

**REFERENCE DOCUMENTS for
PROPOSED LARGER TURBINES AND MET MASTS
AT UPPERCHURCH WINDFARM
for EIAR 2021 and AA 2021**

REFERENCE DOCUMENT 17 of 36

This document contains the following:

UWF Related Works (LA ref. 18/600913, ABP ref. ABP-303634-19)

- **2019 Revised Appropriate Assessment Report For UWF Related Works – Volume E5 (5 of 5)**
 - Appendix A12: Biodiversity Information: Detailed Biodiversity Data and Supplementary Information
 - Appendix A13: Biodiversity Information: Appendix 8.1.1 Confidential Annex

VOLUME E
REVISED APPROPRIATE ASSESSMENT REPORTING

UWF Related Works

Revised Appropriate Assessment Report

For UWF Related Works

January 2019

Volume E5 (5 of 5)

**Appendix A12: Biodiversity Information: Detailed Biodiversity Data and
Supplementary Information**

Appendix A13: Biodiversity Information: Appendix 8.1.1 Confidential Annex



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UWF Related Works

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Appendix A12: Biodiversity Information

Detailed Biodiversity Data and Supplementary Information



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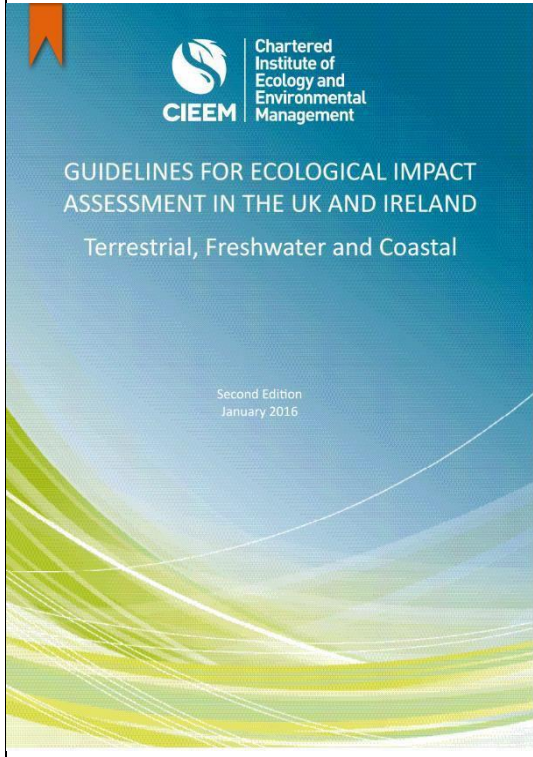
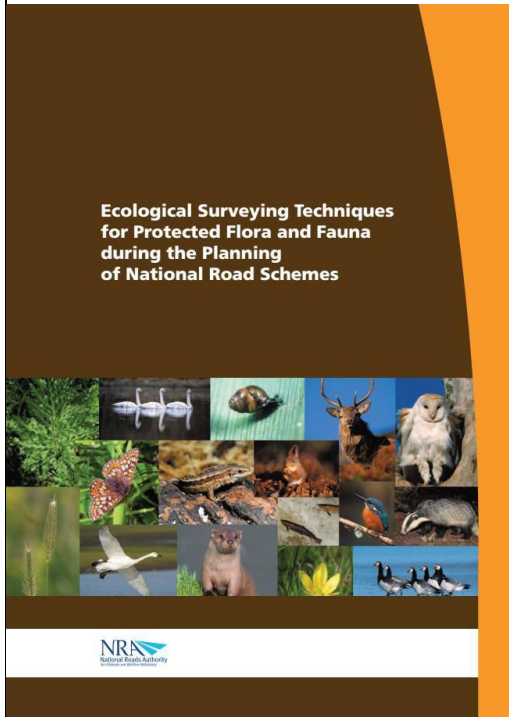

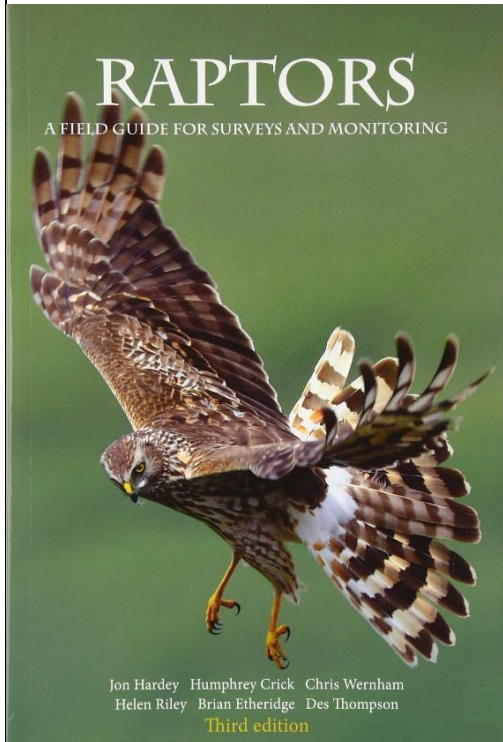
APPENDIX 8.1: DETAILED BIODIVERSITY DATA AND SUPPLEMENTARY INFORMATION

The data and descriptions in this appendix have informed Chapter 8: Biodiversity of the EIA Report. The information presented in this Appendix 8.1 is outlined below

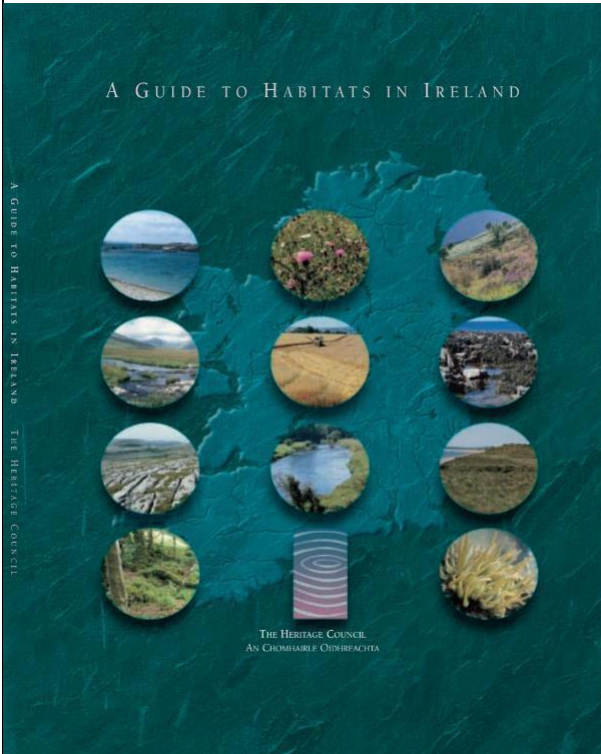
Appendix 8.1 Section	Section Heading
A8.1.1	Guidance Documents and Criteria
A8.1.2	Desktop review
A8.1.3	Survey Results
A8.1.4	Hen Harrier Surveys
A8.1.5	Hen Harrier Flight Lines as surveyed
A8.1.6	Milestone & Inchivara Windfarm Development Preconstruction Hen Harrier Surveys 2015
A8.1.7	Confidential Annex

A8.1.1 Guidance Documents and Criteria

The following publications were used for specific guidance and criteria for the Biodiversity Chapter. Front cover sheets of these publications are presented where accessible.

<p>Guidelines for Ecological Impact Assessment in the United Kingdom- (CIEEM 2016)</p> 	<p>Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. (National Roads Authority, 2008)</p> 
<p>Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms. (Scottish Natural Heritage, 2017)</p> 	<p>Raptors: A Field Guide for surveys and Monitoring, Third Edition (Hardey <i>et al.</i>, 2014)</p> 

A Guide to The Habitats of Ireland. The Heritage Council, Kilkenny. (Fossitt, 2000)



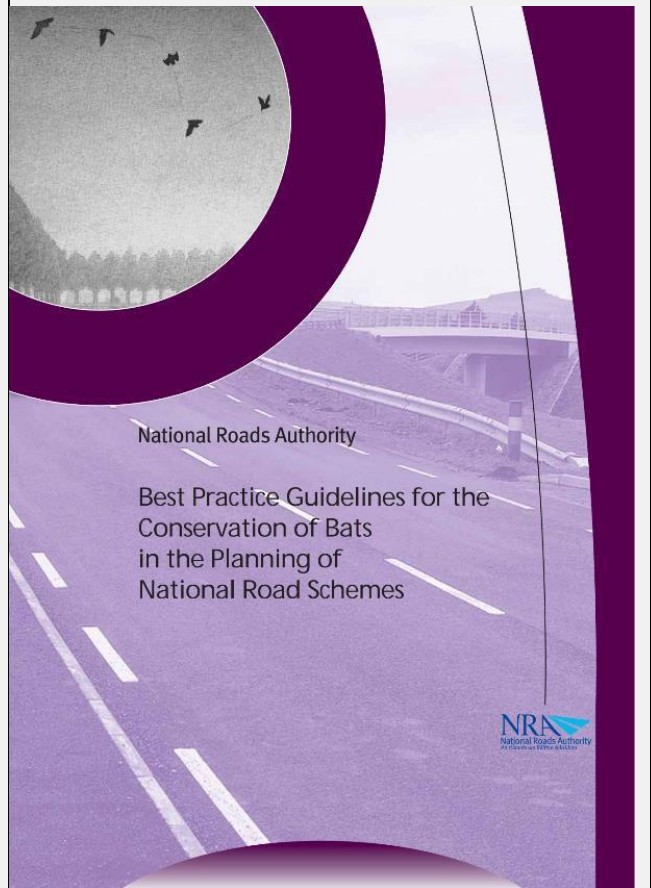
Best Practice Guidance for Habitat Survey and Mapping (Smith *et al.*, 2011)



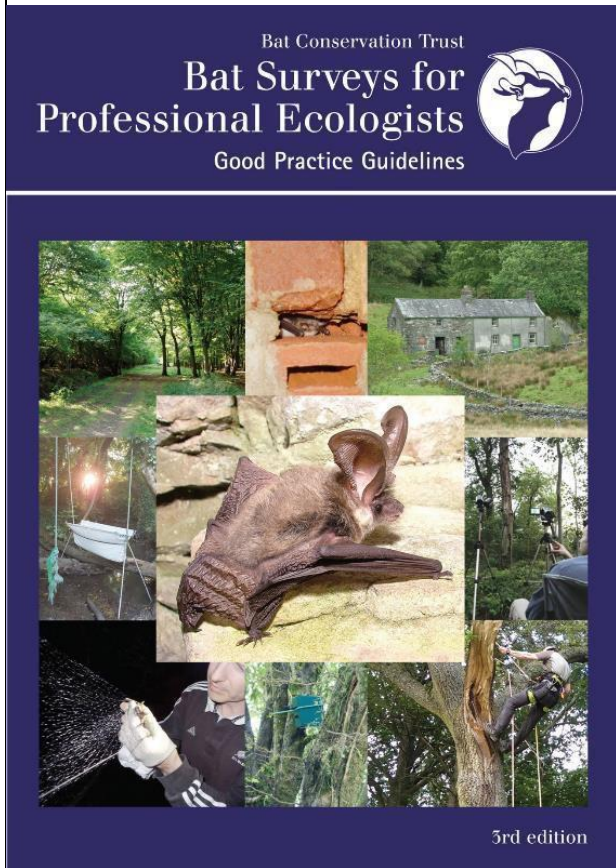
Guidelines for the Treatment of Bats During the Construction of National Road Schemes (National Roads Authority, 2005)



Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (National Roads Authority, 2005)



Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed.) Collins, 2016



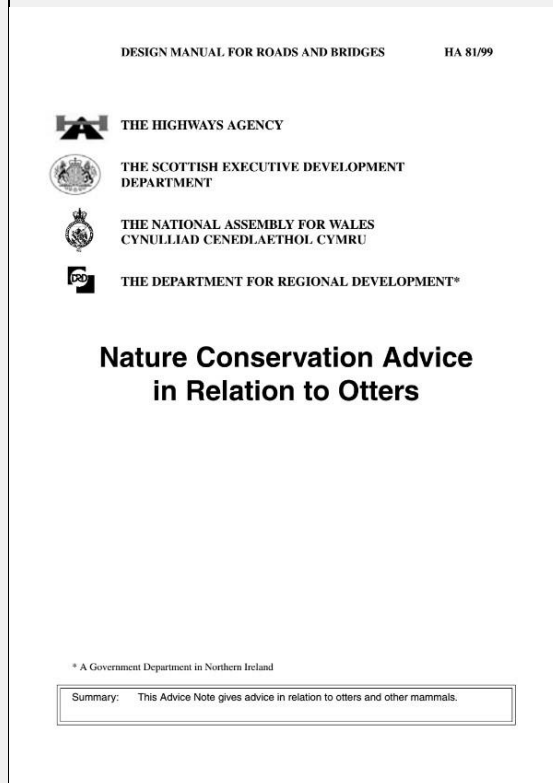
Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes (National Roads Authority, 2005)



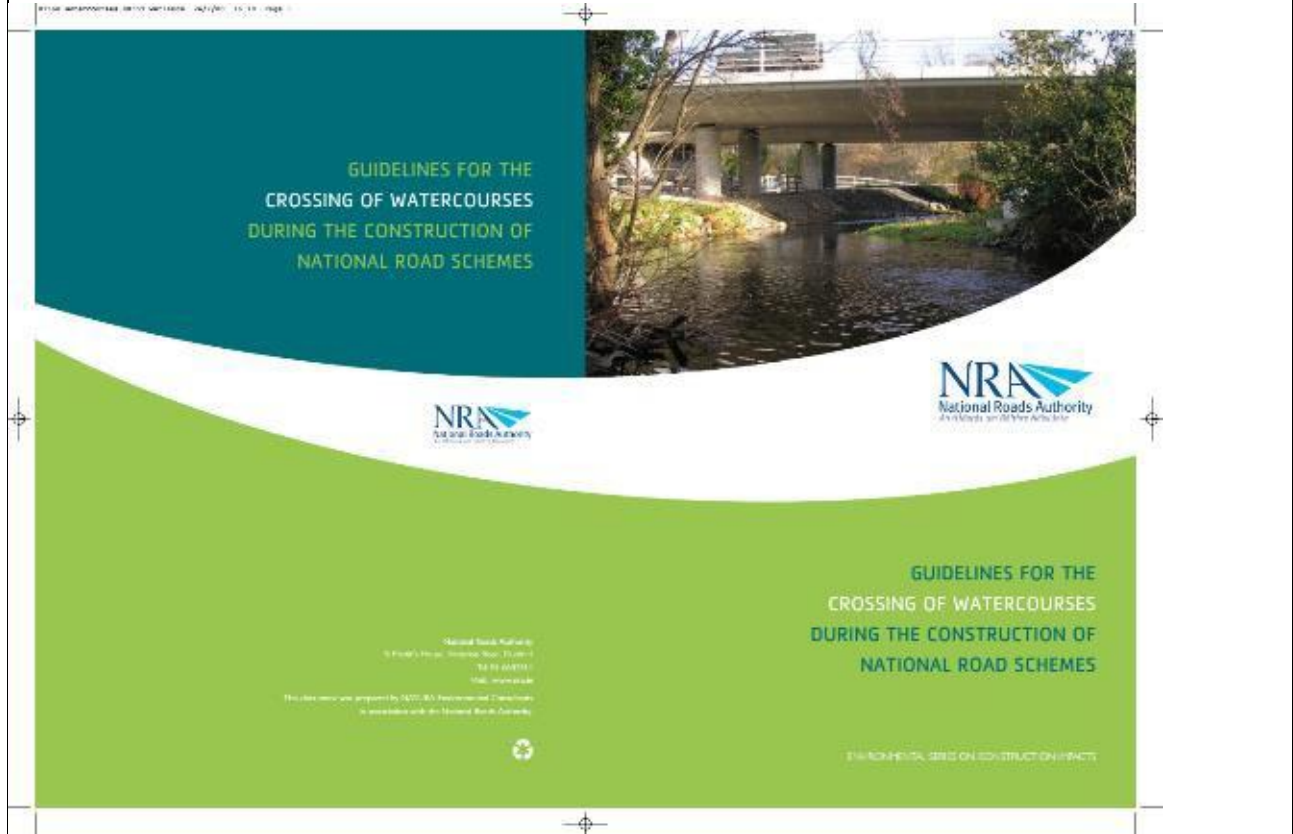
Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (National Roads Authority, 2006)



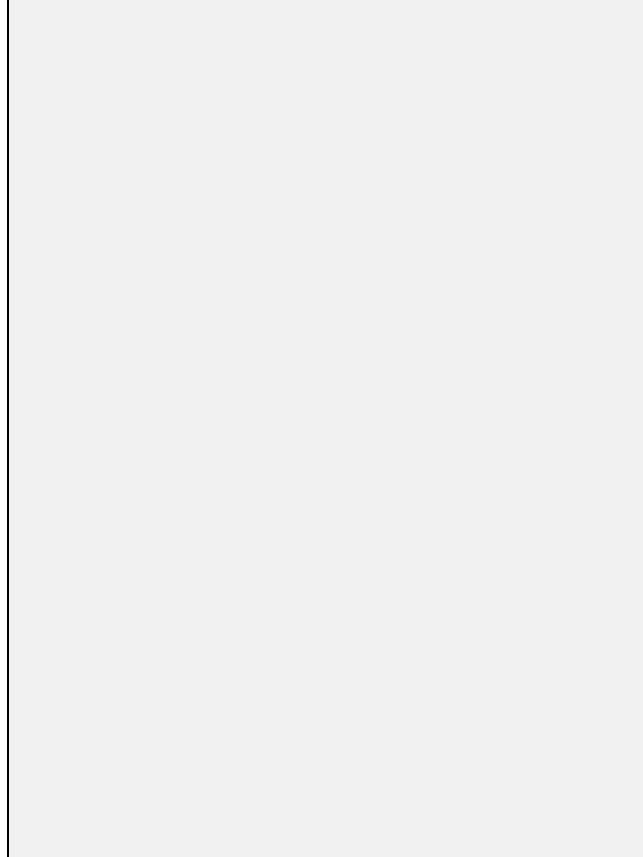
The Good Roads Guide New Roads Nature Conservation Advice in Relation to Otters (Highways Agency, 1999, HA 81/99)



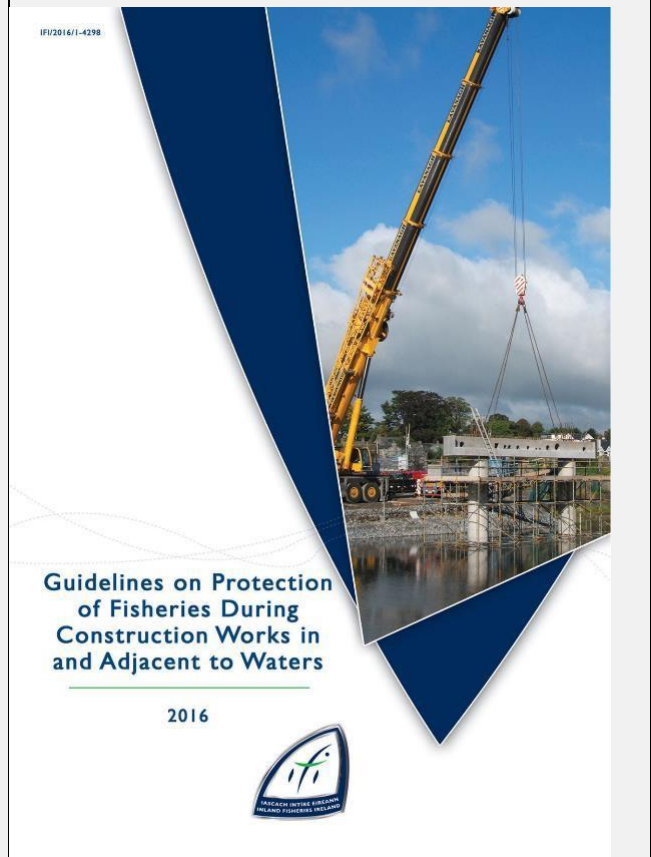
Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (National Roads Authority, 2005)



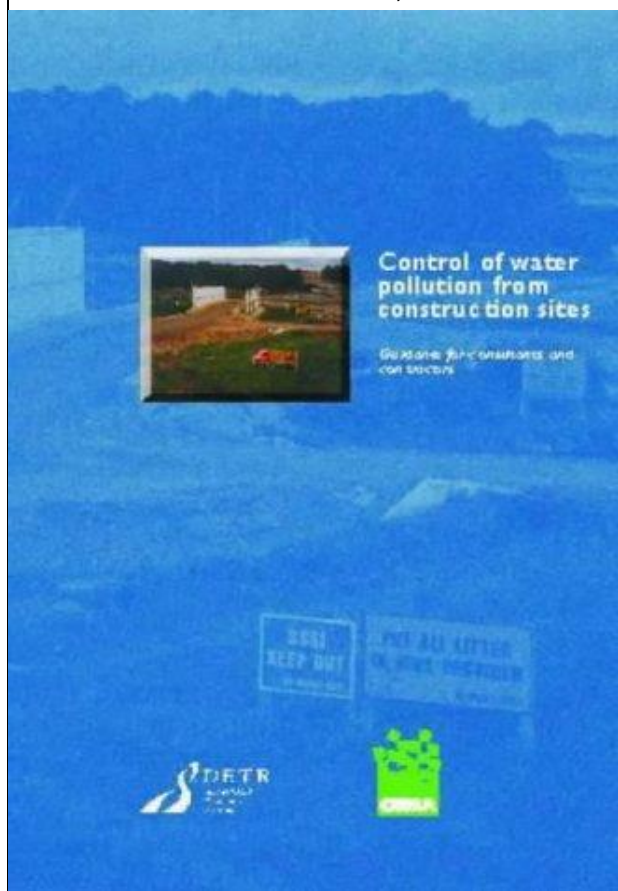
Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board, not dated)



Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016)

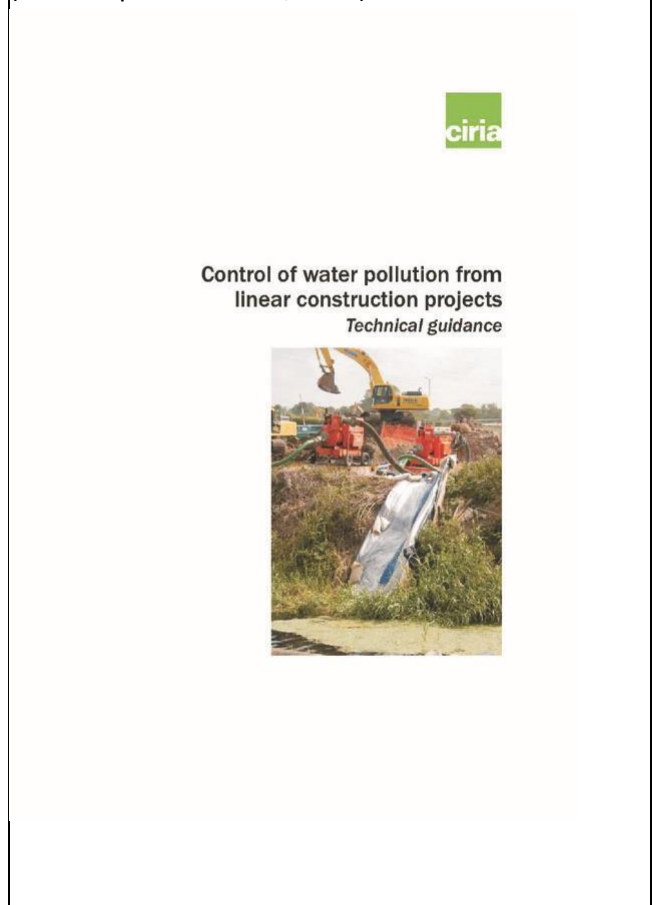


CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006



Water Framework Directive (2000/60/EC).

CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006)



UK Pollution Prevention Guidelines (PPG).

A-8.1.1.1 Scoping and Consultation

Consultation (including in relation to scoping) with statutory consultees and other relevant bodies commenced in August 2015 with respect to the WUWFP. A full list of consultees and a complete chronology of the consultation undertaken is provided hereunder. Further information on scoping is available in Chapter 3 Scoping and Consultation. Please note the consultation referred below in respect for the Grid Connection element does not pertain to the preliminary route now proposed and evaluated within this EIAR for cumulative effects.

Table 1 Chronology of formal Biodiversity related consultation both issued to and received from statutory and non- statutory environmental agencies and organisations

Table 1 Consultation process

Date	Project Element	Consultees	Action
31/08/15	Mountphilips Substation	DAU NPWS IFI	Posted initial Mountphilips consultation documents to DAU (the Manager), NPWS (Jervis Good) and IFI (Michael Fitzsimons and Frank O'Donoghue).
09/02/16	UWF Grid Connection	DAU NPWS IFI	Posted initial UWF Grid Connection consultation documents to DAU (the Manager), NPWS (Jervis Good) and IFI (Michael Fitzsimons and Frank O'Donoghue).
16/02/16	Mountphilips Substation	DAU NPWS IFI	Posted supplementary Mountphilips consultation documents to DAU (the Manager), NPWS (Jervis Good) and IFI (Michael Fitzsimons and Frank O'Donoghue)
22/02/16	Upperchurch Grid Route/Mountphilips Substation	IFI EDL	Initial consultation meeting between IFI (Michael Fitzsimons and Frank O'Donoghue), INIS (Howard Williams and Sarah Ingham) and Ecopower Developments Ltd (Julie Brett) at the IFI offices in Limerick. Minutes recorded by Sarah Ingham and sent to EDL.
24/02/16	Upperchurch Grid Route/Mountphilips Substation	IFI	Verbal communication from Mr Michael Fitzsimons that IFI were very satisfied with the detailed plans being prepared for all watercourse crossings by Ecopower Developments Ltd. Mr Fitzsimons stressed that Ecopower Developments Ltd/Inis had put a lot of work into site specific mitigation which he was confident would protect all watercourses comprehensively during the construction stage.
24/02/16	Upperchurch Grid Route/Mountphilips Substation	NPWS EDL	Initial consultation meeting between NPWS (Jervis Good and Stefan Jones), INIS (Howard Williams and Sarah Ingham) and EDL (Julie Brett) at the NPWS offices in Blackrock, Cork. Minutes recorded by Sarah Ingham and sent to Ecopower Developments Ltd and NPWS.

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29/04/16	Upperchurch Grid Route/Mountphilips Substation	BWI BCI	Posted (by registered post) initial UWF Grid Connection consultation documents to BWI and BCI.
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Date	Project Element	Consultees	Action
29/04/16	Upperchurch Grid Route/Mountphilips Substation	DAU NPWS IFI	Posted (by registered post) project amendment consultation documents re changes to UWF Grid Connection route and Mountphilips Switching Station access route to DAU (the Manager), NPWS (Jervis Good) and IFI (Michael Fitzsimons and Frank O'Donoghue).
11/05/16	Upperchurch Grid Route/Mountphilips Substation	Tipperary Co. Co.	Posted (by registered post) initial UWF Grid Connection consultation documents to the Environment Officer and the Heritage Officer, Tipperary Co. Co.
11/05/16	Upperchurch Grid Route/Mountphilips Substation	DAU	Telecon between Sarah Ingham (INIS) and Michael Murphy (DAU) in which Mr. Murphy confirmed receipt of all documentation by both email and post and of his forwarding of same to Dr Jervis Good for review. He advised that there is currently a backlog in Dr Good's work load and that he would formally respond in due course.
19/05/16	Upperchurch Grid Route/Mountphilips Substation	IFI	Onsite meeting between Mr Howard Williams (INIS) and Mr Michael Fitzsimons (IFI) to inspect potential impacts of proposed watercourse crossing methodologies on the aquatic ecology of a number of watercourses along the grid connection route.
26/05/16	Upperchurch Grid Route/Mountphilips Substation	IFI	Formal written response received from Mr Fitzsimons in respect of the onsite meeting, outlining his professional opinions and recommendations regarding particular watercourses crossing methods. IFI concludes from this meeting that all crossings are possible during the open season but that more detailed methodologies should be drafted prior to work commencing.
23/06/16	Upperchurch Grid Route/Mountphilips Substation	NPWS	Meeting between Howard Williams (INIS) and Pat Foley (NPWS Regional Manager) at hotel in Limerick. Consultation documentation supplied to Mr Foley outlining all ecological survey work conducted, the results to date and what further pre-planning survey work we proposed to provide to ensure a comprehensive Ecology assessment for the entire project.

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28/10/16	Upperchurch Route/Mountphilips Substation	Grid DAU/NPWS	Received formal response letter from DAU stating that based on the documentation submitted by Inis, <i>“the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs has no further observations regarding nature conservation considerations”</i> .
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Date	Project Element	Consultees	Action
20/01/17	Upperchurch Grid Route/Mountphilips Substation	NPWS	<p>Onsite meeting between Ms Aine Lynch (NPWS, CR), Ms Julie Brett (EDL) and Howard Williams (INIS). Mr Williams outlined to Ms. Lynch the ecological receptors covered by the surveys, the actual survey effort completed for each of the ecological receptors for the project to date. Mr. Williams also presented the survey effort outstanding and planned for the future of the project prior to the submission of the planning application.</p> <p>In addition to this information, provisional results of all surveys to date were presented to Ms. Lynch by way of GIS mapping of the locations of all ecological receptors/ecologically sensitive areas recorded relative to the location of the Whole Windfarm Project.</p>
27/01/17	Upperchurch Grid Route/Mountphilips Substation	NPWS	<p>Further to this meeting, Ms. Lynch held a telephone consultation with Mr. Williams on Friday 27th January 2017 during which she confirmed that she had subsequently relayed all details of the meeting to Dr Jervis Good, Regional Ecologist.</p>
06/06/17	UWF Related Works, Counties Tipperary and Limerick	DAU NPWS IFI BCI	<p>Scoping document outlining up-to-date project amendments, ecological surveys to date, a brief synopsis of ecological survey results to date, in addition to an overview of potential impacts resulting from the proposed project.</p>
27/7/2017	Whole UWF Project	NPWS	<p>Watercourse crossings, biosecurity, marsh fritillary, drainage at Bleanbeg Bog, forestry felling and replanting as well as proposed mitigation measures for bats and hen harrier foraging habitats.</p>
23/8/2017	Whole UWF Project	IFI	<p>Conference Call between Mr. Howard Williams, Mr. C. Cullen (INIS) and Mr Michael Fitzsimons (IFI) in respect of watercourse evaluations in terms of fisheries importance and proposed crossing methods. Further to the call Mr. Fitzsimons confirmed via email that a review and discussion of proposed crossings had taken place. Mr. Fitzsimons also confirmed that the proposed crossing methodologies are in line with the methodologies discussed during the scoping inspection carried out with Howard Williams.</p>
27/08/17	Whole UWF Project	NPWS	<p>Information meeting between Dr. Jervis Good</p>

REFERENCE DOCUMENT

			(NPWS, Divisional Ecologist), and Mr. Howard
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Date	Project Element	Consultees	Action
			Williams (INIS). This meeting provided an update of the project for NPWS staff and a discussion on each receptor within the project study area.
13/12/2017	hole UWF Project	NPWS	Project Overview. Final formal meeting with NPWS. Attendees were Mr Pat Foley (NPWS Deputy Regional Manager), Ms Julie Brett (Ecopower) and Mr Howard Williams and Chris Cullen (Inis). Mr Williams gave a full project overview to Mr Foley. Mr Foley acknowledged this and stated that he would pass on any pertinent details to Dr Good.

A8.1.2 Desktop Review

A desktop review was conducted to inform scoping and identify features of ecological importance. The desktop review also included an appraisal of all sites designated for nature conservation under International and National legislation within a 15km radius of the Whole UWF Project. This enabled identification of any *possibly* significant impacts on habitats, flora and fauna, either terrestrial and/or aquatic, likely to arise from the construction and operation of the Whole UWF Project. Potential sites of conservation interest were identified by an examination of Ordnance Survey (OSI) mapping (1:50,000 scale), NPWS maps browser and detailed aerial photography (Bing maps).

Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs) and records of protected species in the vicinity of the UWF Related Works and the Whole UWF Project were identified. This information was obtained by accessing the website of the National Parks and Wildlife Service (NPWS) of the Department of the Environment, Heritage and Local Government.

A data request was also sent to NPWS GIS division for a full inventory of all protected and rare species recorded within pertinent 10km squares overlapping the Whole UWF Project. This data is presented in Table 2.

The database of the National Biodiversity Data Centre was also consulted to assess the presence of rare plant and faunal species and records of protected species reported within the primary 10km squares in which the Whole UWF Project is located. This data is presented in the Tables below

Due to the conditions of the data request with regard to the presentation of sensitive data as defined (<https://www.npws.ie/sites/default/files/general/npws-sensitive-species.pdf>), not all records are presented. In addition, the spatial resolution of each record is presented at 10 km scale in line with the condition that “data are provided on the understanding that users will not use the information to the detriment of individual species or habitats, biodiversity or the environment in general.”

Information on water quality of the relevant watercourses was obtained from the EPA website and Chapter 11 Water.

Tables are presented overleaf in respect of the 10km grid squares within which the UWF Related Works and UWF Related Works with Other Elements

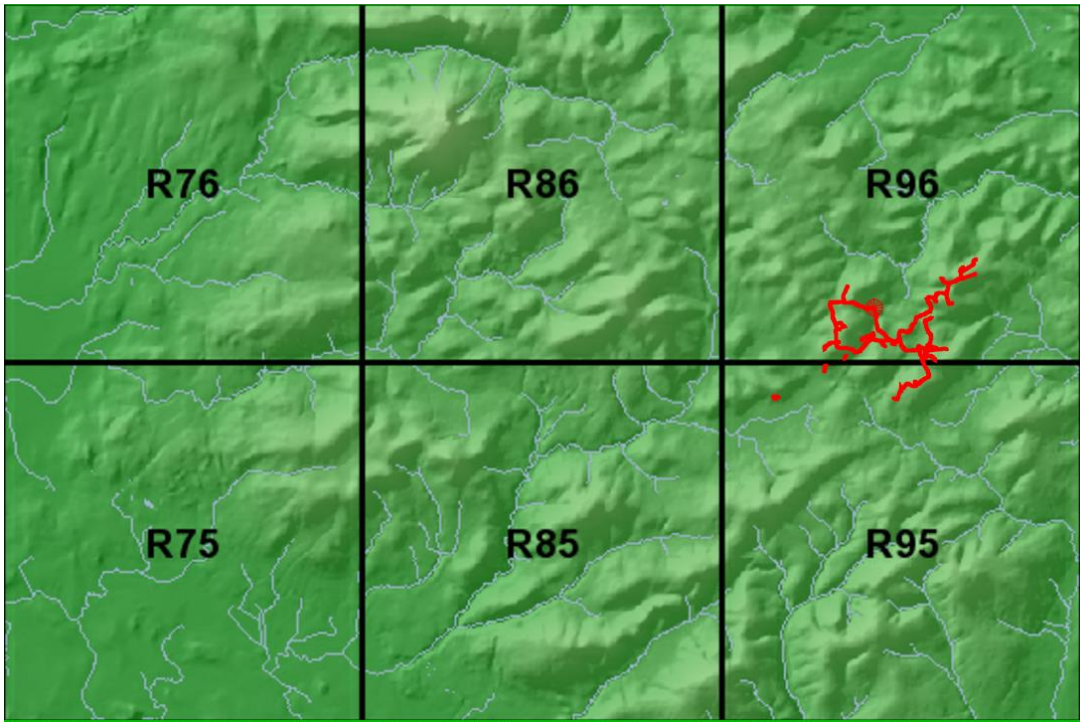


Plate 1: 10km squares selected for desktop review of the UWF Related Works

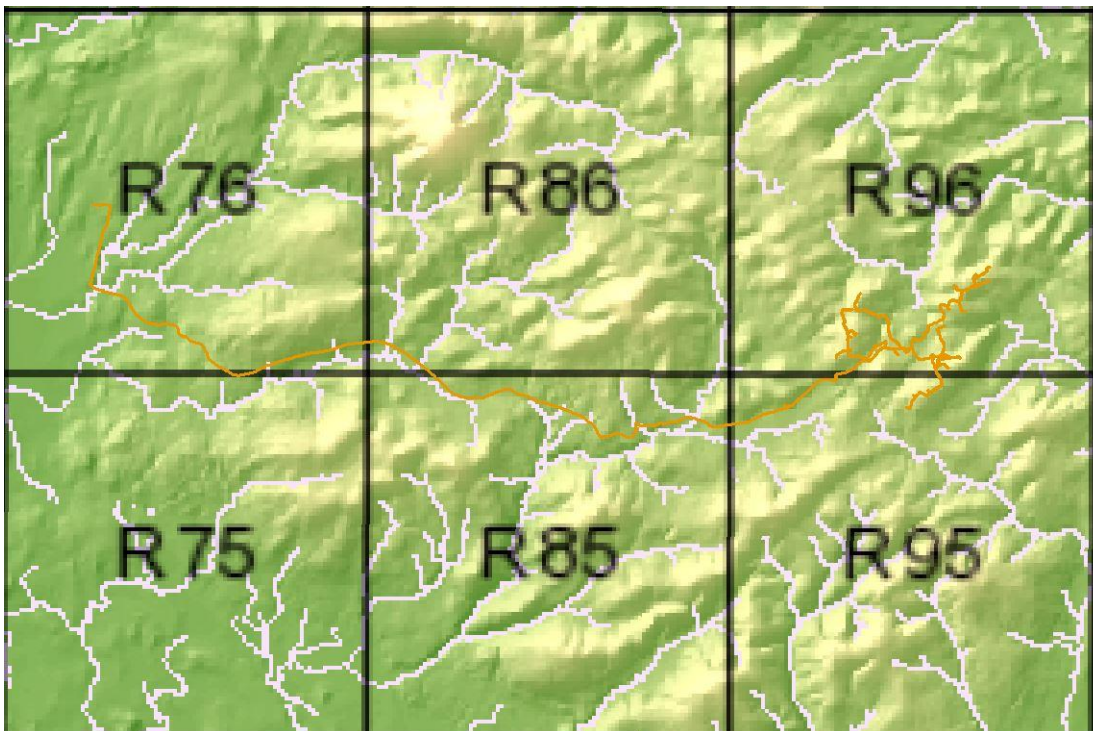


Plate 2: 10km squares selected for desktop review of the UWF Related Works in combination with the Whole UWF Project

Table 2 Records of legally protected and rare species, excluding sensitive species, held by the National Parks and Wildlife Service (<https://www.npws.ie/maps-and-data/open-data-policy>, 22/04/2016)

10 km Grid Square	Scientific Name	Common Name	Date of last record
R76	<i>Cephaloziella stellulifera</i>	Heath Threadwort	06/05/2008
R76	<i>Dama dama</i>	Fallow Deer	2004 - 2005
R76	<i>Eurodryas aurinia</i>	Marsh Fritillary	19/09/2004
R76	<i>Lampetra fluviatilis</i>	River Lamprey	Unknown
R76	<i>Lepus timidus subsp. hibernicus</i>	Irish Hare	2006 - 2007
R76	<i>Lutra lutra</i>	Otter	30/05/1980
R76	<i>Martes martes</i>	Pine Marten	2005 - 2006
R76	<i>Meles meles</i>	Badger	13/02/2007
R76	<i>Mustela erminea subsp. hibernica</i>	Irish Stoat	1969
R76	<i>Petromyzon marinus</i>	Sea Lamprey	Unknown
R76	<i>Rana temporaria</i>	Common Frog	19/02/2006
R76	<i>Sorex minutus</i>	Eurasian Pygmy Shrew	July 1970
R85	<i>Amblystegium fluviatile</i>	Brook-side Feather-moss	28/06/2005
R85	<i>Dama dama</i>	Fallow Deer	2004 - 2005
R85	<i>Entosthodon fascicularis</i>	Hasselquist's Hyssop	28/06/2005
R85	<i>Lutra lutra</i>	Otter	02/09/2010
R85	<i>Martes martes</i>	Pine Marten	2005 - 2006
R85	<i>Meles meles</i>	Badger	15/02/1991
R85	<i>Mustela erminea subsp. hibernica</i>	Irish Stoat	01/06/2005
R85	<i>Philonotis caespitosa</i>	Tufted Apple-moss	28/06/2005
R85	<i>Rana temporaria</i>	Common Frog	03/05/2011
R85	<i>Sciurus vulgaris</i>	Red Squirrel	15/02/1991
R86	<i>Cladonia portentosa</i>	Reindeer Moss	26/08/2003
R86	<i>Dama dama</i>	Fallow Deer	2004 - 2005
R86	<i>Lepus timidus subsp. hibernicus</i>	Irish Hare	24/09/1990
R86	<i>Lutra lutra</i>	Otter	20/09/2010
R86	<i>Meles meles</i>	Badger	24/09/1990
R86	<i>Rana temporaria</i>	Common Frog	23/02/2011

10 km Grid Square	Scientific Name	Common Name	Date of last record
R86	<i>Sphagnum subnitens</i>	Lustrous Bog-moss	11/06/2005
R95	<i>Austropotamobius pallipes</i>	Freshwater Crayfish	07/06/2006
R95	<i>Dama dama</i>	Fallow Deer	2004 - 2005
R95	<i>Lepus timidus subsp. hibernicus</i>	Irish Hare	28/02/1990
R95	<i>Lutra lutra</i>	Otter	20/10/2010
R95	<i>Meles meles</i>	Badger	28/02/1990
R96	<i>Austropotamobius pallipes</i>	Freshwater Crayfish	03/09/2008
R96	<i>Bromus racemosus</i>	Smooth Brome	1969
R96	<i>Cladonia portentosa</i>	Reindeer Moss	Unknown
R96	<i>Dama dama</i>	Fallow Deer	2004 - 2005
R96	<i>Lepus timidus subsp. hibernicus</i>	Irish Hare	08/05/1990
R96	<i>Lutra lutra</i>	Otter	30/08/2010
R96	<i>Meles meles</i>	Badger	08/05/1990
R96	<i>Rana temporaria</i>	Common Frog	13/04/2006
R96	<i>Sorex minutus</i>	Eurasian Pygmy Shrew	May 1969

Table 3 Records of legally protected mammal species held by the National Biodiversity Data Centre (www.biodiversityireland.ie, 20/04/2016)

10 km Grid Square	Scientific name	Common name	Record count	Date of last record	EU HD Annex II	EU HD Annex IV	EU HD Annex V	Wildlife Acts
R76	<i>Lutra lutra</i>	European Otter	5	30/05/1980	X	X		X
R76	<i>Martes martes</i>	Pine Marten	5	21/05/2014			X	X
R76	<i>Meles meles</i>	Eurasian Badger	72	17/02/2011				X
R76	<i>Myotis daubentonii</i>	Daubenton's Bat	26	23/08/2014		X		X
R76	<i>Nyctalus leisleri</i>	Lesser Noctule	1	09/10/2009		X		X
R76	<i>Pipistrellus pipistrellus sensu lato</i>	Pipistrelle	2	09/10/2009		X		X
R76	<i>Pipistrellus pygmaeus</i>	Soprano Pipistrelle	3	09/10/2009		X		X
R76	<i>Sciurus vulgaris</i>	Eurasian Red Squirrel	6	29/12/2015				X
R76	<i>Sorex minutus</i>	Eurasian Pygmy Shrew	1	31/07/1970				X
R86	<i>Lutra lutra</i>	European Otter	8	20/09/2010	X	X		X

10 km Grid Square	Scientific name	Common name	Record count	Date of last record	EU HD Annex II	EU HD Annex IV	EU HD Annex V	Wildlife Acts
R86	<i>Myotis daubentonii</i>	Daubenton's Bat	23	28/08/2009		X		X
R86	<i>Myotis nattereri</i>	Natterer's Bat	1	28/10/2011		X		X
R86	<i>Nyctalus leisleri</i>	Lesser Noctule	1	28/06/2008		X		X
R86	<i>Pipistrellus pipistrellus sensu lato</i>	Pipistrelle	1	28/06/2008		X		X
R86	<i>Pipistrellus pygmaeus</i>	Soprano Pipistrelle	1	28/06/2008		X		X
R86	<i>Martes martes</i>	Pine Marten	5	21/05/2014			X	X
R86	<i>Cervus elaphus</i>	Red Deer	1	31/12/2008				X
R86	<i>Meles meles</i>	Eurasian Badger	51	19/03/2009				X
R86	<i>Sciurus vulgaris</i>	Eurasian Red Squirrel	2	12/04/2011				X
R95	<i>Lutra lutra</i>	European Otter	8	20/08/2012	X	X		X
R95	<i>Martes martes</i>	Pine Marten	2	17/07/2009			X	X
R95	<i>Meles meles</i>	Eurasian Badger	75	19/05/2009				X
R95	<i>Myotis daubentonii</i>	Daubenton's Bat	1	08/08/2009		X		X
R95	<i>Nyctalus leisleri</i>	Lesser Noctule	1	08/08/2009		X		X
R95	<i>Pipistrellus pipistrellus sensu lato</i>	Pipistrelle	1	08/08/2009		X		X
R95	<i>Pipistrellus pygmaeus</i>	Soprano Pipistrelle	2	08/08/2009		X		X
R95	<i>Sciurus vulgaris</i>	Eurasian Red Squirrel	2	03/04/2015				X
R96	<i>Lutra lutra</i>	European Otter	6	30/08/2010	X	X		X
R96	<i>Myotis daubentonii</i>	Daubenton's Bat	1	08/08/2009		X		X
R96	<i>Nyctalus leisleri</i>	Lesser Noctule	1	08/08/2009		X		X
R96	<i>Pipistrellus pipistrellus sensu lato</i>	Pipistrelle	2	08/08/2009		X		X
R96	<i>Pipistrellus pygmaeus</i>	Soprano Pipistrelle	2	08/08/2009		X		X
R96	<i>Plecotus auritus</i>	Brown Long-eared Bat	1	08/08/2009		X		X
R96	<i>Martes martes</i>	Pine Marten	4	28/05/2014			X	X
R96	<i>Erinaceus europaeus</i>	West European Hedgehog	1	12/08/2012				X
R96	<i>Meles meles</i>	Eurasian Badger	67	16/09/2008				X

