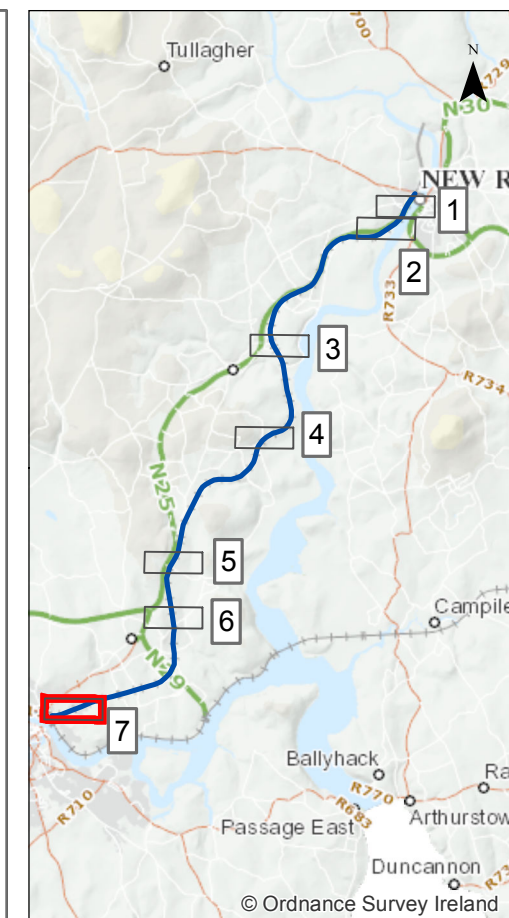
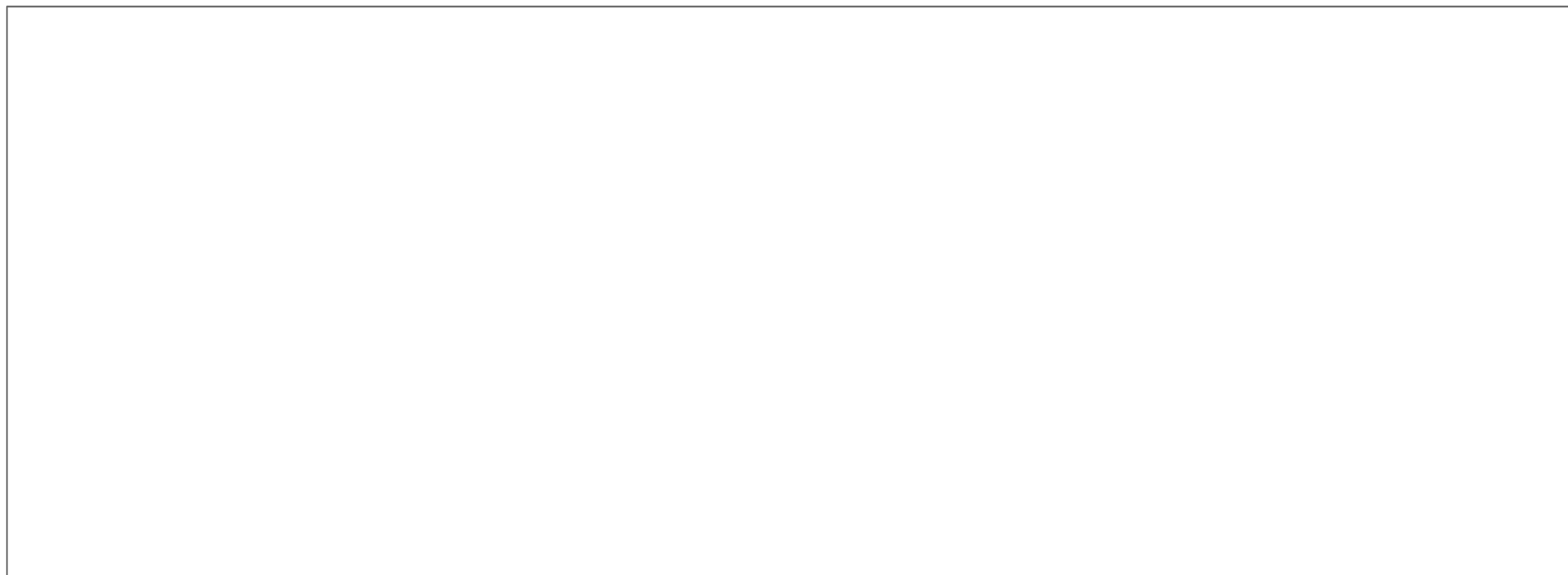
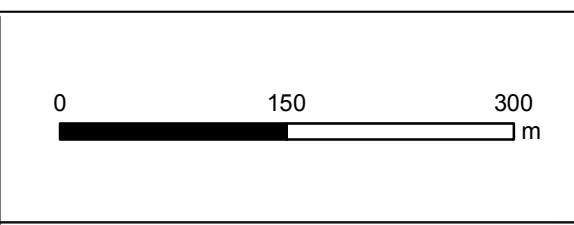


LEGEND:

- Railway
- Bat Roost
- Japanese knotweed
- 7m Buffer
- 30m Buffer
- 50m Buffer

Badger

- ANNEX
- MAIN
- OUTLIER

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Project Title			
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Drawing Title			
ECOLOGICAL CONSTRAINTS			
SHEET 4 of 4			
Date: October 2016	Job No: 15.152.100	Drawing No:	Rev:
Scale: 1:5,000 @ A3	Drawn: MM	Appendix A	