10 km Grid Square	Scientific name	Common name	Record count	Date of last record	EU HD Annex II	EU HD Annex IV	EU HD Annex V	Wildlife Acts
R96	<i>Sciurus vulgaris</i>	Eurasian Red Squirrel	3	03/06/2015				X

Table 4 Records of legally protected bird species held by the National Biodiversity Data Centre (www.biodiversityireland.ie, 20/04/2016)

Grid square	Scientific name	Common name	Record count	Date of last record	EU BD Annex I	EU BD Annex II	EU BD Annex III	Wildlife Acts
R76	<i>Alauda arvensis</i>	Sky Lark	11	19/04/2014				X
R76	<i>Alcedo atthis</i>	Common Kingfisher	7	31/12/2011	X			X
R76	<i>Anas platyrhynchos</i>	Mallard	16	31/12/2011		X	X	X
R76	<i>Anser anser</i>	Greylag Goose	6	31/12/2011		X	X	X
R76	<i>Apus apus</i>	Common Swift	1	31/07/1972				X
R76	<i>Carduelis cannabina</i>	Common Linnet	8	31/12/2011				X
R76	<i>Circus cyaneus</i>	Hen Harrier	8	31/12/2011	X			X
R76	<i>Columba oenas</i>	Stock Pigeon	1	31/07/1972				X
R76	<i>Columba palumbus</i>	Common Wood Pigeon	32	31/12/2011		X	X	X
R76	<i>Crex crex</i>	Corn Crane	2	31/07/1991	X			X
R76	<i>Cygnus olor</i>	Mute Swan	2	31/12/2011				X
R76	<i>Delichon urbicum</i>	House Martin	7	31/12/2011				X
R76	<i>Emberiza citrinella</i>	Yellowhammer	1	31/07/1972				X
R76	<i>Falco columbarius</i>	Merlin	1	07/01/2014	X			X
R76	<i>Falco tinnunculus</i>	Common Kestrel	14	31/12/2011				X
R76	<i>Gallinago gallinago</i>	Common Snipe	9	31/12/2011		X	X	X
R76	<i>Hirundo rustica</i>	Barn Swallow	17	31/12/2011				X
R76	<i>Lagopus lagopus</i>	Red Grouse	5	31/12/2011		X	X	X
R76	<i>Larus canus</i>	Mew Gull	2	31/12/2011				X
R76	<i>Larus ridibundus</i>	Black-headed Gull	7	31/12/2011				X
R76	<i>Locustella naevia</i>	Common Grasshopper Warbler	6	31/12/2011				X
R76	<i>Muscicapa striata</i>	Spotted Flycatcher	11	31/12/2011				X
R76	<i>Numenius arquata</i>	Eurasian Curlew	7	31/12/2011		X		X
R76	<i>Passer domesticus</i>	House Sparrow	20	31/12/2011				X
R76	<i>Phalacrocorax carbo</i>	Great Cormorant	3	31/12/2011				X

Grid square	Scientific name	Common name	Record count	Date of last record	EU BD Annex I	EU BD Annex II	EU BD Annex III	Wildlife Acts
R76	<i>Phasianus colchicus</i>	Common Pheasant	16	31/12/2011		X	X	X
R76	<i>Pluvialis apricaria</i>	European Golden Plover	2	31/12/2011	X	X	X	X
R76	<i>Riparia riparia</i>	Sand Martin	5	31/12/2011				X
R76	<i>Scolopax rusticola</i>	Eurasian Woodcock	1	31/07/1972		X	X	X
R76	<i>Sturnus vulgaris</i>	Common Starling	24	31/12/2011				X
R76	<i>Tyto alba</i>	Barn Owl	2	31/12/2011				X
R76	<i>Vanellus vanellus</i>	Northern Lapwing	3	31/12/2011		X		X
R86	<i>Falco peregrinus</i>	Peregrine Falcon	3	31/12/2011	X			X
R86	<i>Circus cyaneus</i>	Hen Harrier	5	31/12/2011	X			X
R86	<i>Falco columbarius</i>	Merlin	4	31/12/2011	X			X
R86	<i>Anas platyrhynchos</i>	Mallard	3	31/12/2011		X	X	X
R86	<i>Columba palumbus</i>	Common Wood Pigeon	14	31/12/2011		X	X	X
R86	<i>Phasianus colchicus</i>	Common Pheasant	11	31/12/2011		X	X	X
R86	<i>Lagopus lagopus</i>	Red Grouse	8	07/01/2016		X	X	X
R86	<i>Anas crecca</i>	Eurasian Teal	1	31/07/1972		X	X	X
R86	<i>Lymnocyptes minimus</i>	Jack Snipe	2	31/12/2011				
R86	<i>Gallinago gallinago</i>	Common Snipe	10	31/12/2011		X	X	X
R86	<i>Scolopax rusticola</i>	Eurasian Woodcock	3	31/07/1991		X	X	X
R86	<i>Numenius arquata</i>	Eurasian Curlew	5	31/12/2011				
R86	<i>Alauda arvensis</i>	Sky Lark	11	31/12/2011				X
R86	<i>Carduelis cannabina</i>	Common Linnet	9	31/12/2011				X
R86	<i>Delichon urbicum</i>	House Martin	6	31/07/1991				X
R86	<i>Falco tinnunculus</i>	Common Kestrel	11	31/12/2011				X
R86	<i>Hirundo rustica</i>	Barn Swallow	9	31/12/2011				X
R86	<i>Locustella naevia</i>	Common Grasshopper Warbler	2	31/12/2011				X
R86	<i>Muscicapa striata</i>	Spotted Flycatcher	4	31/12/2011				X
R86	<i>Passer domesticus</i>	House Sparrow	14	31/12/2011				X
R86	<i>Riparia riparia</i>	Sand Martin	1	31/12/2011				X
R86	<i>Sturnus vulgaris</i>	Common Starling	14	31/12/2011				X

Grid square	Scientific name	Common name	Record count	Date of last record	EU BD Annex I	EU BD Annex II	EU BD Annex III	Wildlife Acts
R86	<i>Emberiza citrinella</i>	Yellowhammer	4	31/07/1991				X
R95	<i>Alauda arvensis</i>	Sky Lark	6	31/12/2011				X
R95	<i>Alcedo atthis</i>	Common Kingfisher	1	31/07/1972	X			X
R95	<i>Anas platyrhynchos</i>	Mallard	7	31/12/2011		X		X
R95	<i>Apus apus</i>	Common Swift	7	31/07/1991				X
R95	<i>Carduelis cannabina</i>	Common Linnet	11	31/12/2011				X
R95	<i>Circus cyaneus</i>	Hen Harrier	7	31/12/2011	X			X
R95	<i>Columba oenas</i>	Stock Pigeon	3	31/07/1991				X
R95	<i>Columba palumbus</i>	Common Wood Pigeon	17	31/12/2011		X		X
R95	<i>Crex crex</i>	Corn Crane	1	31/07/1972	X			X
R95	<i>Delichon urbicum</i>	House Martin	7	31/12/2011				X
R95	<i>Emberiza citrinella</i>	Yellowhammer	1	31/07/1972				X
R95	<i>Falco peregrinus</i>	Peregrine Falcon	1	28/07/2012				X
R95	<i>Falco tinnunculus</i>	Common Kestrel	8	31/12/2011				X
R95	<i>Gallinago gallinago</i>	Common Snipe	7	31/12/2011		X		X
R95	<i>Hirundo rustica</i>	Barn Swallow	13	31/12/2011				X
R95	<i>Lagopus lagopus</i>	Red Grouse	1	31/07/1972		X		X
R95	<i>Larus argentatus</i>	Herring Gull	2	31/07/1991				X
R95	<i>Larus ridibundus</i>	Black-headed Gull	1	31/12/2011				X
R95	<i>Locustella naevia</i>	Common Grasshopper Warbler	1	31/07/1972				X
R95	<i>Muscicapa striata</i>	Spotted Flycatcher	5	31/12/2011				X
R95	<i>Numenius arquata</i>	Eurasian Curlew	1	31/07/1972		X		X
R95	<i>Passer domesticus</i>	House Sparrow	7	31/12/2011				X
R95	<i>Phasianus colchicus</i>	Common Pheasant	13	31/12/2011		X		X
R95	<i>Riparia riparia</i>	Sand Martin	3	31/07/1991				X
R95	<i>Scolopax rusticola</i>	Eurasian Woodcock	1	31/07/1972		X		X
R95	<i>Sturnus vulgaris</i>	Common Starling	11	31/12/2011				X
R95	<i>Vanellus vanellus</i>	Northern Lapwing	2	31/07/1991		X		X
R96	<i>Alcedo atthis</i>	Common Kingfisher	2	31/07/1991	X			X
R96	<i>Circus cyaneus</i>	Hen Harrier	11	18/04/2015	X			X

Grid square	Scientific name	Common name	Record count	Date of last record	EU BD Annex I	EU BD Annex II	EU BD Annex III	Wildlife Acts
R96	<i>Falco columbarius</i>	Merlin	2	31/07/1991	X			X
R96	<i>Crex crex</i>	Corn Crane	1	31/07/1972	X			X
R96	<i>Columba livia</i>	Rock Pigeon	4	31/12/2011		X		X
R96	<i>Anas platyrhynchos</i>	Mallard	3	31/07/1991		X	X	X
R96	<i>Columba palumbus</i>	Common Wood Pigeon	24	31/12/2011		X	X	X
R96	<i>Phasianus colchicus</i>	Common Pheasant	14	31/12/2011		X	X	X
R96	<i>Lagopus lagopus</i>	Red Grouse	4	31/07/1991		X	X	X
R96	<i>Fulica atra</i>	Common Coot	1	31/07/1972		X	X	X
R96	<i>Gallinago gallinago</i>	Common Snipe	9	31/12/2011		X	X	X
R96	<i>Numenius arquata</i>	Eurasian Curlew	7	31/12/2011		X		X
R96	<i>Vanellus vanellus</i>	Northern Lapwing	2	31/07/1991		X		X
R96	<i>Alauda arvensis</i>	Sky Lark	13	31/12/2011				X
R96	<i>Carduelis cannabina</i>	Common Linnet	15	31/12/2011				X
R96	<i>Columba oenas</i>	Stock Pigeon	1	31/07/1972				X
R96	<i>Delichon urbicum</i>	House Martin	12	31/12/2011				X
R96	<i>Falco tinnunculus</i>	Common Kestrel	14	31/12/2011				X
R96	<i>Hirundo rustica</i>	Barn Swallow	17	31/12/2011				X
R96	<i>Larus canus</i>	Mew Gull	3	31/07/1991				X
R96	<i>Locustella naevia</i>	Common Grasshopper Warbler	3	31/12/2011				X
R96	<i>Muscicapa striata</i>	Spotted Flycatcher	5	31/12/2011				X
R96	<i>Oenanthe oenanthe</i>	Northern Wheatear	2	31/07/1991				X
R96	<i>Passer domesticus</i>	House Sparrow	22	31/12/2011				X
R96	<i>Riparia riparia</i>	Sand Martin	3	31/12/2011				X
R96	<i>Sturnus vulgaris</i>	Common Starling	19	31/12/2011				X
R96	<i>Tachybaptus ruficollis</i>	Little Grebe	1	31/07/1972				X
R96	<i>Emberiza citrinella</i>	Yellowhammer	3	31/07/1991				X
R96	<i>Larus argentatus</i>	Herring Gull	2	31/12/2011				X
R96	<i>Larus ridibundus</i>	Black-headed Gull	8	31/12/2011				X

Table 5 Records of legally protected amphibian species held by the National Biodiversity Data Centre (www.biodiversityireland.ie, 20/04/2016)

Grid square	Scientific name	Common name	Record count	Date of last record	EU HD Annex V	Wildlife Acts
R76	<i>Rana temporaria</i>	Common Frog	9	19/02/2006	X	X
R86	<i>Rana temporaria</i>	Common Frog	1	26/03/2006	X	X
R96	<i>Rana temporaria</i>	Common Frog	12	01/05/2006	X	X

Table 6 Records of legally protected butterfly species held by the National Biodiversity Data Centre (www.biodiversityireland.ie, 20/04/2016)

Grid square	Scientific name	Common name	Record count	Date of last record	EU HD Annex II
R76	<i>Euphydryas aurinia</i>	Marsh Fritillary	6	31/12/1984	X
R86	<i>Euphydryas aurinia</i>	Marsh Fritillary	1	31/12/2010	X
R95	<i>Euphydryas aurinia</i>	Marsh Fritillary	7	31/12/2010	X

Table 7 Records of legally protected bryophyte species held by the National Biodiversity Data Centre (www.biodiversityireland.ie, 20/04/2016)

Grid square	Scientific name	Common name	Record count	Date of last record	EU HD Annex IV
R86	<i>Leucobryum glaucum</i>	Large White-moss	1	21/08/1979	IV

Table 8 Records of legally protected crustacean species held by the National Biodiversity Data Centre (www.biodiversityireland.ie, 20/04/2016)

Grid square	Scientific name	Common name	Record count	Date of last record	EU HD Annex II	Wildlife Acts
R95	<i>Austropotamobius pallipes</i>	Freshwater White-clawed Crayfish	6	07/06/2006	X	X
R96	<i>Austropotamobius pallipes</i>	Freshwater White-clawed Crayfish	8	03/09/2008	X	X

Table 9 Records of non-native invasive species held by the National Biodiversity Data Centre (www.biodiversityireland.ie, 20/04/2016)

Grid square	Species group	Scientific name	Common name	Record count	Date of last record	Medium Impact	High Impact	Wildlife Acts
R76	Flowering plant	<i>Acer pseudoplatanus</i>	Sycamore	1	21/10/2008	X		
R76	Flowering plant	<i>Gunnera tinctoria</i>	Giant-rhubarb	1	17/09/2008		X	
R76	Flowering plant	<i>Heracleum mantegazzianum</i>	Giant Hogweed	4	31/05/2009		X	
R76	Terrestrial mammal	<i>Cervus nippon</i>	Sika Deer	1	12/01/2009		X	X
R76	Terrestrial mammal	<i>Dama dama</i>	Fallow Deer	6	30/04/2009			
R76	Terrestrial mammal	<i>Mustela vison</i>	American Mink	1	01/06/2015		X	

R76	Terrestrial mammal	Myodes glareolus	Bank Vole	2	17/11/2010	X		
R76	Terrestrial mammal	Oryctolagus cuniculus	European Rabbit	1	06/04/1990	X		
R76	Terrestrial mammal	Sciurus carolinensis	Eastern Squirrel Grey	1	31/12/2001		X	
R86	Flowering plant	Fallopia japonica	Japanese Knotweed	1	28/06/2014		X	
R86	Flowering plant	Heracleum mantegazzianum	Giant Hogweed	1	18/09/2008		X	
R86	Flowering plant	Impatiens glandulifera	Indian Balsam	1	17/09/2008		X	
R86	Terrestrial mammal	Sciurus carolinensis	Eastern Squirrel Grey	1	31/12/2001		X	
R86	Terrestrial mammal	Dama dama	Fallow Deer	11	28/11/2011		X	X
R86	Terrestrial mammal	Oryctolagus cuniculus	European Rabbit	1	24/09/1990	X		
R95	Conifer	Pseudotsuga menziesii	Douglas Fir	1	04/09/2007	X		
R95	Flowering plant	Acer pseudoplatanus	Sycamore	2	24/09/2007	X		
R95	Flowering plant	Fallopia japonica	Japanese Knotweed	2	22/04/2010		X	
R95	Flowering plant	Heracleum mantegazzianum	Giant Hogweed	1	04/09/2007		X	
R95	Flowering plant	Leycesteria formosa	Himalayan Honeysuckle	1	04/09/2007	X		
R95	Flowering plant	Prunus laurocerasus	Cherry Laurel	1	24/09/2007		X	
R95	Flowering plant	Quercus rubra	Red Oak	1	04/09/2007	X		
R95	Mollusc	Cornu aspersum	Common Garden Snail	1	19/07/1971	X		
R95	Terrestrial mammal	Crocidura russula	Greater White-toothed Shrew	3	24/08/2012	X		
R95	Terrestrial mammal	Dama dama	Fallow Deer	2	31/12/2008		X	X
R95	Terrestrial mammal	Myodes glareolus	Bank Vole	1	24/08/2012	X		
R95	Terrestrial mammal	Oryctolagus cuniculus	European Rabbit	1	28/02/1990	X		
R96	Flowering plant	Acer pseudoplatanus	Sycamore	4	22/09/2008	X		

R96	Mollusc	Cornu aspersum	Common Snail	Garden	3	19/09/1977	X			
R96	Mollusc	Potamopyrgus antipodarum	Jenkins' Spire Snail		1	19/09/1977	X			
R96	Mollusc	Tandonia sowerbyi	Keeled Slug		1	19/09/1977	X			
R96	Terrestrial mammal	Cervus nippon	Sika Deer		1	11/09/2013		X		X
R96	Terrestrial mammal	Dama dama	Fallow Deer		2	25/10/2011		X		X
R96	Terrestrial mammal	Crocidura russula	Greater toothed Shrew	White-	1	14/11/2010	X			
R96	Terrestrial mammal	Myodes glareolus	Bank Vole		1	14/11/2010	X			
R96	Terrestrial mammal	Oryctolagus cuniculus	European Rabbit		1	08/05/1990	X			

A-8.1.2.1 Bats

National landscape suitability maps for Irish bat species (Lundy *et al.*, 2010) were reviewed using the Map Viewer of the National Biodiversity Data Centre. The suitability index for the 'all bats combined' layer varies across the Whole UWF Project; moderate suitability within the environs of UWF Related Works, high suitability areas are found in the environs of Mountphilips at the western extremity of the UWF Grid Connection and at central location of the UWF Grid Connection, UWF Replacement Forestry and the Upperchurch Windfarm. Overall, the landscape suitability follows a consistent west to east pattern of decreasing suitability for all species, which roughly corresponds with the changes in altitude.

With regard to the UWF Other Activities, areas comprising very high suitability are to be found at the western end of the Whole UWF Project near Foynes and Limerick. Further elements of UWF Other Activities near Thurles are in areas of high suitability, while the haulage route between Thurles and Limerick crosses areas of moderate and high suitability. Due to the small scale of works for the UWF Other Activities (predominantly street furniture removal), no source pathway linkages were identified for Bats, and these locations were therefore excluded from further desktop review.

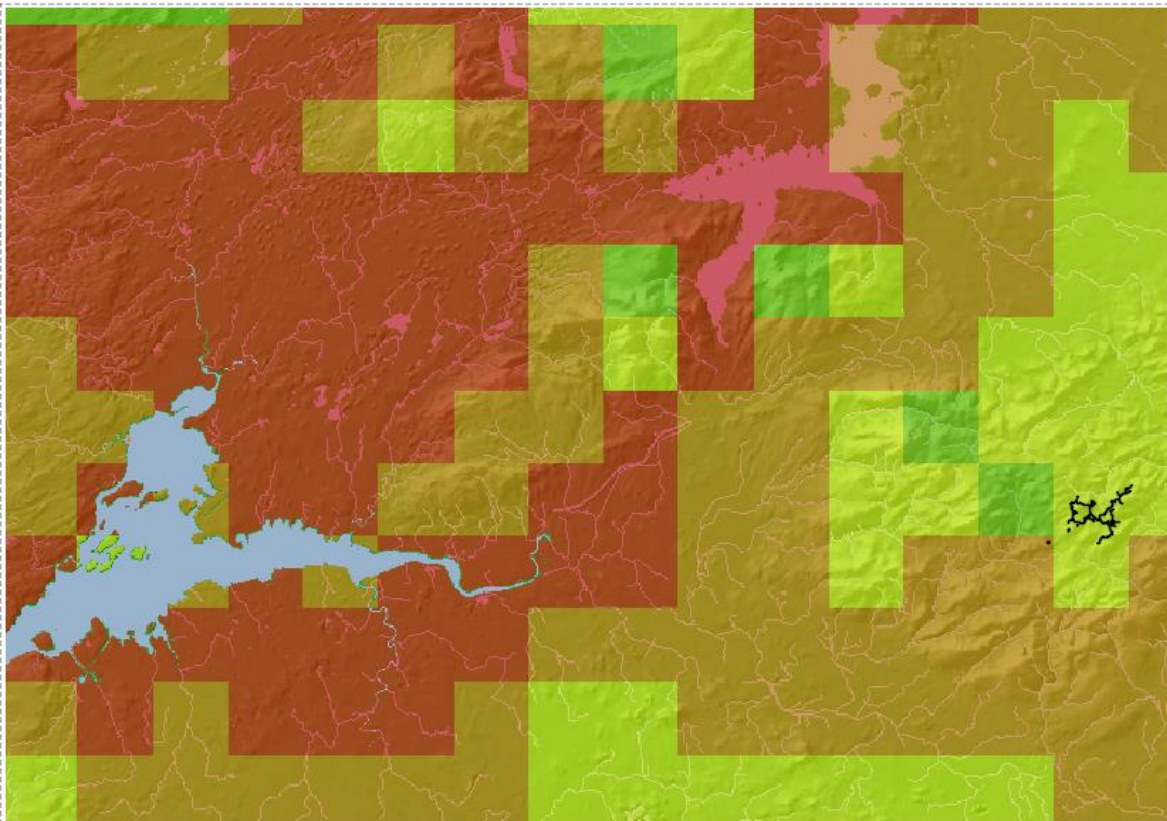


Plate 3: Bat Suitability Areas as per National Bat Suitability Landscape Mapping

(Those areas shown in red have the highest habitat suitability index, and those in green, the lowest suitability index. However, squares highlighted as less favourable may still have local areas of abundance).

A8.1.3 Survey Results

A-8.1.3.1 Aquatic Species

Table 10 Summary of type and number of watercourse crossings for Related Works.

Watercourse Characterisation	UWF Related Works
Watercourse with Fisheries value (EPA Blue Line)	1
Watercourse with Fisheries value (EPA Blue Line Equivalent)	5
Sub-optimal watercourse with Low fisheries value	2
Drainage ditch with No fisheries value	24

Table 11 Watercourse Classification and Crossing Method for the UWF Related Works

WC_No	Crossing Method Type	Description of Cross Method Type	E_ITM	N_ITM
WW1	C1	No Existing Structure / Yes Instream Works / cable & traffic crossing / installation of permanent watercourse crossing structure / cables and ducting installed over or under new permanent watercourse crossing structure	595749	659884
WW2	F*	No Existing Structure / No instream works / cable and traffic / Internal Windfarm cabling installed over watercourse using the consented UWF Clear Span Bridge	595702	659970
WW3	C3	No Existing Structure / Yes Instream Works / cable crossing only / no watercourse crossing structure required / cables and ducting installed under watercourse	595624	660346
WW4	C1	No Existing Structure / Yes Instream Works / cable & traffic crossing / installation of permanent watercourse crossing structure / cables and ducting installed over or under new permanent watercourse crossing structure	595423	660338
WW5	C2	No Existing Structure / Yes Instream Works / cable & traffic crossing / installation of temporary watercourse crossing structure / cables and ducting installed under new temporary watercourse crossing structure	595372	660334
WW6	A1	Existing Structure / No instream works / cable & traffic crossing / no works to existing watercourse crossing structure / cables and ducting installed over or under existing structure	595203	660339
WW7	C2	No Existing Structure / Yes Instream Works / cable & traffic crossing / installation of temporary watercourse crossing structure / cables and ducting installed under new temporary watercourse crossing structure	595139	660440
WW8	C2	No Existing Structure / Yes Instream Works / cable & traffic crossing / installation of temporary watercourse crossing structure / cables and ducting installed under new temporary watercourse crossing structure	595105	660460
WW9	C3	No Existing Structure / Yes Instream Works / cable crossing only / no watercourse crossing structure required / cables and ducting installed under watercourse	595097	660464
WW10	C3	No Existing Structure / Yes Instream Works / cable crossing only / no watercourse crossing structure required / cables and ducting installed under watercourse	596075	660400
WW11	A1	Existing Structure / No instream works / cable & traffic crossing / no works to existing watercourse crossing structure / cables and ducting installed over or under existing structure	596062	660403
WW12	B2	Existing Structure / Yes Instream Works / traffic crossing only / replacement of existing watercourse crossing structure / No cables or ducting installed	595915	660710
WW13	C4	No Existing Structure / Yes Instream Works / traffic crossing only / installation of new permanent watercourse crossing structure / No cables or ducting installed	595783	661007
WW14	C4	No Existing Structure / Yes Instream Works / traffic crossing only / installation of new permanent watercourse crossing structure / No cables or ducting installed	595765	661079
WW15	C1	No Existing Structure / Yes Instream Works / cable & traffic crossing / installation of permanent watercourse crossing structure / cables and ducting installed over or under new permanent watercourse crossing structure	596495	662228
WW16	C2	No Existing Structure / Yes Instream Works / cable & traffic crossing / installation of temporary watercourse crossing structure / cables and ducting installed under new temporary watercourse crossing structure	595912	661510
WW17	C3	No Existing Structure / Yes Instream Works / cable crossing only / no watercourse crossing structure required / cables and ducting installed under watercourse	595637	661315

WC_No	Crossing Method Type	Description of Cross Method Type	E_ITM	N_ITM
WW18	C3	No Existing Structure / Yes Instream Works / cable crossing only / no watercourse crossing structure required / cables and ducting installed under watercourse	595485	661140
WW19	C3	No Existing Structure / Yes Instream Works / cable crossing only / no watercourse crossing structure required / cables and ducting installed under watercourse	595458	661086
WW20	C3	No Existing Structure / Yes Instream Works / cable crossing only / no watercourse crossing structure required / cables and ducting installed under watercourse	595021	660778
WW21	B2	Existing Structure / Yes Instream Works / traffic crossing only / replacement of existing watercourse crossing structure / No cables or ducting installed	594437	660618
WW22	C4	No Existing Structure / Yes Instream Works / traffic crossing only / installation of new permanent watercourse crossing structure / No cables or ducting installed	594025	660680
WW23	A1	Existing Structure / No instream works / cable & traffic crossing / no works to existing watercourse crossing structure / cables and ducting installed over or under existing structure	593736	660338
WW24	C1	No Existing Structure / Yes Instream Works / cable & traffic crossing / installation of permanent watercourse crossing structure / cables and ducting installed over or under new permanent watercourse crossing structure	593181	661387
WW25	C1	No Existing Structure / Yes Instream Works / cable & traffic crossing / installation of permanent watercourse crossing structure / cables and ducting installed over or under new permanent watercourse crossing structure	593114	661553
WW26	C3	No Existing Structure / Yes Instream Works / cable crossing only / no watercourse crossing structure required / cables and ducting installed under watercourse	593831	661628
WW27	C2	No Existing Structure / Yes Instream Works / cable & traffic crossing / installation of temporary watercourse crossing structure / cables and ducting installed under new temporary watercourse crossing structure	594187	661530
WW28	C3	No Existing Structure / Yes Instream Works / cable crossing only / no watercourse crossing structure required / cables and ducting installed under watercourse	594370	661382
WW29	A1	Existing Structure / No instream works / cable & traffic crossing / no works to existing watercourse crossing structure / cables and ducting installed over or under existing structure	594572	660835
WW30	A1	Existing Structure / No instream works / cable & traffic crossing / no works to existing watercourse crossing structure / cables and ducting installed over or under existing structure	594623	660786
WW31	B2	Existing Structure / Yes Instream Works / traffic crossing only / replacement of existing watercourse crossing structure / No cables or ducting installed	594278	660793
WW32	A2	Existing Structure / No instream works / traffic crossing only / no works to existing watercourse crossing structure / No cables or ducting installed	593168	661686

* Type F - internal windfarm cable crossing (WW2) is over a consented UWF Clear Span Bridge - No Existing Structure / No instream works / cable and traffic.

Table 12 Watercourse Classification and Crossing Method for the UWF Related Works

WC_No	Description of watercourse crossing method	E_ITM	N_ITM
W1	Installation of new temporary watercourse crossing structure. Instream works will be required.	572323	664478
W2	Installation of new permanent watercourse crossing structure. Instream works will be required.	572555	664581
W3	Installation of new permanent watercourse crossing structure. Instream works will be required.	572658	664566
W4	Bridge over Newport River - No instream works , Cables installed in structure of the bridge	572510	662301
W5	Existing Structure – Cables will cross over the culvert in the road pavement.	574524	661294
W6	Existing Structure – Cables will cross over the culvert in the road pavement.	575525	660651
W7	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	576074	660060
W8	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	576444	659881
W9	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	576619	659895
W10	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	576903	659957
W11	Existing Structure – Cables will cross over the culvert in the road pavement.	576988	659988
W12	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	577105	660063
W13	Existing Structure – Cables will cross over the culvert in the road pavement.	577225	660132

W14	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	577339	660172
W15	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	577760	660301
W16	Bridge - No instream works , Cables installed in structure of the bridge	577846	660328
W17	Bridge - No instream works , Cables installed in structure of the bridge	578135	660411
W18	Bridge - No instream works , Cables installed in structure of the bridge	578303	660457
W19	Existing Structure – Cables will cross over the culvert in the road pavement.	578495	660490
W20	Existing Structure – Cables will cross over the culvert in the road pavement.	578576	660502
W21	Existing Structure – Cables will cross over the culvert in the road pavement.	578689	660518
W22	Existing Structure – Cables will cross over the culvert in the road pavement.	578832	660539
W23	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	579115	660603
W24	Bridge - No instream works , Cables installed in structure of the bridge	579439	660716
W25	Existing Structure – Cables will cross over the culvert in the road pavement.	579691	660757
W26	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	580029	660792
W27	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	580180	660810
W28	Bridge - No instream works , Cables installed in structure of the bridge	580528	660767

W29	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	580869	660617
W30	Bridge - No instream works , Cables installed in structure of the bridge	580922	660590
W31	Bridge - No instream works , Cables installed in structure of the bridge	581396	660262
W32	Existing Structure – Cables will cross over the culvert in the road pavement.	581838	659906
W33	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	581946	659793
W34	Existing Structure – Cables will cross over the culvert in the road pavement.	582790	659248
W35	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	583812	659483
W36	Existing Structure – Cables will cross over the culvert in the road pavement.	584371	659327
W37	Existing Structure – Cables will cross over the culvert in the road pavement.	584950	659105
W38	Bridge - No instream works , Cables installed in structure of the bridge	585273	659014
W39	Bridge - No instream works , Cables installed in structure of the bridge	585486	658934
W40	Existing Structure – Cables will cross over the culvert in the road pavement.	586010	658701
W41	Existing Structure – Cables will cross over the culvert in the road pavement.	586233	658545
W42	Existing Structure – Cables will cross over the culvert in the road pavement.	586605	658203
W43	Existing Structure – Cables will cross over the culvert in the road pavement.	586893	658278

W44	Bridge - No instream works , Cables installed in structure of the bridge	587423	658557
W45	Existing Structure – Cables will cross over the culvert in the road pavement.	587699	658489
W46	Existing Structure – Cables will cross over the culvert in the road pavement.	587893	658498
W47	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	588326	658578
W48	Bridge - No instream works , Cables installed in structure of the bridge	588920	658727
W49	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	589305	658621
W50	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	589660	658460
W51	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	589836	658491
W52	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	590060	658536
W53	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	590581	658611
W54	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	590819	658751
W55	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	591090	658848
W56	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	592458	659714
W57	Ex Existing Structure – Cables will cross over the culvert in the road pavement.	593241	659975
W58	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	593651	660262
W59	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	593940	660564

W60	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	594023	660693
W61	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	594278	660789
W62	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	594612	660623
W63	Existing Structure - Potential culvert replacement works if culvert is damaged during construction activities. Cables will be installed under culvert	594860	660609

A-8.1.3.2 Hen Harrier

All Hen Harrier Surveys results are in section A8.1.4 of this Biodiversity Appendix

A-8.1.3.3 Bats

Designated sites

Bats are not listed as conservation interests for any designated sites within 15km of the UWF Related Works.

Preliminary evaluation of potential bat roosts

Preliminary ecological appraisals were carried out for buildings within 150m of Related Works.

Bat roosts - Buildings

In addition to the preliminary roost appraisals, presence / absence bat surveys and/or roost characterisation surveys were carried out that had moderate or high suitability for bats within the vicinity of UWF Related Works. The surveyor focussed on the building for the majority of the survey, but if no bats were observed entering the structure at dawn then the surveyor took the opportunity to track passing bats to other roosts in the surrounding area; a number of pipistrelle roosts were located using this method. Four structures were surveyed on three occasions in 2016 in order to cover the maternity period (July / August), the mating period (September / October) and the hibernation period (December).

Bat roosts were identified, some of which supported multiple roost types. See Table 42 for summary of roost details. Detailed descriptions of each roost are provided in a confidential annexe to this report, which will be provided to the planning authority and key statutory consultees but will not be made publicly available. The confidential annex includes all roost evaluations pertinent to the UWF Related Works.

Each structure has been assigned an overall ecological value using the six-level hierarchical system outlined in *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2016). In line with this and for the purposes of this report we consider maternity and hibernation roosts of *Myotis* spp and brown long-eared bats to be of county importance, while maternity and hibernation roosts of common and soprano pipistrelles and non-breeding roosts of all other species are considered to be of local importance. Roosts containing single bats are considered to be of negligible ecological importance, although it should be noted that they still receive legal protection. On this basis, one building is considered to be of local importance, one building is considered to be of county importance.

In addition, roost number 18 (within a building) was identified during the survey of a nearby bridge along the haul route, but as no construction works are proposed to the bridge or road in this area, there is no risk of effects on the building. On this basis, roost number 18 is not considered to be within the zone of influence of the Whole UWF Project, and will not be included in the evaluation of effects.

Table 13 Roost suitability of buildings within the study area of the Related Works

Code	ITM grid ref		Description	Rating	Surveyed?
H93	592349	659868	Two-storey house	M	Y
H94	592577	659794	Metal-roofed barns	N	
H95	592660	659789	Bungalow	L	
H96	592805	659732	Two-storey house	L	
H97	592823	659756	Bungalow	L	
H98	592855	659730	Bungalow	L	
H99	592961	659742	Farmhouse and barns	L	
H100	592921	659806	Bungalow and barns	L	
H101	593267	659975	Bungalow	L	
H102	593327	659998	Bungalow	L	
H103	593332	660032	Bungalow	L	
H104	593371	660016	Metal-roofed barn	L	
H105	593411	660036	Bungalow	L	
H106	593446	660059	Two-storey house	L	
H107	593654	660420	Metal-roofed barns	N	
H108	593741	660362	Bungalow	L	
H109	593756	660301	Two-storey house	L	
H110	593815	660412	Two-storey house	M	
H111	593873	660405	Ruins	L	
H112	593915	660483	Incomplete house	L	
H113	593951	660527	Two-storey house	L	
H114	593998	660679	Derelict house	M	Y
H115	593094	661520	Bungalow	M	Y
H116	594058	661685	Farmhouse and barns	H	Y
H117	594087	661628	Metal barns	N	
H118	594177	661544	Two-storey house	L	
H119	594365	660893	Bungalow	L	
H120	594440	660889	Derelict stone house	M	
H121	595050	660559	Derelict house, shed	H	Y
H122	595061	660938	House / metal barns	L	
H123	595119	660954	Metal barn	N	
H124	595315	661219	New two-storey house	N	
H125	595674	661140	Bungalow / warehouse	L	
H126	595775	661168	Bungalow	M	Y
H127	595968	660708	Metal barns	N	

Bat roosts - Buildings

In addition to the preliminary roost appraisals, presence / absence bat surveys and/or roost characterisation surveys were carried out at 6 buildings that had moderate or high suitability for bats. The surveyor focussed on the building for the majority of the survey, but if no bats were observed entering the structure at dawn then the surveyor took the opportunity to track passing bats to other roosts in the surrounding area; a number of pipistrelle roosts were located using this method. The six structures were surveyed on three occasions in 2016 in order to cover the maternity period (July / August), the mating period (September / October) and the hibernation period (December).

Each structure has been assigned an overall ecological value using the six-level hierarchical system outlined in *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2016). In line with this and for the purposes of this report we consider maternity and hibernation roosts of *Myotis* spp and brown long-eared bats to be of county importance, while maternity and hibernation roosts of common and soprano pipistrelles and non-breeding roosts of all other species are considered to be of local importance. Roosts containing single bats are considered to be of negligible ecological importance, although it should be noted that they still receive legal protection. On this basis, two buildings are considered to be of county importance, three to be of local importance, and one to be of negligible importance.

Table 14 Summary of bat roosts their distances from the UWF Related Works.

No	Description of structure	Evidence of bats	Valuation	Proximity to UWF Related Works
14	Dwelling house	Day roost / satellite roost: 1 common pipistrelle	Negligible	45m
15	Dwelling house and traditional farm buildings	Maternity roost: 50 - 60 common pipistrelles Maternity roost: 5 soprano pipistrelles.	Local	130m
16	Dwelling house and traditional farm buildings	Maternity roost: 4 - 5 natterers bats. Transitional / mating roosts: 5 - 10 natterers bats, 20 common pipistrelles, 3 brown long-eared bats. Summer non-breeding / day roost: 2 common pipistrelles, 1 Leisler's bat. Hibernation roost: natterer's bats, common pipistrelles, Leisler's bat.	County	0m
17	Dwelling house	Maternity roost: 2 - 3 natterers bats	County	5m

Bat roosts - Trees

Ground-level roost assessments were carried out for all trees with moderate or low bat suitability within 50m of the UWF Related Works. No live bats were seen or heard, and no field signs were observed (e.g. droppings, fur-oil staining, urine splashes), so none of these trees were confirmed to be supported roosting bats at the time of survey. All other broadleaf trees within 50m of the UWF Related Works were inspected, but none had any potential roost features that would be suitable for bats, so they were considered to have negligible roost suitability.

Bat roosts - Bridges & Culverts

All water crossings we inspected for bat suitability. All bridges with suitability for bats were inspected by torchlight. No live bats were seen or heard, and no field signs were observed (e.g. droppings, fur-oil staining, urine splashes). Therefore, none of these structures appeared to support roosting bats. 2 no. crossings had negligible suitability.

Table 15 Preliminary bat roost suitability for bridges within the study area of the UWF Related Works

Code	ITM Grid Ref		Description	Rating	Surveyed?
B02 (red)	594025	660694	Concrete culvert	N	
B03 (red)	593943	660563	Small stone culvert	N	

Potential limitations and information gaps

In accordance with the CIEEM Guidelines (2016), this section aims to identify any aspects in which the baseline data may be deficient, and to discuss how it has been taken into account in the evaluation of effects. Overall, this study is considered to have a broad spatial and seasonal coverage, and provides a good representation of bat roosting and foraging / commuting behaviour along the Whole UWF Project. The survey effort is considered to be proportionate to the potential effects of the Whole UWF Project (Section 2.2.5 of the BCT Guidelines). Nonetheless, some minor limitations are discussed below.

Restricted access to properties

Where possible within the vicinity of elements 2 -4, detailed bat surveys were carried out for buildings of high or moderate suitability within 150m. It was not always possible to obtain permission to enter private property and/or to access the interior of buildings, so in some cases the presence / absence surveys were carried out from public roads. However, this is not considered to have negatively affected the results, because swarming behaviour can usually be observed at any location around a building, even if the roost entry point is not directly visible.

Weather conditions

Bat activity can vary significantly in relation to weather conditions, with higher activity during periods of warm, calm, dry weather, and lower activity during cold, windy or wet weather. In the BCT guidelines it is recommended that surveying should be avoided during periods of heavy rain, strong winds, mist or dusk temperatures below 10°C. However, it should be noted that the climate of Ireland is often unsettled during summer months, so it is not always possible to ensure that surveys are carried out during ideal weather conditions, particularly when automated detectors are deployed for a number of days at a time.

Based on the highest activity levels of each species over the two sampling periods, each location was assigned an ecological value using the six-level hierarchical system outlined in the CIEEM guidelines (2016), with reference to the bat-specific guidance outlined in Wray *et al.*, (2011). Locations were considered to be of county importance if they had near-constant activity by pipistrelles and/or frequent activity (or higher) of any other species, to be of local importance if they had frequent pipistrelle activity and occasional activity of any other species, and to be of negligible importance if they had occasional (or lower) activity of pipistrelles and negligible activity of other species.

Table 16 Summary of bat activity levels at each sampling point. Species codes are as follows: CP (common pipistrelle), SP (soprano pipistrelle), L (Leisler's bat) and MY (Myotis spp.)

Site	Grid ref	Habitat	Month	Characterisation of activity	Ecological value
SD26	593610	Farmyard	Jun	Near-constant CP	County
	660433		Sept	Occasional CP	
SD27	594849	Edge of conifer plantation	Jun	Occasional CP	Negligible
	660597		Sept	Negligible	

Table 17 Bat Activity Indices for each species during each sampling period

Site	Grid ref	Month	L	CP	SP	NP	MY	MD	MIN	MW	BLE	UnID	Total	Summary	Habitat	Ecological value
SD26	593610	Jun	0.8	65.2	0.2	0	0	0.3	0	0	0	0	66.7	Near-constant CP	Farmyard, close to a silage store	County
		Sept	0.9	6.3	0.4	0	0	0.2	0	0	0	0.1	8	Occasional CP		
SD27	594849	Jun	0.2	7.2	0.1	0	0.1	0	0	0	0	0	7.6	Occasional CP	Broadleaf trees on edge of conifer plantation	Negligible
		Sept	0	0.5	0.3	0	0.1	0	0.1	0	0	0	1			

Species codes: L - Leisler's bat; CP - common pipistrelle; SP - soprano pipistrelle; NP - Nathusius' pipistrelle; MY - Myotis genus, species unidentified; MN - Natterer's bat; MD - Daubenton's bat; MW - whiskered bat; BLE - brown long-eared bat; UnID - unidentified bat

Terms of characterisation	Bat Activity Index	Average interval between calls
Negligible	<2	> 30 minutes
Occasional	2 - 12	5 - 30 minutes
Frequent	12 - 60	1 - 5 minutes
Near-constant	>60	< 1 minute

A-8.1.3.4 Habitats

A 50-m buffer was applied to work locations comprising the Whole UWF Project, with the exception of the Upperchurch Windfarm, which has already been described in the EIS for the Upperchurch Windfarm planning application. The area within the buffer is termed the ‘survey corridor’ hereafter. Nomenclature for vascular plants follows Parnell and Curtis (2012). UWF Grid Connection habitat can be seen on figures WP 8.5 in Volume C3 EIAR Figures

A-8.1.3.4.1 UWF Related Works

The habitats within the survey corridor of the UWF Related Works comprise a mosaic of agricultural grassland, commercial forestry plantations, peatlands, heath, earth banks, wet grassland, acid grasslands, private roads and public roads.

Table 18 Habitats (non-linear) surveyed within a 100-m survey corridor of the UWF Related Works, the total of each habitat within the survey corridor and an evaluation of their conservation value.

Habitat Type	Area within Survey Corridor (ha)	Evaluation
BL3	5.12	Local Importance (Lower Value)
ED2	1.74	Local Importance (Lower Value)
ED3	0.63	Local Importance (Lower Value)
GA1	113.38	Local Importance (Lower Value)
GA1/GS4	1.70	Local Importance (Higher Value)
GA1/WS1	0.42	Local Importance (Higher Value)
GA2	0.27	Local Importance (Lower Value)
GS2	0.14	Local Importance (Higher Value)
GS3	1.58	Local Importance (Higher Value)
GS4	11.95	Local Importance (Higher Value)
GS4/WS1	0.49	Local Importance (Higher Value)
HH1/GS4	0.11	Local Importance (Higher Value)
HH3	2.32	Local Importance (Higher Value)
GS3/HH3	2.81	Local Importance (Higher Value)
PB2	2.03	County Importance
PB2/GS4	0.13	Local Importance (Higher Value)
PB4	0.10	Local Importance (Higher Value)
WD1	0.15	Local Importance (Higher Value)
WD4	42.45	Local Importance (Lower Value)
WL2	0.09	Local Importance (Higher Value)
WS1	1.68	Local Importance (Higher Value)
WS2	0.78	Local Importance (Higher Value)
WS2/GS4	0.43	Local Importance (Higher Value)

Table 19 Habitats (linear) surveyed within a 100-m survey corridor of the UWF Related Works, the total length of each habitat within the survey corridor and an evaluation of their conservation value.

Habitat Type	Length within Survey Corridor (m)	Evaluation
BL2	10429.54	Local importance (Lower value)
BL3	156.40	Local importance (Lower value)
FW1	693.78	County Importance; Local Importance (Higher Value)
FW2	433.92	Local Importance (Higher Value)
FW4	2800.05	Local importance (Lower value)
GS2	159.93	Local importance (Lower value)
WL1	702.00	Local Importance (Higher Value)
WL1/WL2	187.63	Local Importance (Higher Value)
WL2	721.43	Local Importance (Higher Value)

Earth Banks (BL2)

This was the most frequently encountered field boundary within the survey corridor along with post and wire fencing. The vegetation on these earth banks varied depending on location and altitude. Earth banks at higher elevations contained species such as heathers, bilberry, bramble and heath bedstraw typical of heath habitat. Species in the lowland earth banks included frequent bramble and gorse along with occasional hawthorn or blackthorn bushes, more typical of hedgerow or scrub habitats. Earth banks were generally 1.5 m high and c. 2 m thick. Wire and post fencing ran alongside to make the boundary stock proof. Some earth banks are in poor condition due to trampling by livestock and lack of maintenance.

Buildings and artificial surfaces (BL3)

This habitat was recorded along public roads, dwelling houses and farmyards and associated paved areas. Plant species were generally absent from this habitat or if present, restricted to common ruderal species.

Hedgerows (WL1)

Hedgerow habitat within the survey corridor was rarely recorded. The habitat, when present, comprised frequent hawthorn (*Crataegus monogyna*), bramble and gorse along with occasional blackthorn (*Prunus spinosa*) and elder (*Sambucus nigra*).

Hedgerows (WL1)/ Treelines (WL2)

This habitat was recorded occasionally where hedgerow habitat and treeline habitat were present intermittently along a field boundary.

Treelines (WL2)

Treeline habitats within the survey corridor were generally of two types; the first was dominated by mature Sitka spruce trees which were planted as shelter belts for dwellings, farmyards or along field boundaries for livestock. The second type of treeline consisted of broadleaved species including a mix of ash and sycamore.

Eroding/Upland Rivers (FW1)

The eroding/upland rivers habitat was recorded within the survey corridor as streams generally 0.5 to 1 m wetted width showing vertical erosion in the stream bed with steep banks. Boulders, cobbles and gravels were the main aggregates in the stream bed. Evidence of previous spate flows was observed but water levels were lower during the survey. Evidence of livestock poaching and subsequent siltation of watercourse was observed at one location.

Drainage Ditches (FW4)

This habitat was recorded around the margins of agricultural grasslands and also within conifer forestry plantations. Species present in the revegetated drains included abundant soft rush, hemlock water dropwort (*Oenanthe crocata*), wild angelica (*Angelica sylvestris*), nettle and bramble. Water levels and flow rates, if present, was often low.

Improved Agricultural Grassland (GA1)

This was the most frequently recorded habitat within the survey corridor of the UWF Related Works. Intensively management examples of the habitat were dominated by perennial rye grass (*Lolium perenne*) with Yorkshire fog (*Holcus lanatus*) and white clover (*Trifolium repens*) all occurring frequently. Daisy (*Bellis perennis*), ragwort (*Senecio jacobaea*), Common mouse-ear (*Cerastium fontanum*), broad-leaved dock (*Rumex obtusifolius*) and common sorrel (*Rumex acetosa*) were recorded occasionally.

In some less intensively managed and/or poorer drained areas within fields, soft rush was locally frequent along with frequent creeping buttercup (*Ranunculus repens*) and occasional meadow buttercup (*Ranunculus acris*). However, species diversity was generally low and ground conditions not sufficiently wet to include in the wet grassland habitat type, as well as evidence of agricultural improvement and/or intensive management.

Amenity Grassland (GA2)

Within the survey corridor, amenity grassland was associated with lawns and other managed grassland areas in gardens.

Dry-humid acid grassland (GS3)

The dry-humid acid grassland habitat was recorded in the upland areas of the survey corridor, at the margins of existing peatland habitats or area of former bog which has been historically harvested and has regenerated with wet heath, acid grassland or wet grassland habitats.

Sweet vernal grass (*Anthoxanthum odoratum*), mat-grass (*Nardus stricta*), common bent (*Agrostis capillaris*) and velvet bent (*Agrostis canina*) were frequently recorded grass species in this habitat. Purple moor grass and wavy hair grass (*Deschampsia flexuosa*) occurred occasionally along with green ribbed sedge, carination sedge (*Carex panicea*) and heath woodrush (*Luzula multiflora* agg.). Heath rush (*Juncus squarrosus*), flea sedge (*Carex pulicaris*) and great woodrush (*Luzula sylvatica*) occurred rarely. The forb element included frequent tormentil (*Potentilla erecta*), ling heather, cat's ear (*Hypochaeris radicata*) and heath milkwort (*Polygala serpyllifolia*).

In addition, heath bedstraw (*Galium saxatile*), devil's bit scabious (*Succisa pratensis*) and lousewort (*Pedicularis sylvatica*) were recorded at one location for this habitat.

Wet Grassland (GS4)

Wet grassland was frequently recorded in low lying areas, on poorly draining soils and adjacent to watercourses. Soft rush and creeping buttercup were locally abundant in patches within this habitat. Yorkshire fog, creeping bent (*Agrostis stolonifera*), marsh ragwort (*Senecio aquaticus*) were frequently recorded along with lesser spearwort (*Ranunculus flammula*), marsh bedstraw (*Galium palustre*), marsh foxtail (*Alopecurus geniculatus*) occurred occasionally.

Notably species rich fields were less frequently recorded and included sharp flowered rush (*Juncus acutiflorus*), sweet vernal grass, heath woodrush, marsh thistle (*Cirsium palustre*), greater bird's-foot-trefoil (*Lotus pedunculatus*), lesser stitchwort (*Stellaria graminea*), field horse tail (*Equisetum arvense*), oval sedge (*Carex ovalis*), devils bit scabious and heath spotted orchid (*Dactylorhiza maculata*).

Dry siliceous heath (HH1)

This habitat was located along firebreaks within the conifer plantation habitat where overlying peat soils had been excavated and the vegetation had recolonised the remaining shallow peat/ siliceous subsoil track. Species present included frequent ling heather and occasional bell heather along with tormentil. Gorse and bramble were also present rarely.

Wet Heath (HH3)

This habitat was recorded at the margins of existing upland blanket bog habitat where there was evidence of historic peat harvesting and subsequent vegetation regeneration on the shallower peat soils. Species present included heather with purple moor grass, heath rush and wavy hair grass. Tormentil and bilberry occurred occasionally with soft rush, bog cotton, green ribbed sedge, mat-grass and sweet vernal grass. Heath spotted orchid and deer grass occurred rarely.

Dry-humid acid grassland (GS3)/ Wet Heath (HH3) Mosaic

This habitat was recorded at locations where dry-humid acid grassland formed intimate mosaics with the adjoining wet heath habitat. The species composition present comprised those as outlined in the dry-humid acid grassland habitat above with the presence of wet heath species such as ling heather, bilberry and tormentil

Upland Blanket Bog (PB2)

Ling heather, purple moor grass and bog cotton were all frequently recorded in this habitat. Bell heather (*Erica cinerea*), Cross-leaved heath, tormentil, green ribbed sedge and deergrass were recorded occasionally. Heath rush occurred rarely.

Cutover Bog (PB4)

This habitat was recorded between banks of upland blanket bog which had been harvested for turf. The level of these cut over areas was 1 to 1.5 m below the surrounding bog. The peaty soil was waterlogged and species diversity was low with the habitat being dominated by Yorkshire fog and soft rush.

Conifer plantation (WD4)

The conifer plantation habitat within the survey corridor was dominated by Sitka spruce and was generally of a mature age class with trees 8 to 10 m high and the canopy fully closed. Understorey plants were generally absent due to heavy shade.

Immature woodland (WS2)

This habitat was recorded along the margins of recently planted conifer plantations, generally along public roads and watercourses. The species were generally broadleaved species such as frequent downy birch (*Betula pubescens*) along with occasional alder (*Alnus glutinosa*) and rowan. The trees in these planted buffer areas were generally c. 2.5 to 3 m high and immature.

Scrub (WS1)

The species composition of this habitat varied across the survey corridor. Scrub habitat included frequent gorse, bramble, hawthorn and willow. This habitat was recorded in areas of low intensity management such as adjacent to watercourses and conifer plantations, former pasture that is no longer grazed/mowed frequently.

Spoil and bare ground (ED2)

This habitat type was mainly recorded on unpaved farm tracks and, to a lesser extent, forestry roads within the survey corridor. These roads are c. 4 - 5 m wide and surfaced with hardcore or compacted earth for farm machinery, livestock or forestry machinery to access the forestry. Frequent use and/or regular maintenance/resurfacing keeps these habitats free of vegetation.

Recolonising bare ground (ED3)

This habitat was recorded along infrequently used farm tracks or yards which did not have regular maintenance or heavy traffic and so a range of ruderal species have re-established on the gravel or hardcore surface. Common species recorded included nettle, dandelion, broadleaf plantain, pineappleweed and shepherd's-purse.

A-8.1.3.4.2 UWF Replacement Forestry

The habitats within the UWF Replacement Forestry lands comprise of improved and wet grassland with earth banks, drainage ditches and streams dividing the fields. An area of scrub and conifer plantation is concentrated on the steep sides of a small glen through which the stream flows.

Additional habitats are described herein that occur within the Best Practice survey buffer however it is not proposed that these are planted with forestry. Results are included for completeness.

Table 20 Habitats (non-linear) surveyed within a 50-m buffer of the UWF Replacement Forestry, the total of each habitat within the survey corridor and an evaluation of their conservation value.

Habitat Type	Area within UWF Replacement Forestry lands (ha)	Evaluation
BL3	0.000001	Local Importance (Lower Value)
ED3	0.45	Local Importance (Lower Value)
GA1	8.92	Local Importance (Lower Value)
GS4	1.77	Local Importance (Lower Value)
WD1	0.18	Local Importance (Higher Value)
WD4	0.57	Local Importance (Lower Value)
WS1	0.59	Local Importance (Higher Value)

Table 21 Habitats (linear) surveyed within a 50-m buffer of the UWF Replacement Forestry, the total of each habitat within the survey corridor and an evaluation of their conservation value.

Habitat Type	Length within UWF Replacement Forestry lands (m)	Evaluation
BL2	748.86	Local importance (Lower value)
BL3	228.66	Local importance (Lower value)
FW1	489.44	National Importance; Local Importance (Higher Value)
FW4	314.32	Local importance (Lower value)
WL1	44.62	Local Importance (Higher Value)
WL2	89.50	Local Importance (Higher Value)

Earth Banks (BL2)

This was the most frequently encountered field boundary within the UWF Replacement Forestry lands and associated survey buffer. The vegetation on these earth banks included frequent bramble and gorse along with occasional hawthorn, willow spp. and bracken. Earth banks were generally 1.5 m high and c. 2 m thick. Wire and post fencing ran alongside to make the boundary stock proof.

Buildings and artificial surfaces (BL3)

This habitat was only recorded along the tarmacked surface of the public road that is located close to the western boundary of the UWF Replacement Forestry lands.

Hedgerows (WL1)

Hedgerow habitat was rarely recorded within the UWF Replacement Forestry lands. The habitat was recorded adjacent to an existing farm road which allows access to the lands via the public road. Species present comprised of frequent grey willow (*Salix cinerea*) and occasional eared willow (*Salix aurita*) as well as bramble and bracken.

Treeline (WL2)

Treelines were rarely recorded within the UWF Replacement Forestry lands. One treeline consisting of frequent ash (both mature and semi-mature trees) along with mature sycamore and Sitka spruce were located along the stream in the east of the survey area.

Eroding/Upland Rivers (FW1)

The eroding/upland rivers habitat was recorded within the UWF Replacement Forestry lands at the bottom of a small glen which runs from southwest to northeast through the study area. The stream was fast flowing with predominantly riffle morphology with occasional pools with a wetted width of c. 1.5 m and up to 0.5 m deep in pool with more shallow stretches over the riffles. Cobbles and gravels were the main aggregates in the stream bed. There was evidence of erosion on the banks of the stream. The majority of the stream is enclosed in scrub and conifer plantation.

The stream is a tributary of the Foilnahan (EPA Code 16F62) which is, in turn, a headwater stream of the Clodiagh River (EPA Code:16C02).

Drainage Ditches (FW4)

This habitat was recorded around the margins of agricultural grasslands, often associated with earth bank field boundaries. The drainage ditches within the UWF Replacement Forestry lands were dry or near stagnant during the site visit. The ditches were all vegetated with abundant soft rush, bramble, nettle along with occasional wild angelica.

Improved Agricultural Grassland (GA1)

This was the most frequently recorded habitat within the UWF Replacement Forestry lands. Species recorded included abundant perennial rye grass with frequent Yorkshire fog and white clover. Broad-leaved dock and creeping buttercup were recorded occasionally. The majority of fields within the UWF Replacement Forestry lands were being used for grazing cattle. One field showed evidence of recent mowing for baled silage.

Wet Grassland (GS4)

Wet grassland was recorded in the low-lying areas adjacent to the stream. Soft rush and creeping buttercup were abundant. Yorkshire fog, creeping bent and marsh ragwort were frequently recorded. Wild angelica was frequent at the margins of the stream.

Mixed Broadleaved Woodland (WD1)

This habitat was recorded along the margin of the conifer plantations within the UWF Replacement Forestry lands as a buffer between watercourses and the plantations. Species present included abundant alder with occasional ash. Trees were 6 to 8 m tall and semi mature.

Conifer plantation (WD4)

The conifer plantation habitat within the UWF Replacement Forestry survey corridor was confined to a small areas of Sitka spruce that has been planted on the steeply sloping margins of the small glen. The plantation was semi-mature and closed canopy with the trees c. 6 to 8 m tall.

Scrub (WS1)

This habitat was recorded within the small glen, adjacent to the stream. The species composition consisted of frequent willow spp. and bramble. Bracken was locally dominant in patches. Mature ash trees and hazel shrubs occurred rarely.

Recolonising bare ground (ED3)

This habitat was recorded along the existing farm tracks within the UWF Replacement Forestry lands. Species present consisted of perennial rye grass, annual meadow grass and broadleaf plantain.

A-8.1.3.4.3 UWF Other Activities

Haul Route Activities

The habitats along the Haul Route Activities locations mainly comprise of public road with associated margin vegetation often comprising grassy verges, ornamental planting, hedgerows and treelines and scrub.

Table 22 Habitats (non-linear) surveyed within a 100-m survey corridor of the UWF Other Activities, the total of each habitat within the survey corridor and an evaluation of their conservation value.

Habitat Type	Area within Survey Corridor (ha)	Evaluation
BC4	0.2	Local Importance (Lower Value)
BL3	8.2	Local Importance (Lower Value)
ED2	0.2	Local Importance (Lower Value)
FW1	0.4	County Importance; Local Importance (Higher Value)
GA1	13.0	Local Importance (Lower Value)
GA2	1.7	Local Importance (Lower Value)
GS2	3.9	Local Importance (Lower Value)
GS4	1.1	Local Importance (Lower Value)
HH1	0.4	Local Importance (Lower Value)
WD1	5.1	Local Importance (Higher Value)
WD4	0.3	Local Importance (Lower Value)
WL2	0.2	Local Importance (Higher Value)
WS1	1.3	Local Importance (Higher Value)
WS2	0.3	Local Importance (Lower Value)

Table 23 Habitats (linear) surveyed within a 100-m survey corridor of the UWF Other Activities, the total of each habitat within the survey corridor and an evaluation of their conservation value.

Habitat Type	Length within Survey Corridor (m)	Evaluation
BL1	207.57	Local importance (Lower value)
BL2	29.61	Local importance (Lower value)
ED2	57.22	Local importance (Lower value)
GS2	1617.89	Local importance (Lower value)
FW1	277.06	County Importance; Local Importance (Higher Value)
FW4	16.17	Local importance (Lower value)
HD1	111.88	Local importance (Lower value)
WL1	1761.73	Local Importance (Higher Value)
WL2	268.91	Local Importance (Higher Value)

Stone walls (BL1)

Bare stone walls occur along the road corridor, as a road boundary, or forming the border for ornamental planting within residential areas.

Earth Banks (BL2)

The road corridor along the haul route, particularly in the Upperchurch area is characterised by earth banks, created during the road construction. These banks are associated with hedgerows and field boundaries or are commonly vegetated with dry grassy verge communities.

Buildings and artificial surfaces (BL3)

This habitat type included all dwellings, paved areas, footpaths and the roadway within the survey corridor. In general, these artificial surfaces are of low ecological value. However, some buildings may be of ecological value to roosting bats.

Spoil and bare ground (ED2)

This habitat type was recorded in one location at an unpaved farm tracks within the survey corridor.

Dry Meadow / Grassy Verge (GS2)

Grassy verges occurred along the road corridor throughout the haul route study area. The verge width varied; however, the botanical composition was found to be relatively homogenous with two distinct categories identified. The verge associated with recent road development and managed national roads was species poor, characterised by improved grass seed mix including rye grass and bent grass species with a low forb component such as daisy, dandelion, chickweed (*Stellaria media*) and plantain spp. Grassy verges south of the N7 motorway and west of Thurles were dominated by grasses including cock's foot grass (*Dactylis glomerata*), meadow foxtail (*Alopecurus pratensis*), Yorkshire fog and false oat grass (*Arrhenatherum elatius*) with forbs characteristic of a hedgerow understory including creeping buttercup, hogweed (*Heracleum sphondylium*), cow parsley (*Anthriscus sylvestris*), vetch (*Vicia* spp.), nettle and foxglove (*Digitalis purpurea*).

Eroding/Upland Watercourse (FW1)

The road corridor along the UWF other activities crosses a number of minor first and second order streams. A portion of the route on the R498 follows the Nenagh River corridor in the area of Latteragh, Co. Tipperary. Ecological evaluation: The Nenagh River is evaluated as being of County Importance; while the minor streams crossed by the route are evaluated as of Local importance (Higher Value).

Drainage Ditches (FW4)

This habitat was infrequently encountered within the survey corridor, only being recorded at one location associated with the edge of a farm roadway and earth bank.

Dense Bracken (HD1)

Small areas of bracken (*Pteridium aquilinum*) cover occur on higher ground adjacent to the road corridor.

Hedgerow (WL1)

Linear hedgerow features occur throughout the rural road network within the UWF Other Activities survey corridor, associated with the road corridor and agricultural field boundaries adjoining the road. Hedgerows were dominated by native species including hawthorn, blackthorn, elder, wych elm (*Ulmus glabra*) and hazel. Along the road verge, regular maintenance kept ash and sycamore growth in check.

Treeline (WL2)

Treelines were associated with the road corridor and agricultural field boundaries. Ash and sycamore dominated, with occasional pedunculate oak (*Quercus robur*) and conifers including Sitka spruce, *Pinus* spp. and *Cupressus* spp.

Wet Grassland (GS4)

No wet grassland occurs along the road verge; however, a number of field parcels adjacent to the road was classified as such, dominated by soft rush, nettles, Yorkshire fog and Yellow iris (*Iris pseudacorus*).

Conifer Plantation (WD4)

Due west of Thurles on higher ground blocks of conifer plantation were recorded adjacent to or set back from the road. These were dominated by Sitka spruce.

Scrub (WS1)

Willow scrub and maintained sycamore, dense bramble and unmanaged hedgerow were classified as scrub habitat, occurring frequently throughout the study area.

Immature woodland (WS2)

Plantations of immature woodland were recorded adjacent to the road route used as ornamental planting, screening coniferous plantation or as commercial broadleaved plantations.

Mixed Broadleaved Woodland (WD1)

Limited areas of mature broadleaved woodland were recorded along the route, in all locations this habitat was found to be dominated or compromised by non-native species including beech and sycamore.

Dry Siliceous Heath (HH1)

Occurs on earth banks created along the road verge and on areas of road cut. Dominated by ling heather with bilberry, foxglove, tormentil, hard fern (*Blechnum spicant*), gorse and bracken. The area and extent of this habitat along the road corridor is significantly restricted and is not connected to dry heath habitats in the wider upland landscape.

Recolonising Bare Ground (ED3)

Bare ground adjacent to the road corridor, or set back from the road, resulting from road maintenance or agricultural works.

Flowerbeds and Borders (BC4)

Man-made ornamental borders and planted flowerbeds which contain non-native shrub and flower species.

A-8.1.3.4.4 Overhead Line Activities

Overhead Line Activities are associated with the existing overhead 110kV line between Killonan ESNB Station (just east of Limerick City) and ESNB Angle Mast Structure No. 90 (2.3 km north of Mountphilips substation). These activities will be carried out by ESNB or ESNB contractors. Activities include (a) re-sagging/correcting the tension, and (b) fibre-wrapping.

The relevant sections of the Killonan to Nenagh overhead line are across open farmland and near Killonan, around the perimeter of an industrial estate. In order to gain access to the ESNB structures for ESNB contractor crews and equipment, the local public road network in the vicinity of the line will be used and from there they will gain access through private land, utilising existing private track or road, wherever possible. This access already exists at each location for line maintenance and no change to the established access is anticipated.

A total of 18 habitats were recorded within a 50-metre buffer of the Overhead Line Activities. The majority of the study area was composed of improved agricultural grassland. Table 56 lists the structure numbers and the habitats located at each structure.

Site surveys were carried out by INIS ecologists Mr Howard Williams, Mr. Chris Cullen, Ms. Jennifer Pearson and Mr. Peter O'Connor from 16th to 19th January 2018 inclusive. Habitats surrounding each structure and underneath the line were recorded and classified using Fossit (2000) classification and target notes were made. Incidental observations of birds and signs/observations of non-volant mammals were also recorded.

Habitat Description of Overhead Line Activities

Improved agricultural grassland GA1

The majority of the study area consisted of improved agricultural grassland habitat. These habitats are species poor, some fields were poorly drain with approximately 40% Soft Rush (*Juncus effuses*) cover. Rye-grasses (*Lolium spp.*) were dominant. Yorkshire-fog (*Holcus lanatus*), Creeping Buttercup (*Ranunculus repens*) and docks (*Rumex spp.*) were frequent. Creeping Bent (*Agrostis stolonifera*) was also frequent in some poorly drain fields. This habitat was present at 54 of the 90 structures i.e. Angle Mast (AM), Intermediate Tower (INT) or Intermediate Pole (IMP) sites.

Amenity Grassland GA2

A small section of amenity grassland was encountered during the survey within the Annacotty Business Park. This habitat was species poor. Yorkshire fog, Rye-grasses and Creeping Buttercup were common. This habitat was present at AM 19.

Wet grassland GS4

Entire fields and some sections within improved grassland fields were classified as wet grassland. These habitats had wet or waterlogged soils. Soft Rush was abundant. Yorkshire Fog and Creeping Buttercup were frequent. Hard Rush (*Juncus inflexus*) and Iris sp. (*Iris sp.*) were occasionally encountered. This habitat was present at IMP 20, AM 21 and IMPs 46, 47 and 87.

Oak-ash-hazel woodland WN2

A small section of this habitat was recorded within the study area. Oak, Ash and Hazel were common. This habitat was located south west AM 90, 50 metres from the nearest point on the overhead line.

Riparian woodland WN5

A section of this habitat was recorded along the Ballykinlalee stream (EPA No: IE_SH_25B770660). Alder, Willow and Ash were present. No structures are present within this habitat, the overhead line passes over this habitat.

Wet willow-alder-ash woodland WN6

The habitat wet willow-alder-ash woodland was recorded on a number of occasions. Willow species (*Salix* spp.) were common. Alder (*Alnus glutinosa*) was frequent. Ash (*Fraxinus excelsior*) was occasional to frequent. The understory consisted of Bramble (*Rubus ulmifolius*) on occasion. Creeping Bent, Ivy (*Hedera helix*), Hart's-tongue Fern (*Phyllitis scolopendrium*) and Lady-fern (*Athyrium filix-femina*) was also recorded. This habitat was present at poles IMP 62 and IMP 63.

Mixed broadleaved/conifer woodland WD2

Sections of mixed broadleaved/conifer woodland were recorded within the study area. Fir (*Abies sp.*) and Pine (*Pinus sp.*) species were common. Birch (*Betula sp.*) and Alder were frequent. No structures are located within this habitat. IMP 53 is located on the border of this habitat; the overhead line is approximately 7 to 15 metres from this habitat.

Conifer Plantation WD4

Large stands of mature conifer plantation were recorded within the study area. Conifer species were of even age. In some cases, plantation was bordered by broadleaved trees such as Hazel, Willow and Alder. One section of young conifer plantation was also recorded. No structures are located within this habitat. The closest structure, AM 58, is located 6 metres from this habitat.

Scrub WS1

Areas of dense scrub were recorded frequently. This habitat occurred in corridors between conifer plantation amongst other areas. European Gorse (*Ulex europaeus*) and Bramble were common. Willows, Hawthorn (*Crataegus monogyna*) and Blackthorn (*Prunus spinosa*) also formed this habitat. This habitat is present at 24 of the 90 AM/IMP/INT sites.

Broadleaved Woodland WD1/ Wet Grassland GS4

A mosaic habitat of broadleaved woodland and wet grassland habitat was recorded within the Annacotty Business Park. Within this habitat Willow and Elder were recorded. Soft Rush and Yorkshire Fog were frequent. No structures were present within this habitat, the overhead line is within 1 metre of this habitat.

Cutover Bog PB4

IMP 66 and the proximal surrounding area is located in cutover bog habitat. This bog has been used for extensive turf cutting.

Ornamental/non-native shrub WS3

Ornamental/non-native shrub habitat was recorded as linear features proximal to domestic dwellings. Escallonia (*Escallonia macrantha*) was abundant in one location.

Hedgerows WL1

Hedgerows were frequently recorded as linear boundaries to improved agricultural fields, wet grassland and other habitats. Blackthorn and Hawthorn were common. Ash and Bramble were frequent. Elder (*Sambucus nigra*) and Ivy were occasional. European Gorse was occasional and common within certain hedgerows. This habitat was present at 11 of the AM/IMP/INT sites, see table 56.

Treelines WL2

A number of field boundaries contained hedgerow which were dominated by large trees. Ash, Hazel, Horse Chestnut (*Aesculus hippocastanum*) and Beech (*Fagus sylvatica*), Elm, Hawthorn, Blackthorn were all recorded. This habitat was present at IMP 67 and IMP 69.

Drainage Ditches FW2

Drainage ditches were commonly recorded along linear features such as hedgerows and treelines. Within the ditches Common Reed and Willow were frequently recorded.

Eutrophic Lake FL1

A lake was recorded within the same improved grassland field as IMP 75. Pondweeds (*Potamogeton sp.*) and Brooklime (*Veronica beccabunga*) were frequent. Common Reed (*Phragmites australis*) and Hard Rush bordered the lake.

Depositing/lowland rivers FW2

The river Mulkear was encountered along the survey route, poles are located either side of the river and the overhead lines pass over the river. The section of river that was surveyed was classified as a depositing lowland river. At the time of survey, the river was high and fast-flowing. It is estimated that the river was 20-25 metres wide. The stream West Clyduff passes through the Annacotty Business Park from the south to the north. This habitat is present near AM 32, IMP 34, IMP 35, IMP 72 and IMP 89.

Buildings and artificial surfaces BL3

Buildings and hardstanding composed of concrete, tarmac and hard core were recorded during the study. Buildings encountered included substations, industrial and domestic buildings.

Watercourse crossings at Overhead Lines activities

A total of 11 water crossings are proposed for the overhead lines activities. Watercourse crossings W1, W2, W3, W4, W5, W6 were classified as FW4 due to their artificial man-made nature. Water crossings W7, W8, W9, W10 and W11 were classified as FW2 due to the presence of fine sediments. Pole 86 is located in close proximity to the Ballykinlalee stream (EPA code: 1E_SH_25B770660). Pole 2 is located approximately 20 metres south of the Groody River (EPA code: 1E_SH_25G050200). Table 55 outlines the watercourse crossings along the overhead lines activities.

Table 24 Watercourse crossings - Overhead Line Activities.

Water-course_No	Watercourse Description	Watercourse habitat type	Existing crossing
W1	c. 1 m wide, c. 1 m deep, standing water	FW4	Yes - 3 metres wide
W2	c. 1 m wide, c. 1 m deep, ditch was almost dry approximately 40 metres east of the proposed crossing location	FW4	Yes - 3 metres wide
W3	C. 2 m wide and 40 cm deep, peat (100), standing water	FW4	No
W4	c. 50 cm wide, c. 5cm deep, mud (100) standing water	FW4	No
W5	c. 1 metre wide, c. 2 metres deep, water flowing slowly	FW4	No
W6	c. 1.5 metres wide, c. 30cm deep	FW4	No
W7	c. 1 metre wide, c. 3cm deep Stone (60), silt and mud (40)	FW2	No
W8	c. 1 metre wide, Sand (20), stone (50) and rock (30), fast flowing	FW2	No
W9	c. 1.5 metres wide, c. 15cm deep, fast flowing, silt (80) and stone (20), fast flowing	FW2	No
W10	c. 1.5 metres wide, c. 15cm, silt (70), pebble (10) and stone (20), fast flowing	FW2	3 metres wide
W11	c. 2.5 metres wide, c. 20cm deep, mud (100), slow flowing	FW2	3 metres wide

All watercourses will be crossed by clear span bridge or bog mats. The bog mats or bridges will be in place for maximum one day at any location. No instream works are required to successfully complete the Overhead Lines activities.



Water crossing 3; FW4 Drainage ditch



Water crossing 10; FW2 lowland depositing

Table 25 Outlines the habitats recorded at each pole at the Overhead Line Activities.

Structure number	Structure type	Habitats at Pole location
1	Angle Mast	BL3
2	Intermediate Tower	GA1
3	Angle Mast	GA1
4	Intermediate Tower	GA1, HL1
5	Angle Mast	WS1
6	Intermediate Tower	GA1
7	Intermediate Tower	GA1
8	Intermediate Tower	GA1
9	Intermediate Tower	GA1
10	Intermediate Tower	GA1
11	Angle Mast	GA1, WL1
12	Intermediate Pole	GA1
13	Intermediate Tower	GA1
14	Intermediate Tower	GA1
15	Intermediate Tower	GA1
16	Intermediate Tower	GA1
17	Intermediate Tower	GA1, WL1
18	Intermediate Tower	WS1
19	Angle Mast	GA2
20	Intermediate Pole	GS4
21	Angle Mast	GS4
22	Intermediate Pole	BL3, WS1
23	Angle Mast	BL3 (and standing water)
24	Angle Mast	GA1
25	Intermediate Pole	GA1, WL1
26	Intermediate Tower	GA1
27	Intermediate Pole	GA1
28	Intermediate Pole	GA1
29	Intermediate Pole	GA1
30	Intermediate Pole	GA1
31	Intermediate Pole	GA1
32	Angle Mast	GA1, WL1, FW4

REFERENCE DOCUMENT

Structure number	Structure type	Habitats at Pole location
33	Intermediate Pole	GA1
34	Intermediate Pole	GA1, WL1, FW4
35	Intermediate Pole	GA1, WL1, FW4
36	Intermediate Pole	GA1, WL1
37	Intermediate Pole	GA1, WL1
38	Intermediate Pole	GA1, WL1
39	Intermediate Pole	GA1
40	Angle Mast	GA1, WS1
41	Intermediate Pole	GA1
42	Intermediate Pole	GA1, WL1, WS1
43	Intermediate Pole	GA1, WS1
44	Intermediate Pole	GA1, HL2
45	Intermediate Pole	GA1
46	Intermediate Pole	GS4
47	Intermediate Pole	GS4
48	Angle Mast	WS1
49	Angle Mast	WS1
50	Intermediate Pole	WS1
51	Intermediate Pole	GA1
52	Intermediate Pole	GA1
53	Intermediate Pole	WS1
54	Intermediate Pole	WS4
55	Intermediate Pole	WS4
56	Intermediate Pole	WS4
57	Intermediate Pole	GM1
58	Angle Mast	WS1
59	Intermediate Pole	WS1
60	Intermediate Pole	WS1
61	Intermediate Pole	WS4
62	Intermediate Pole	WN6
63	Intermediate Pole	WN6
64	Intermediate Pole	HD1/burnt
65	Intermediate Pole	WS1

REFERENCE DOCUMENT

Structure number	Structure type	Habitats at Pole location
66	Intermediate Pole	PB4
67	Intermediate Pole	WS1, WL2
68	Intermediate Pole	WS1
69	Intermediate Pole	GA1, WL2
70	Intermediate Pole	GA1
71	Intermediate Pole	GA1
72	Intermediate Pole	GA1, FW4
73	Intermediate Pole	GA1, WS1
74	Intermediate Pole	GA1, WS1
75	Intermediate Pole	GA1
76	Intermediate Pole	GA1
77	Intermediate Pole	GA1
78	Angle Mast	WS4
79	Intermediate Pole	GA1
80	Intermediate Pole	GA1, HL2
81	Intermediate Pole	GA1
82	Intermediate Pole	WS1
83	Intermediate Pole	WS1
84	Intermediate Pole	WS1
85	Intermediate Pole	GA1
86	Intermediate Pole	GA1
87	Intermediate Pole	GS4
88	Intermediate Pole	WS1
89	Intermediate Pole	GA1, FW4
90	Angle Mast	WS1, WL1

A-8.1.3.5 Habitats Directive 92/43/EEC Annex I Habitat Assessments

A-8.1.3.5.1 UWF Related Works

Wet heath (HH3) habitat identified during the habitat survey at Foilnaman (Turbine 21) was assessed for correspondence to the habitat 'Northern Atlantic wet heaths with *Erica tetralix* (4010) again using the methodology outlined by Perrin *et al.*, (2014). **The habitat did not meet the required criteria to be classified as Annex I quality habitat**, primarily due to the absence of *Erica tetralix* within 20 m of the relevé.

The dry-humid acid grassland (GS3)/wet heath (HH3) mosaic habitat identified during the habitat survey at Shevry (around Turbine 2 and the borrow pit) was assessed for correspondence to the Annex habitats 'Northern Atlantic wet heaths with *Erica tetralix* (4010)' and the priority habitat 'Species-rich *Nardus* grasslands (6230)'. **This habitat did not meet the criteria presented in Perrin *et al.*, (2014) or O'Neill *et al.*, (2013) to be classified as Annex I quality habitat.**

Rare/Protected Plant Species

Small White orchid (*Pseudorchis albida*)

Desktop reviews indicated that Small White orchid (*Pseudorchis albida*) has been recorded within the R86 and R96 10km squares. The BSBI database holds a record in tetrad (2 * 2 km square) R86P (BSBI database <http://bsbi.org/maps?taxonid=2cd4p9h.c3v>, accessed 19/09/2017). The NBDC database shows a record from June 2009 in the the Silvermines Mountains at Knockanroe in the monad (1 * 1 km square) R8469 (<http://maps.biodiversityireland.ie/#/Map>, accessed 19/09/2017).

This species is listed in Schedule A of the Flora (Protection) Order, 2015 and is classed as Vulnerable in the Red Data List of Vascular Plants (Wyse Jackson *et al.*, 2016). **This species was not recorded during the habitat surveys for the project.** The desktop data indicates that the historic locations for this plant are c. 7 km north of the Whole UWF Project

Killarney Fern (*Trichomanes speciosum*)

The desktop review also showed that Killarney Fern (*Trichomanes speciosum*) has historically been recorded in the R86 hectad (10km square). This species is listed in Schedule A of the Flora (Protection) Order, 2015 and is classed as Least Concern in the Red Data List of Vascular Plants (Wyse Jackson *et al.*, 2016). No recent records exist for the species within hectads through which the Whole UWF Project will pass. **This species was not recorded during the habitat survey.**

Bog Rosemary (*Andromeda polifolia*)

Bog Rosemary (*Andromeda polifolia*) was recorded incidentally at Bleanbeg Bog during a Merlin survey in April 2017. This species is classed as Least Concern in the Red Data List of Vascular Plants (Wyse Jackson *et al.*, 2016). The species was previously unrecorded for the hectad R76 in either BSBI or NBDC databases. The plant was located c. 120 m northwest of the Whole UWF Project.

Plant Species List

Table 26 A full Botanical list of species recorded, across all Project Elements is herein presented.

Common Name	Scientific Name
Alder	<i>Alunus glutinosa</i>
Annual meadow grass	<i>Poa annua</i>
Ash	<i>Fraxinus excelsior</i>
Beech	<i>Fagus sylvatica</i>
Bell heather	<i>Erica cinerea</i>
Bilberry	<i>Vaccinium myrtillus</i>
Birch	<i>Betula spp.</i>
Blackthorn	<i>Prunus spinosa</i>
Bog asphodel	<i>Nartecium ossifragum</i>
Bog cotton	<i>Eriophorum angustifolium</i>
Bracken	<i>Pteridium aquilinum</i>
Bramble	<i>Rubus fruticosus agg.</i>
Broadleaf plantain	<i>Plantago major</i>
Broad-leaved dock	<i>Rumex obtusifolius</i>
Brooklime	<i>Veronica beccabunga</i>
Carination sedge	<i>Carex panicea</i>
Cat's ear	<i>Hypochaeris radicata</i>
Cock's foot grass	<i>Dactylis glomerata</i>
Common bent	<i>Agrostis capillaris</i>
Common chickweed	<i>Stellaria media</i>
Common hogweed	<i>Heracleum sphondylium</i>
Common mouse-ear	<i>Cerastium fontanum</i>
Common Reed	<i>Phragmites australis</i>
Common sorrel	<i>Rumex acetosa</i>
Cow parsley	<i>Anthriscus sylvestris</i>
Creeping bent	<i>Agrostis stolonifera</i>
Creeping buttercup	<i>Ranunculus repens</i>
Cross-leaved Heath	<i>Erica tetralix</i>
Daisy	<i>Bellis perennis</i>
Dandelion	<i>Taraxacum agg.</i>
Deergrass	<i>Trichophorum cespitosum</i>
Devil's bit scabious	<i>Succisa pratensis</i>
Downy birch	<i>Betula pubescens</i>
Eared willow	<i>Salix aurita</i>
Early purple orchid	<i>Orchis mascula</i>
Elder	<i>Sambucus nigra</i>
Escallonia	<i>Escallonia macrantha</i>
European larch	<i>Larix decidua</i>

REFERENCE DOCUMENT

Common Name	Scientific Name
False oat grass	<i>Arrhenatherum elatius</i>
Field horse tail	<i>Equisetum arvense</i>
Flea sedge	<i>Carex pulicaris</i>
Foxglove	<i>Digitalis purpurea</i>
Gorse	<i>Ulex europaeus</i>
Great woodrush	<i>Luzula sylvatica</i>
Greater bird's-foot-trefoil	<i>Lotus pedunculatus</i>
Green-ribbed sedge	<i>Carex binervis</i>
Grey willow	<i>Salix cinerea</i>
Ground Ivy	<i>Glechoma hederacea</i>
Hard fern	<i>Blechnum spicant</i>
Hard Rush	<i>Juncus inflexus</i>
Hart's-tongue Fern	<i>Phyllitis scolopendrium</i>
Hawthorn	<i>Crataegus monogyna</i>
Hazel	<i>Corylus avellana</i>
Heath bedstraw	<i>Galium saxatile</i>
Heath milkwort	<i>Polygala serpyllifolia</i>
Heath rush	<i>Juncus squarrosus</i>
Heath spotted orchid	<i>Dactylorhiza maculata</i>
Heath woodrush	<i>Luzula multiflora agg.</i>
Hemlock water dropwort	<i>Oenanthe crocata</i>
Holly	<i>Ilex aquifolium</i>
Honeysuckle	<i>Lonicera periclymenum</i>
Horse chestnut	<i>Aesculus hippocastanum</i>
Iris sp	<i>Iris sp.</i>
Ivy	<i>Hedera hibernica</i>
Lesser spearwort	<i>Ranunculus flammula</i>
Lesser stitchwort	<i>Stellaria graminea</i>
Ling heather	<i>Calluna vulgaris</i>
Lodgepole pine	<i>Pinus contorta</i>
Lousewort	<i>Pedicularis sylvatica</i>
Marsh bedstraw	<i>Galium palustre</i>
Marsh foxtail	<i>Alopecurus geniculatus</i>
Marsh ragwort	<i>Senecio aquaticus</i>
Marsh thistle	<i>Cirsium palustre</i>
Mat-grass	<i>Nardus stricta</i>
Meadow buttercup	<i>Ranunculus acris</i>
Meadow fox-tail	<i>Alopecurus pratensis</i>
Nettle	<i>Urtica dioica</i>
Norway spruce	<i>Picea abies</i>
Oval sedge	<i>Carex ovalis</i>
Pedunculate oak	<i>Quercus robur</i>

REFERENCE DOCUMENT

Common Name	Scientific Name
Perennial rye grass	<i>Lolium perenne</i>
Pineappleweed	<i>Matricaria discoidea</i>
Pondweed sp	<i>Potamogeton sp</i>
Purple Moor-grass	<i>Molinia caerulea</i>
Ragwort	<i>Senecio jacobaea</i>
Rowan	<i>Sorbus aucuparia</i>
Sharp flowered rush	<i>Juncus acutiflorus</i>
Shepherd's-purse	<i>Capsella bursa-pastoris</i>
Sitka spruce	<i>Picea sitchensis</i>
Snowberry	<i>Symphoricarpos albus</i>
Soft rush	<i>Juncus effusus</i>
Sweet vernal grass	<i>Anthoxanthum odoratum</i>
Sycamore	<i>Acer pseudoplatanus</i>
Tormentil	<i>Potentilla erecta</i>
Tufted hair-grass	<i>Deschampsia caespitosa</i>
Velvet bent	<i>Agrostis canina</i>
Vetch spp.	<i>Vicia spp.</i>
Wavy hair grass	<i>Deschampsia flexuosa</i>
White clover	<i>Trifolium repens</i>
Wild angelica	<i>Angelica sylvestris</i>
Willow spp.	<i>Salix spp.</i>
Wood dock	<i>Rumex sanguineus</i>
Wych elm	<i>Ulmus glabra</i>
Yellow iris	<i>Iris pseudacorus</i>
Yorkshire fog	<i>Holcus lanatus</i>

A-8.1.3.6 General Birds

A-8.1.3.6.1UWF Related Works

Countryside Bird Surveys undertaken along transects in Knockcurraghbola Commons during the breeding season of 2016

Red = Red-listed species in the Birds of Conservation Concern (Colhoun and Cummins, 2013) are those of highest conservation priority

Orange = Amber-listed species in the Birds of Conservation Concern (Colhoun and Cummins, 2013) are those of which are of lesser conservation priority

Green = Green-listed species in the Birds of Conservation Concern (Colhoun and Cummins, 2013) are those of which are of least conservation priority

White = Not assessed/omitted from the Birds of Conservation Concern (Colhoun and Cummins, 2013) list

Table 27 Countryside Bird Surveys undertaken along transects in Knockcurraghbola Commons during the breeding season of 2016

Transect No.	Knockcurraghbola Commons		Transect No.	Knockcurraghbola Commons		Transect No.	Knockcurraghbola Commons	
	May-16	Jun-16		May-16	Jun-16		May-16	Jun-16
Visit			Visit			Visit		
Species			Greenfinch			Reed Bunting		
Barn Swallow	1	4	Hen Harrier			Robin	5	3
Blackbird	4	4	Hooded Crow		2	Rook		10
Blackcap		1	House Sparrow			Siskin		
Blue Tit	1		Jackdaw			Skylark		
Bullfinch			Jay			Song Thrush	4	6
Chaffinch	6	3	Linnet			Sparrowhawk		
Chiffchaff			Magpie		2	Starling		
Coal Tit		2	Mallard			Stonechat		
Cuckoo			Meadow Pipit	3	1	Wheatear		
Duncock		1	Mistle Thrush	1	1	Whitethroat	1	
Goldcrest	2	2	Moorhen			Willow Warbler	1	
Goldfinch			Pheasant			Wood Pigeon	1	
Grasshopper Warbler	1		Pied Wagtail			Wren	3	4
Great Tit			Redpoll		2			
Total Abundance	35	48						
Species Diversity	15	16						

Winter bird transect surveys undertaken along transects in Knockcurrabola Commons during the non-breeding season of 2016/17.
Red = Red-listed species in the Birds of Conservation Concern (Colhoun and Cummins, 2013) are those of highest conservation priority
Orange = Amber-listed species in the Birds of Conservation Concern (Colhoun and Cummins, 2013) are those of lesser conservation priority
Green = Green-listed species in the Birds of Conservation Concern (Colhoun and Cummins, 2013) are those of least conservation priority
White = Not assessed/omitted from the Birds of Conservation Concern (Colhoun and Cummins, 2013) list

Table 28 Winter bird transect surveys undertaken along transects in Knockcurrabola Commons during the non-breeding season of 2016/17.

Transect No.	Knockcurraghbola Commons					Transect No.	Knockcurraghbola Commons				
	Nov-16	Dec-16	Jan-17	Feb-17	Visit		Nov-16	Dec-16	Jan-17	Feb-17	
Species					Wren	2		1			
Kestrel					Great Tit				1		
Golden Plover					Coal Tit	3					
Snipe	1				Blue Tit	1					
Wood Pigeon					Long-tailed Tit						
Meadow Pipit					Magpie	2					
Pied Wagtail					Jay						
Grey Wagtail					Jackdaw						
Duncock	1		1		Rook	2					
Robin	3		3	3	Hooded Crow						
Stonechat					Raven						
Song Thrush				1	Starling		50				
Mistle Thrush	1				House Sparrow						
Blackbird	3	1	2		Chaffinch	3			1		
Redwing			5		Treecreeper						
Fieldfare		14			Bullfinch						
Goldcrest			1		Reed Bunting						

A-8.1.3.6.2 Incidental Bird Recordings at Overhead Line Activities Study Area

All incidental sightings of birds were recorded within the overhead lines activities study area. Table 64 lists the bird species and the total number of each species recorded. A total of 64 bird species consisting of 109 individual birds were recorded.

Table 29 List of birds recorded during survey, total count and Birds of Conservation Concern in Ireland status for each species encountered.

Species	BOCCI status (Colhoun and Cummins, 2013)	Total Count
Blackbird	Green	7
Blue Tit	Green	3
Bullfinch	Green	5
Chaffinch	Green	22
Coal Tit	Green	2
Goldcrest	Amber	2
Great Tit	Green	6
House Sparrow	Amber	6
Jay	Green	2
Long-tailed Tit	Green	5
Pied Wagtail	Green	1
Robin	Amber	9
Rook	Green	2
Snipe	Amber	11
Song Thrush	N/A	2
Starling	Amber	5
Stonechat	Amber	1
Wood Pigeon	Green	3
Little Egret	Green	1
Magpie	Green	6
Goldfinch	Green	5
Redwing	Green	1
Wren	Green	2
Species Diversity		23
Total Abundance		109

Kingfisher Survey

Kingfisher surveys following the methodology presented in National Roads Authority (2008) was undertaken on the 22nd, 23rd, 25th January 2019 in relation to the UWF Grid Connection. Watercourse crossings were evaluated for any evidence of nest holes within 300m of crossing locations (in tandem with Otter surveys). In each case banks were inspected for evidence of King- fisher, and general suitability of banks in proximity to crossing locations for nesting Kingfisher. Target notes were made on suitable nesting banks, and any observed nest holes. No nest holes, suitable nest banks or visual observations of Kingfisher were noted.

A-8.1.3.7 Non Volant Mammals

A-8.1.3.7.1 UWF Related Works

No badgers were recorded during the July 2017 surveys

Table 30 Observations of all other non-volant mammals recorded during surveys for the UWF Related Works

Observation ID	Species	Evidence	Easting (ITM)	Northing (ITM)	Notes
34	Deer sp.	Deer tracks/slot	594802	660625	
162	Fox	Fox Scat	594483	661518	Droppings on edge of farm track
165	Fox	Fox Scat	594689	661471	Droppings at mammal crossing point on earth bank.
167	Fox	Fox Scat	594584	661694	Dropping on mammal trail near crossing point of stream

A-8.1.3.7.2 Overhead Line Activities Mammal records

Incidental records of mammal signs and individuals were made during surveys with the overhead line activities study area, findings are detailed below.

Otter

An old Otter holt was recorded within the bank of a drainage ditch shared by watercourse crossing 2 (W2). An otter pathway located 80 metres west of AM 3 was recorded leading from the Groody River over a grassland field and into an adjoining stream.

Badger

No active Badger setts were recorded within close proximity to the poles. An old badger sett was recorded within the hedgerow 180 metres north east AM 78.

Fox

The smell of fox was recorded along a hedgerow leading to water crossing 1 (W1).

Deer

A herd of 6 deer, Fallow, were observed in the conifer plantation adjacent to IMP 83.

Rabbit

Rabbit burrows were recorded on occasion within some of the hedgerows. A rabbit was observed adjacent to Annacotty Business Park.

Mammal pathways

Mammal pathways were recorded frequently within hedgerows and through treelines. These could be used by a number of mammals including Badger and Fox.

A-8.1.3.8 Amphians and reptiles at UWF Related Work

Table 31 Amphibians and reptiles in UWF Related Works study area

Observation ID	Species	Easting (ITM)	Northing (ITM)	Location	Date	Notes
4	Frog	593269	661083	Knockmaroe	13/07/2017	Adult in disturbed ground near mobile phone mast
5	Frog	593127	661667	Grousehall	13/07/2017	Adult in species rich wet grassland
6	Frog	594368	661161	Foilynaman	19/05/2017	Adult in improved grassland next to plantation
9	Viviparus Lizard	595169	659348	Shevry	13/07/2017	In acid grassland

A-8.1.3.9 Marsh Fritillary at the UWF Related Works

Table 32 Observations of Marsh Fritillary recorded during surveys for the Whole UWF Project.

Observation ID	Easting (ITM)	Northing (ITM)	Evidence	Year	Location
56	595775	659918	Larval Web	Sep-17	Shevry
57	595732	659852	Larval Web	Sep-17	Shevry
58	595751	659829	Larval Web	Sep-17	Shevry
59	595775	659815	Larval Web	Sep-17	Shevry

A8.1.4 Hen Harrier Surveys

Ecopower Developments commissioned Joe Adamson (independent bird surveyor) to undertake Hen Harrier surveys between March 2015 to April 2017. Joe is a graduate of the Royal Society of Chemistry in Applied Chemistry and has a MSc. in Environmental Resource Management. He is a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM) since 2010. Joe Adamson is an Ecologist, working in the energy sector since 1997, mainly on natural gas pipelines and windfarms, in a range of disciplines, including ornithological surveys & ecological surveys. Joe has over 40 years of field observation experience of birds and has worked on over 75 windfarms throughout Ireland, conducting ornithological surveys.

A-8.1.4.1 Survey Results

Breeding Season (Summer) 2015 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
2	26/03/2015	JA	DRY	OVERCAST	EXCELLENT	F2-3	NW	8	1000	1300	3H
3	26/03/2015	JA	DRY	OVERCAST	EXCELLENT	F2-3	NW	10	1330	1630	3H
1	27/03/2015	JA	OCC. SHOWERS	OVERCAST	GOOD	F3	SE	8	1540	1840	3H
2	27/03/2015	JA	SQUALLS	OVERCAST	GOOD	F2-3	SE	8	0900	1200	3H
2	27/03/2015	JA	OCC. SHOWERS	OVERCAST	EXCELLENT	F3	SE	8	1230	1530	3H
2	27/03/2015	JA	OCC. SHOWERS	OVERCAST	GOOD	F3	SE	8	1230	1530	3H
3	28/03/2015	JA	HEAVY SQUALLS	OVERCAST	GOOD	F3-4	W	8	1320	1620	3H
4	28/03/2015	JA	HEAVY SQUALLS	OVERCAST	GOOD	F3-4	W	10	1000	1300	3H
1	29/03/2015	JA	OCC. SHOWERS	OVERCAST	GOOD	F2-3	SW	10	0900	1200	3H
4	29/03/2015	JA	OCC. SHOWERS	OVERCAST	GOOD	F2-3	SW	10	1230	1530	3H
2	16/04/2015	JA	NONE	SUNNY	EXCELLENT	F2-3	SE	12	1330	1630	3H
3	16/04/2015	JA	NONE	SUNNY	EXCELLENT	F2-3	SE	10 TO 12	1000	1300	3H

Breeding Season (Summer) 2015 Hen Harrier Survey Results												
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)	
1	17/04/2015	JA	NONE	NONE	GOOD	F1	NE	14	1530	1830	3H	
2	17/04/2015	JA	NONE	SOME	CLEAR	F1	NE	8	0900	1200	3H	
3	17/04/2015	JA	NONE	SOME	EXCELLENT	F1	NE	12	1215	1515	3H	
1	18/04/2015	JA	NONE	NONE	GOOD	F4	E	6	1215	1515	3H	
4	18/04/2015	JA	NONE	NONE	EXCELLENT	F4	E	7	1530	1830	3H	
5	18/04/2015	JA	NONE	LITTLE	EXCELLENT	F4	E	6	0900	1200	3H	
4	19/04/2015	JA	NONE	NONE	EXCELLENT	F1-2	E	15	1330	1630	3H	
5	19/04/2015	JA	NONE	NONE	EXCELLENT	F1-2	E	12	1000	1300	3H	
3	27/05/2015	JA	HEAVY	NONE	GOOD	F4-5	SW	10	1300	1600	3H	
4	27/05/2015	JA	HEAVY	NONE	OKAY	F4	SW	10	0930	1230	3H	
1	28/05/2015	JA	FREQUENT SQUALLS	NONE	GOOD	F4-5	NW	8	0930	1230	3H	
5	28/05/2015	JA	FREQUENT SQUALLS	NONE	GOOD	F4-5	NW	9	1245	1545	3H	
2	29/05/2015	JA	HEAVY	NONE	GOOD	F4	NW	8 TO 10	0900	1200	3H	
3	29/05/2015	JA	NONE	CLEAR	EXCELLENT	F4	NW	10	1215	1515	3H	
4	30/05/2015	JA	NONE	SUNNY	GOOD	F2-3	SW	12	1245	1545	3H	
5	30/05/2015	JA	NONE	CLOUDY AT TIMES	GOOD	F2-3	SW	12 TO 13	0930	1230	3H	
1	31/05/2015	JA	NONE	SUNNY	GOOD	F3	SW	14	1250	1550	3H	
2	31/05/2015	JA	NONE	SUNNY	GOOD	F2-3	SW	12 TO 13	0930	1230	3H	

Breeding Season (Summer) 2015 Hen Harrier Survey Results												
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)	
1	17/06/2015	JA	NONE	SUNNY	EXCELLENT	F3	SW	13	1000	1300	3H	
2	17/06/2015	JA	NONE	CLEAR	EXCELLENT	F3	SW	14	1315	1515	2H	
2	18/06/2015	JA	NONE	CLEAR	EXCELLENT	F2-3 VEERING F3-4	SW TO W	18 TO 19	1000	1200	2H	
3	18/06/2015	JA	NONE	HAZY	GOOD	F3-4	W	19 TO 20	1300	1600	3H	
1	19/06/2015	JA	NONE	OVERCAST	GOOD	F2-3	SW	18 TO 19	0930	1230	3H	
3	19/06/2015	JA	NONE	SUNNY	GOOD	F2-3	SW	18	1245	1545	3H	
4	20/06/2015	JA	NONE	SUNNY THEN CLOUDY	EXCELLENT	F2-3	SW	15	0930	1230	3H	
5	20/06/2015	JA	NONE	SUNNY, SOME CLOUD	CLEAR	F3	SW	18	1300	1600	3H	
4	21/06/2015	JA	NONE	SUNNY, SOME CLOUD	GOOD	F2-3	SW	15	1000	1300	3H	
5	21/06/2015	JA	NONE	CLEAR	EXCELLENT	F2-3	SW	16	1300	1600	3H	
2	20/07/2015	JA	OCC. SQUALLS	OVERCAST	GOOD	F3-4	SW	14	0930	1230	3H	
5	20/07/2015	JA	OCC. SQUALLS	OVERCAST	GOOD	F3-4	SW	14	1300	1600	3H	
1	21/07/2015	JA	OCC. SQUALLS	SOME CLOUD	EXCELLENT	F5	WSW	12	1215	1515	3H	
2	21/07/2015	JA	OCC. SQUALLS	CLOUDY	EXCELLENT	F4-5	W	12	1515	1815	3H	
3	21/07/2015	JA	OCC. SQUALLS	SOME CLOUD	GOOD	F4-5	WSW	10	0900	1200	3H	
4	22/07/2015	JA	NONE	OVERCAST	GOOD	F3	NW	15	1230	1530	3H	
5	22/07/2015	JA	NONE	CLOUDY	GOOD	F2-3	NW	15	0930	1230	3H	
1	23/07/2015	JA	OCC. SHOWERS	OVERCAST	GOOD	F2-3	NW	14	1000	1300	3H	

Breeding Season (Summer) 2015 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
4	23/07/2015	JA	SHOWERY	OVERCAST	GOOD	F3-4	NW	14 TO 15	1330	1630	3H
3	24/07/2015	JA	NONE	CLOUDY AT TIMES	GOOD	F2	SW	14 TO 15	0930	1230	3H
2	23/08/2015	JA	CONTINUOUS SQUALLS	OVERCAST	GOOD	F2-3	SW	16	1000	1300	3H
3	23/08/2015	JA	SQUALLS	NONE	GOOD	F2-3	SW	16	1330	1630	3H
1	24/08/2015	JA	NONE	CLEAR	EXCELLENT	F4	NW	15	1330	1630	3H
2	24/08/2015	JA	OCC. DRIZZLE	OVERCAST	GOOD	F3	NW	15	1000	1300	3H
1	25/08/2015	JA	HEAVY RAIN	DULL	POOR AT TIMES	F2-3	SW	12	0930	1230	3H
3	25/08/2015	JA	HEAVY RAIN	NONE	GOOD	F2	SW	12	1300	1600	3H
4	26/08/2015	JA	NONE	SUNNY, OCC. CLOUD	EXCELLENT	F4	SW	15	1245	1545	3H
5	26/08/2015	JA	NONE	SUNNY, SOME CLOUD	CLEAR	F3-4	SW	15	0930	1230	3H
4	27/08/2015	JA	NONE	SUNNY. CLOUDY AT TIMES	GOOD	F3-4	SW	15	1300	1600	3H
5	27/08/2015	JA	NONE	SUNNY	CLEAR	F3-4	SW		0930	1230	3H

Non-Breeding Season (Winter) 2015 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
1	17/09/2015	JA	NONE	SOME CLOUD	EXCELLENT	F2-2	SW	12	0930	1230	3H
2	15/09/2015	JA	NONE	CLOUDY	GOOD	< F1	NW	17 TO 18	1100	1400	3H
3	15/09/2015	JA	NONE	OVERCAST	GOOD	F1	NW	15	1405	1705	3H
2	16/09/2015	JA	NONE	LOW CLOUD AT TIMES	GOOD	F2-3	N	10	0930	1230	3H
3	16/09/2015	JA	NONE	BRIGHT, OCC. CLOUD	GOOD	F2-3	N	10	1235	1535	3H
5	17/09/2015	JA	NONE	SOME CLOUD	EXCELLENT	F2	SW	11 TO 12	1300	1600	3H
1	18/09/2015	JA	HEAVY RAIN	NONE	POOR AT TIMES	F3-4	SW	14	1000	1300	3H
4	18/09/2015	JA	HEAVY RAIN	NONE	POOR	F3-4	SW	12	1330	1630	3H
4	19/09/2015	JA	NONE	SUNNY, CLOUDY AT TIMES	GOOD	F3-4	SW	14	1330	1630	3H
5	19/09/2015	JA	NONE	SUNNY, SOME CLOUD	GOOD	F3-4	SW	15	1000	1300	3H
4	20/10/2015	JA	MISTY, CLEARING AT TIMES	NONE	GOOD	F3-4	SW	9 TO 10	1300	1600	3H
2	21/10/2015	JA	HEAVY MISTY RAIN	NONE	POOR	F3-4	SW	10	1000	1300	3H
3	21/10/2015	JA	HEAVY MISTY RAIN	NONE	POOR	F3-4	SW	10	1315	1615	3H
4	22/10/2015	JA	NONE	BRIGHT AT TIMES, OVERCAST	GOOD	F4	NW	9	1000	1300	3H
1	29/10/2015	JA	NONE	SUNNY	GOOD	F1 BECOMING F3-4	SW	9	0930	1230	3H

Non-Breeding Season (Winter) 2015 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
5	29/10/2015	JA	NONE	SUNNY	GOOD	F3-4	SW	8 TO 9	1245	1545	3H
1	30/10/2015	JA	NONE	SOME SUN	GOOD	F4	SW	8	0930	1230	3H
2	30/10/2015	JA	NONE	BRIGHT	GOOD	F4	SW	8	1240	1540	3H
3	31/10/2015	JA	NONE	OVERCAST, CLOUDY, CLEAR	GOOD	F3-4	SW	8	0930	1230	3H
5	31/10/2015	JA	NONE	OVERCAST, CLOUDY, CLEAR	GOOD	F3-4	SW	8	1240	1540	3H
1	11/11/2015	JA	SHOWERS	DULL	GOOD	F3-4 OCC. 4-5	SW	8	1310	1610	3H
2	12/11/2015	JA	SHOWERS	DULL, OVERCAST	GOOD	F5-6	SW	7 TO 8	1000	1200	2H
4	13/11/2015	JA	SHOWERS	DULL	GOOD	F4-5	SW	9	1310	1610	3H
5	13/11/2015	JA	NONE	DULL, OVERCAST	GOOD	F4-5	SW	8 TO 9	1000	1300	3H
1	25/11/2015	JA	FREQUENT SHOWERS	SUNNY	GOOD	F4-5	W	10	0930	1230	3H
3	25/11/2015	JA	FREQUENT SHOWERS	SUNNY	GOOD	F4-5	W	10	1245	1545	3H
2	26/11/2015	JA	DENSE MIST, OCC. DRIZZLE	NONE	POOR	F2	W	9 TO 10	1000	1300	3H
3	26/11/2015	JA	MIST, CLEARING AT TIMES	NONE	GOOD	F2	W	9 TO 10	1315	1515	2H
4	27/11/2015	JA	MISTY RAIN, CLEARING LATER	NONE	POOR	F2-3	W	9 TO 10	1245	1545	3H
5	27/11/2015	JA	MISTY RAIN, CLEARING AT TIMES	NONE	POOR AT TIMES	F2-3	W	8 TO 9	0930	1230	3H

Non-Breeding Season (Winter) 2015 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
2	11/12/2015	JA	NONE	BRIGHT, SUNNY	GOOD	F2-3	SE	7 TO 8	0930	1230	3H
3	11/12/2015	JA	NONE	BRIGHT, SUNNY	GOOD	F2-3	SE	7 TO 8	1240	1540	3H
5	12/12/2015	JA	PERSISTENT SQUALLS	NONE	GOOD	F2-3	SW	9 TO 10	1210	1510	3H
4	13/12/2015	JA	WET	CLOUDY, DULL	GOOD	F3-4	SW	9 TO 10	1240	1540	3H
5	13/12/2015	JA	WET	CLOUDY, DULL	GOOD	F3-4	SW	9 TO 10	0930	1230	3H
1	22/12/2015	JA	OCC. HEAVY DRIZZLE	OVERCAST	GOOD	F3-4	S-SW	7 TO 8	0900	1100	2H
2	22/12/2015	JA	OCC. DRIZZLE	OVERCAST, BRIGHT SPELLS	GOOD	F4-5	S-SW	6 TO 8	1100	1300	2H
3	22/12/2015	JA	DRY	BRIGHT, SOME CLOUD	GOOD		S-SW	6 TO 7	1300	1500	2H
4	23/12/2015	JA	NONE	BRIGHT, SUNNY	GOOD	F2-3	SW	6 TO 7	1310	1610	3H
2	14/01/2016	JA	FROST ON GROUND	BRIGHT, OVERCAST	GOOD	F3-4	WNW	4	1100	1300	2H
3	14/01/2016	JA	OCC. DRIZZLE	BRIGHT, SOME CLOUD	GOOD	F4	WNW	4	1305	1505	2H
2	15/01/2016	JA	NONE	SUNNY, CLEAR	GOOD	F3-4	SE	4 TO 5	1215	1415	2H
4	15/01/2016	JA	NONE	SUNNY, CLEAR	GOOD	F3	NW	4 TO 5	1405	1605	2H
1	16/01/2016	JA	NONE	FOGGY AT FIRST, CLEAR	GOOD	F1-2	SE	5	1000	1200	2H
5	16/01/2016	JA	NONE	BRIGHT	GOOD	F1-2	SE	5	1420	1620	2H
1	17/01/2016	JA	NONE	FOGGY, LIFTING AT TIMES	GOOD	F1-2	SE	5 TO 6	0930	1230	3H

Non-Breeding Season (Winter) 2015 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
3	17/01/2016	JA	NONE	FOGGY, LIFTING AT TIMES	GOOD	F1-2	SE	5	1240	1540	3H
1	26/01/2016	JA	CONTINUOUS RAIN	NONE	GOOD	F3-4	SW	7 TO 8	0930	1030	1H
3	26/01/2016	JA	PERSISTENT RAIN	NONE	GOOD	F3-4	SW		1040	1140	1H
2	27/01/2016	JA	OCC. SQUALLS	NONE	GOOD	F3-4	NW	8 TO 9	1140	1340	2H
4	27/01/2016	JA	DRY	CLEAR	GOOD	F3-4	NW	8 TO 9	1400	1600	2H
5	27/01/2016	JA	OCC. SQUALLS	NONE	GOOD	F3-4	NW	8 TO 9	0930	1130	2H
1	11/02/2016	JA	OCC. LIGHT SHOWERS	BRIGHT, SUNNY	GOOD	F1	SE	6 TO 7	0900	1200	3H
3	11/02/2016	JA		BRIGHT, SUNNY	GOOD	F1-2	SE	8 TO 9	1230	1530	3H
4	12/02/2016	JA	OCC. SHOWER	DULL, OVERCAST	GOOD	F2	SW	8 TO 9	0930	1230	3H
5	12/02/2016	JA	NONE	DULL, OVERCAST	GOOD	F3	SW	8 TO 9	1300	1600	3H
2	16/02/2016	JA	HEAVY PERSISTENT RAIN	NONE	POOR AT TIMES	AT GALE FORCE	SE	10	1000	1300	3H
3	16/02/2016	JA	HEAVY PERSISTENT RAIN	NONE	GOOD	GALE FORCE	SE	10	1315	1615	3H
1	17/02/2016	JA	HEAVY RAIN AT TIMES	NONE	POOR AT TIMES	F2-3	SW	7 TO 8	0900	1200	3H
4	17/02/2016	JA	NONE	SUNNY, CLEAR	GOOD	F2-3	SW	7 TO 8	1230	1630	4H
5	17/02/2016	JA	HEAVY SHOWER AT 1300	BRIGHT, SUNNY	GOOD	F1	SW	8 TO 9	1230	1530	3H

Non-Breeding Season (Winter) 2015 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
2	18/02/2016	JA	NONE	BRIGHT, SUNNY	GOOD	F1-2	W	6 TO 7	0900	1200	3H

Breeding Season (Summer) 2016 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
1	26/03/2016	JA	FREQUENT SHOWERS	OVERCAST	GOOD	F3-4	SW	10	1200	1500	3H
1	26/03/2016	JA	FREQUENT SHOWERS	OVERCAST	GOOD	F3-4	SW	10	0845	1145	3H
1	27/03/2016	JA	FREQUENT HAIL SHOWERS	BRIGHT AT TIMES	GOOD	F5	SSW	10	0930	1230	3H
4	27/03/2016	JA	FREQUENT HAIL SHOWERS	BRIGHT	GOOD	F5-6	SSW	8 TO 9	1300	1600	3H
4	28/03/2016	JA	FREQUENT SHOWERS	BRIGHT, SUNNY	GOOD	F3-4	SW	10	0900	1200	3H
3	30/03/2016	JA	OCC. SHOWERS	SUNNY	GOOD	F3-4	SW		1240	1540	3H
5	30/03/2016	JA	FREQUENT HAIL SHOWERS	SUNNY	GOOD	F3-4	SW	8 TO 9	0930	1230	3H
2	31/03/2016	JA	NONE	BRIGHT, SUNNY	GOOD	F2-3	SW	12	1240	1540	3H
4	06/04/2016	JA	FREQUENT HAIL	CLEAR AT TIMES	GOOD	F4-5 (GALE FORCE AT TIMES)	NW	6 TO 8	1545	1845	3H
2	08/04/2016	JA	NONE	OVERCAST	GOOD	F2-3	SW	9	1230	1530	3H
3	27/04/2016	JA	OCC. HEAVY HAIL SHOWER	SOME CLOUD	GOOD	F3-4	NW	8	0900	1200	3H
5	27/04/2016	JA	NONE	SOME CLOUD	GOOD	F3-4	NW	10	1300	1600	3H
1	28/04/2016	JA	CONTINUOUS SQUALLS	OVERCAST	POOR AT TIMES	F4-5	WSW	8 TO 9	1530	1830	3H
3	28/04/2016	JA	OCC. SQUALLS	NONE	GOOD	F5 OCC-5-6	WSW	7 TO 8	1215	1515	3H
5	28/04/2016	JA	OCC. SQUALLS, DRIZZLE	OVERCAST	GOOD	F4-5	SW	8 TO 9	0900	1200	3H
1	29/04/2016	JA	OCC. SHOWERS	OVERCAST	GOOD	F4-5	NW	6 TO 7	0900	1200	3H
2	29/04/2016	JA	OCC. SHOWERS	OVERCAST	GOOD	F3-4	NW		1530	1830	3H
4	29/04/2016	JA	OCC. SHOWERS	OVERCAST	GOOD	F3-4	NW	6 TO 7	1215	1515	3H

Breeding Season (Summer) 2016 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
2	11/05/2016	JA	NONE	HAZY	GOOD	F1-2	N	12	1500	1800	3H
3	11/05/2016	JA	NONE	HAZY	GOOD	F1-2	N	12	1130	1430	3H
1	12/05/2016	JA	NONE	OVERCAST	FAIR	F2-3	NE	10	1000	1300	3H
4	13/05/2016	JA	NONE	CLOUDLESS, SUNNY	GOOD	F1-2	NE	10	0930	1230	3H
2	14/05/2016	JA	NONE	CLOUD	GOOD	F2-3	NE	10	1300	1600	3H
3	14/05/2016	JA	NONE	CLOUDY AT TIMES	GOOD	F1-2	NE	9 TO 10	0930	1230	3H
4	27/05/2016	JA	NONE	SUNNY	EXCELLENT	F2-3	NE	12	1000	1300	3H
5	27/05/2016	JA	NONE	OVERCAST	GOOD	F2-3	NE	13	1330	1630	3H
1	28/05/2016	JA	NONE	CLOUDY WITH HAZE	GOOD	F1	NE	12	1000	1300	3H
5	29/05/2016	JA	NONE	SUNNY	GOOD	F3-4	NE	17	1300	1600	3H
1	07/06/2016	JA	NONE	CLEAR	GOOD	F1-2	SW	17 TO 18	1000	1300	3H
3	07/06/2016	JA	NONE	CLEAR, SUNNY	GOOD	F1-2	SW	20	1330	1630	3H
2	08/06/2016	JA	NONE	FOG THEN SUNSHINE	GOOD	F1-2	SW	12	1000	1300	3H
1	09/06/2016	JA	RAIN AT 1300	OVERCAST THEN BRIGHTER	GOOD	F1-2	SW	12	1000	1300	3H
5	09/06/2016	JA	SLIGHT DRIZZLE AT 1430	SUNNY, SOME CLOUD	GOOD	F2	S	15 TO 17	1315	1615	3H
2	10/06/2016	JA	RAIN, CLEARING AT TIMES	OVERCAST	GOOD	F2	SE	12	0900	1200	3H
3	10/06/2016	JA	RAIN, CLEARING AT TIMES	OVERCAST	GOOD	F2	SE	12	1215	1515	3H
4	15/06/2016	JA	OCC. SHOWERS	BRIGHT	GOOD	F3-4	NW	15	1200	1500	3H
4	17/06/2016	JA	NONE	OVERCAST	GOOD	F3-4	N	8 TO 10	1245	1545	3H

Breeding Season (Summer) 2016 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
5	17/06/2016	JA	NONE	OVERCAST	GOOD	F3-4	N	10	0930	1230	3H
1	19/07/2016	JA	NONE	SUNNY, OCC. CLOUD	GOOD	F2-3	E	25 TO 26	1200	1500	3H
3	19/07/2016	JA	NONE	SUNNY, CLOUDY SPELLS	GOOD	F2-3	E	30	1530	1830	3H
1	20/07/2016	JA	NONE	SUNNY, SOME CLOUD	EXCELLENT	F2-3	SW	15	0900	1200	3H
3	20/07/2016	JA	OCC. LIGHT SHOWER	CLOUDY SPELLS	GOOD	F3-4	SW	15 TO 16	1220	1520	3H
2	21/07/2016	JA	NONE	HAZY	GOOD	F3-4	S	12	0930	1230	3H
4	21/07/2016	JA	NONE	OVERCAST	GOOD	F4	S	12 TO 15	1245	1545	3H
2	22/07/2016	JA	RAIN AT 1400	OVERCAST, CLOUDY	GOOD	F2-3	NW	15	1240	1540	3H
5	22/07/2016	JA	OCC. LIGHT DRIZZLE	CLOUDY AT TIMES	GOOD	F2-3	NW	10	0930	1230	3H
4	23/07/2016	JA	MISTY	OVERCAST	FAIR	F2	W	14	1245	1545	3H
5	23/07/2016	JA	DRIZZLE	OVERCAST, FOG AT TIMES	GOOD	F1-2	W	12	0930	1230	3H
3	08/08/2016	JA	OCC. SQUALLS	SUNNY	GOOD	F3-4	NW	17 TO 18	1530	1830	3H
4	08/08/2016	JA	OCC. SQUALLS	SUNNY	GOOD	F3-4	NW	17 TO 18	1200	1500	3H
2	09/08/2016	JA	NONE	OCC. CLOUD	GOOD	F4-5	NW	10 TO 12	1015	1315	3H
2	10/08/2016	JA	OCC. LIGHT SQUALLS	OVERCAST	GOOD	F4-5	NW	10	0930	1230	3H
3	11/08/2016	JA	NONE	OVERCAST	GOOD	F2-3	SW	15	1300	1600	3H
4	11/08/2016	JA	OCC. LIGHT DRIZZLE	OVERCAST	GOOD	F2-3	W	14 TO 15	0930	1230	3H
1	16/08/2016	JA	NONE	SUNNY	GOOD	F1-2	SE	20 TO 22	1600	1900	3H
5	16/08/2016	JA	NONE	SUNNY	GOOD	F1-2	SE	17 TO 20	1230	1530	3H

Breeding Season (Summer) 2016 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
1	17/08/2016	JA	OCC. DRIZZLE	OVERCAST, HAZY	GOOD	F1-2 OCC. 1-2	E	15 TO 17	1000	1300	3H
5	17/08/2016	JA	NONE	OVERCAST, HAZY	GOOD	F1-2 OCC. 3-4	E	17	1330	1630	3H

Non-Breeding Season (Winter) 2016 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
4	21/09/2016	JA	HEAVY AT TIMES	OVERCAST	FAIR TO POOR	F2-3	S	10	1130	1430	3H
5	21/09/2016	JA	HEAVY AT TIMES	BRIGHT	GOOD	F2-3	S	12	1500	1800	3H
1	22/09/2016	JA	HEAVY SHOWERS AT TIMES	SOME CLOUD COVER	GOOD	F1-2 UP TO F3-4	SW	5 TO 6	1000	1300	3H
1	23/09/2016	JA	NONE	OVERCAST BUT BRIGHT	GOOD	F4 OCC. F5	SW	6 TO 7	0930	1230	3H
5	23/09/2016	JA	NONE	OVERCAST BUT BRIGHT	EXCELLENT	F4-5	SW	6 TO 8	1245	1545	3H
4	27/09/2016	JA	NONE	BRIGHT, SOME HAZE	GOOD	F5-6	SW	14 TO 15	1100	1400	3H
2	27/09/2016	JA	NONE	BRIGHT, SOME HAZE	GOOD	F5-6	SW	15	1430	1730	3H
2	28/09/2016	JA	NONE	OVERCAST, BRIGHT, CLOUD	GOOD	F3-4	SW	10 TO 12	1000	1300	3H
3	28/09/2016	JA	NONE	OVERCAST, OCC. BRIGHT SPELLS	GOOD	F4-5 OCC. F5-6	SW	15	1330	1630	3H
5	29/10/2016	JA	NONE	SUNNY, SOME CLOUD	GOOD	F1-2	SW	8 TO 10	1100	1300	2H
2	29/10/2016	JA	NONE	BRIGHT, OVERCAST AT TIMES	GOOD	F1-2	SW	10 TO 13	1330	1630	3H
4	30/10/2016	JA	NONE	BRIGHT, SUNNY	GOOD	F1-2	S	12 TO 15	1330	1430	1H
3	30/10/2016	JA	NONE	BRIGHT, SUNNY	GOOD	F1-2	SW	8 TO 9	0900	1100	2H
3	31/10/2016	JA	NONE	OVERCAST, FOG	POOR	<F1	S	10	1115	1315	2H
1	31/10/2016	JA	NONE	HAZY, SOME SUN	GOOD	<F1	S	8 TO 10	0900	1100	2H
2	01/11/2016	JA	NONE	BRIGHT, SOME CLOUD	GOOD	F4	NE	6 TO 7	1045	1245	2H
1	01/11/2016	JA	NONE	OVERCAST, SOME BRIGHT SPELLS	GOOD	F3-4	ENE	6 TO 7	0830	1030	2H

Non-Breeding Season (Winter) 2016 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
4	01/11/2016	JA	NONE	BRIGHT, SUNNY, SOME CLOUD	GOOD	F3-4	NE	7 TO 8	1250	1450	2H
4	02/11/2016	JA	NONE	BRIGHT, SUNNY	GOOD	F1	NE	7	1215	1315	1H
2	02/11/2016	JA	NONE	BRIGHT, SUNNY, SOME CLOUD	GOOD	F1-2	NE	6 TO 7	0945	1045	1H
3	02/11/2016	JA	NONE	BRIGHT, SUNNY, SOME CLOUD	GOOD	F1-2	NE	6 TO 7	0830	0930	1H
1	24/11/2016	JA	NONE	BRIGHT, SUNNY	GOOD	F1-2	NE	4 TO 5	1000	1300	3H
5	24/11/2016	JA	NONE	BRIGHT, SUNNY	GOOD	F1-2	NE	4 TO 5	1320	1620	3H
1	25/11/2016	JA	NONE	DENSE FOG AT FIRST	GOOD	F1-2	NE	2 TO 3	0930	1230	3H
5	25/11/2016	JA	NONE	FOGGY	GOOD AT TIMES	F1-2	NE	2 TO 3	1245	1545	3H
2	26/11/2016	JA	NONE	SLIGHT FOG AT FIRST	GOOD	F2	NE	2 TO 3	1350	1550	2H
3	26/11/2016	JA	NONE	DENSE FOG AT FIRST	GOOD	F2	NE	1 TO 2	0930	1130	2H
4	27/11/2016	JA	NONE	OVERCAST BUT BRIGHT	GOOD	F1	NE	4	0930	1230	3H
3	29/11/2016	JA	NONE	BRIGHT, SUNNY	GOOD	<F1	SW	2	1000	1300	3H
2	29/11/2016	JA	NONE	BRIGHT, SUNNY, SOME CLOUD	GOOD	<F1	SW	3	1215	1415	2H
4	30/11/2016	JA	NONE	BRIGHT, CLOUDLESS	GOOD	<F1	SE	2	0930	1230	3H
3	01/12/2016	JA	NONE	BRIGHT, CLOUDLESS	GOOD	<F1	SE	-2/-3	0930	1130	2H
2	01/12/2016	JA	NONE	BRIGHT, SUNNY	GOOD	F1	SE	0	1345	1545	2H

Non-Breeding Season (Winter) 2016 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
5	12/12/2016	JA	NONE	BRIGHT, OVERCAST	EXCELLENT	F2	SW	7	1245	1545	3H
1	12/12/2016	JA	NONE	OVERCAST, DULL	GOOD	F3-4	SW	8	0930	1230	3H
4	13/12/2016	JA	MISTY	OVERCAST, DULL	GOOD	F2-3	SE	7	1215	1515	3H
5	13/12/2016	JA	NONE	BRIGHT, SUNNY	GOOD	F2-3	SE	6	0900	1200	3H
4	14/12/2016	JA	HEAVY SQUALLS	OVERCAST, DULL	POOR AT TIMES	F1-2	SE	13	1215	1515	3H
1	14/12/2016	JA	FREQUENT HEAVY SQUALLS	OVERCAST, DULL	POOR AT TIMES	F1-2	SE	12	0900	1200	3H
4	28/12/2016	JA	NONE	CLOUD 4/8, BRIGHT	GOOD	F1	SSW	8 TO 9	1010	1310	3H
2	29/12/2016	JA	NONE	CLOUD 8/8, OVERCAST	EXCELLENT	F1	S	8 TO 9	1215	1515	3H
3	29/12/2016	JA	NONE	OVERCAST	GOOD	<F1	SW	8	0900	1200	3H
4	30/12/2016	JA	NONE	OVERCAST, BRIGHT	GOOD	F1	SW	7 TO 10	0915	1215	3H
2	30/12/2016	JA	NONE	OVERCAST, CALM	GOOD	F1-2	SW	10 TO 11	1230	1530	3H
3	03/01/2017	JA	NONE	CLOUD 2/8, BRIGHT	GOOD	F1	WNW	6 TO 8	1235	1535	3H
2	25/01/2017	JA	RAIN AT FIRST CLEARING LATER	BRIGHT	GOOD	F4	SW VEERING S	9	0930	1230	3H
3	25/01/2017	JA	RAIN AT 1500	OVERCAST BUT BRIGHT	GOOD	F5-6	SSW	9 TO 10	1230	1530	3H
5	26/01/2017	JA	NONE	OVERCAST, HAZY	GOOD	G6-7 GALE FORCE OCC.	SE	5 TO 6	1215	1515	3H
5	26/01/2017	JA	NONE	DULL, OVERCAST	GOOD	F5 OCC. F5-6	SE	6	0900	1200	3H
4	26/01/2017	JA	FREQUENT HEAVY SQUALLS	BRIGHT	GOOD	F3-4	NW	3 TO 4	1000	1300	3H

Non-Breeding Season (Winter) 2016 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
4	27/01/2017	JA	NONE	BRIGHT BECOMING OVERCAST	GOOD	F1-2	SW	8	1245	1545	3H
1	27/01/2017	JA	HEAVY SHOWER AT FIRST CLEARING	NONE	GOOD	F1-2 THEN F3-4	SE TO SW	7	0930	1230	3H
5	28/01/2017	JA	NONE	BRIGHT, SUNNY	GOOD	F1-2	SW	6	0930	1230	3H
4	29/01/2017	JA	MISTY RAIN, OCC. CLEAR SPELLS	NONE	GOOD	F1-2	SE	9 TO 10	1000	1300	3H
1	29/01/2017	JA	MISTY RAIN, CLEARING LATER	NONE	GOOD	F1-2	SE	9 TO 10	1315	1615	3H
2	30/01/2017	JA	MISTY RAIN AT FIRST	NONE	GOOD	F3-4 OCC. F4-5	SE	10	1000	1300	3H
2	31/01/2017	JA	NONE	FOGGY AT FIRST, SUNNY	GOOD	F1-2	SE TO SW	10	1000	1300	3H
3	31/01/2017	JA	NONE	BRIGHT, CLOUDY AT TIMES	GOOD	F1-2	SW	8 TO 9	1310	1610	3H
5	27/02/2017	JA	OCC. SHOWERS	BRIGHT, OVERCAST	GOOD	F3-4	SW	3 TO 4	1230	1530	3H
3	27/02/2017	JA	OCC. SHOWERS	BRIGHT BECOMING OVERCAST	GOOD	F3-4	SW	3 TO 4	0900	1200	3H
5	28/02/2017	JA	HEAVY SQUALLS	CLEAR AT TIMES	GOOD	F5-6 OCC. GALE FORCE	NW	2 TO 3	1230	1530	3H
4	28/02/2017	JA	FREQUENT HEAVY SQUALLS	DULL, OVERCAST	GOOD	F5-6	NW	2 TO 3	0900	1200	3H
1	01/03/2017	JA	NONE	BRIGHT THEN OVERCAST	GOOD	F1-2	SW	3 TO 4	0900	1200	3H
3	02/03/2017	JA	MISTY RAIN AT TIMES	BRIGHT THEN OVERCAST	GOOD	F3-4	SE	4	0930	1230	3H

Non-Breeding Season (Winter) 2016 Hen Harrier Survey Results											
VP Name	Date	Observer	Rain	Cloud	Visibility	Wind Speed (Bft)	Wind Direction	Temp (Deg C)	Start Time	End Time	Duration of survey (hrs)
1	03/03/2017	JA	SHOWERY WITH CLEAR SPELLS	DULL, OVERCAST	GOOD	F3-4	SE	6 TO 7	1245	1545	3H
2	03/03/2017	JA	SHOWERY WITH CLEAR SPELLS	NONE	GOOD	F3-4	SE	6 TO 7	0930	1230	3H
2	04/03/2017	JA	DRIVING RAIN AT TIMES	CLEAR SPELLS	GOOD	F5-6	WNW	7 TO 8	1245	1545	3H
1	19/03/2017	JA	FREQUENT SHOWERS	BRIGHT SPELLS	GOOD	F5-6	S	12 TO 13	1030	1230	2H
3	19/03/2017	JA	SHOWERS	BRIGHT AT TIMES	GOOD	F5-6	S	13 TO 14	1345	1645	3H
2	20/03/2017	JA	SHOWERY, SOME HAIL	BRIGHT SPELLS	GOOD	F5	SW	8	1300	1600	3H
1	20/03/2017	JA	OCC. LIGHT SHOWER	BRIGHT, CLOUD AT TIMES	GOOD	F4-5 OCC 5-6	SW	9	0930	1230	3H
2	21/03/2017	JA	SLIGHT SNOW FLURRY	BRIGHTENING UP	GOOD	F4	SSW	2	0930	1230	3H
5	30/03/2017	JA	SHOWERY	DULL, OVERCAST	GOOD	F4-5	S	10	1430	1730	3H
4	30/03/2017	JA	FREQUENT RAIN	DULL, OVERCAST	GOOD	F4-5	S	10	1100	1400	3H
4	31/03/2017	JA	SHOWERY WITH BRIGHT SPELLS	OVERCAST AT TIMES	GOOD	F4-5	SW	10	0930	1230	3H
5	01/04/2017	JA	FREQUENT SQUALLS	BRIGHT	GOOD	F4-5	SW	8	0930	1230	3H
3	02/04/2017	JA	NONE	SOME CLOUD, FOG. SUNNY AFTER	GOOD	F2-3	SW	7 TO 8	0930	1230	3H

Breeding Season (Summer) 2015 Hen Harrier Sighting Notes									
VP Name	Date	Species	Sex	Time of sighting	Habitat	Duration (s)	Activity	Bird Notes	
5	19/04/2015	Hen Harrier	Female (Adult)	11:33	Diciduous Forestry	7 sec	Foraging	Observes briefly flying over brow of hill at edge of diciduous forestry	
3	27/05/2015	Nil Sightings							
4	27/05/2015	Nil Sightings							
1	28/05/2015	Nil Sightings							
5	28/05/2015	Nil Sightings							
2	29/05/2015	Nil Sightings							
3	29/05/2015	Nil Sightings							
4	30/05/2015	Nil Sightings							
5	30/05/2015	Nil Sightings							
1	31/05/2015	Nil Sightings							
2	31/05/2015	Nil Sightings							
1	17/06/2015	Nil Sightings							
2	17/06/2015	Nil Sightings							
2	18/06/2015	Nil Sightings							
3	18/06/2015	Nil Sightings							
1	19/06/2015	Nil Sightings							
3	19/06/2015	Nil Sightings							
4	20/06/2015	Nil Sightings							
5	20/06/2015	Nil Sightings							
4	21/06/2015	Nil Sightings							
5	21/06/2015	Nil Sightings							
2	20/07/2015	Nil Sightings							
5	20/07/2015	Nil Sightings							
1	21/07/2015	Nil Sightings							
2	21/07/2015	Nil Sightings							

Breeding Season (Summer) 2015 Hen Harrier Sighting Notes									
VP Name	Date	Species	Sex	Time of sighting	Habitat	Duration (s)	Activity	Bird Notes	
3	21/07/2015	Nil Sightings							
4	22/07/2015	Nil Sightings							
5	22/07/2015	Nil Sightings							
1	23/07/2015	Nil Sightings							
4	23/07/2015	Nil Sightings							
3	24/07/2015	Nil Sightings							
2	23/08/2015	Nil Sightings							
3	23/08/2015	Nil Sightings							
1	24/08/2015	Nil Sightings							
2	24/08/2015	Nil Sightings							
1	25/08/2015	Nil Sightings							
3	25/08/2015	Nil Sightings							
4	26/08/2015	Nil Sightings							
5	26/08/2015	Nil Sightings							
4	27/08/2015	Nil Sightings							
5	27/08/2015	Nil Sightings							

Non-Breeding Season (Winter) 2015 Hen Harrier Sighting Notes									
VP Name	Date	Species	Sex	Time of sighting	Habitat	Duration (s)	Activity	Bird Notes	
2	26/11/2015	Nil Sightings							
3	26/11/2015	Nil Sightings							
4	27/11/2015	Nil Sightings							
5	27/11/2015	Nil Sightings							
2	11/12/2015	Nil Sightings							
3	11/12/2015	Nil Sightings							
5	12/12/2015	Nil Sightings							
4	13/12/2015	Nil Sightings							
5	13/12/2015	Nil Sightings							
1	22/12/2015	Nil Sightings							
2	22/12/2015	Nil Sightings							
3	22/12/2015	Nil Sightings							
4	23/12/2015	Nil Sightings							
2	14/01/2016	Nil Sightings							
3	14/01/2016	Nil Sightings							
2	15/01/2016	Nil Sightings							
4	15/01/2016	Nil Sightings							
1	16/01/2016	Nil Sightings							
5	16/01/2016	Nil Sightings							
1	17/01/2016	Nil Sightings							
3	17/01/2016	Nil Sightings							
1	26/01/2016	Nil Sightings							
3	26/01/2016	Nil Sightings							
2	27/01/2016	Nil Sightings							
4	27/01/2016	Nil Sightings							
5	27/01/2016	Nil Sightings							

Non-Breeding Season (Winter) 2015 Hen Harrier Sighting Notes									
VP Name	Date	Species	Sex	Time of sighting	Habitat	Duration (s)	Activity	Bird Notes	
1	11/02/2016	Nil Sightings							
3	11/02/2016	Nil Sightings							
4	12/02/2016	Nil Sightings							
5	12/02/2016	Nil Sightings							
2	16/02/2016	Nil Sightings							
3	16/02/2016	Nil Sightings							
1	17/02/2016	Nil Sightings							
4	17/02/2016	Nil Sightings							
5	17/02/2016	Nil Sightings							
2	18/02/2016	Nil Sightings							

Breeding Season (Summer) 2016 Hen Harrier Sighting Notes									
VP Name	Date	Species	Sex	Time of sighting	Habitat	Duration (s)	Activity	Bird Notes	
2	10/08/2016	Nil Sightings							
3	11/08/2016	Nil Sightings							
4	11/08/2016	Nil Sightings							
1	16/08/2016	Nil Sightings							
5	16/08/2016	Nil Sightings							
1	17/08/2016	Nil Sightings							
5	17/08/2016	Nil Sightings							

Non-Breeding Season (Winter) 2016 Hen Harrier Sighting Notes									
VP Name	Date	Species	Sex	Time of sighting	Habitat	Duration (s)	Activity	Bird Notes	
4	26/01/2017	Nil Sightings							
4	27/01/2017	Nil Sightings							
1	27/01/2017	Hen Harrier	Female (Adult)	10:45	Grassland and Conifer edge	360	Commuting & Hunting	Flew across valley then started to hunt over rough pasture circling field and edge of small conifer planting until lost from view. 6 mins total 2 mins hunting (less that 10 m above ground)	
5	28/01/2017	Nil Sightings							
4	29/01/2017	Nil Sightings							
1	29/01/2017	Nil Sightings							
2	30/01/2017	Nil Sightings							
2	31/01/2017	Nil Sightings							
3	31/01/2017	Nil Sightings							
5	27/02/2017	Nil Sightings							
3	27/02/2017	Nil Sightings							
5	28/02/2017	Nil Sightings							
4	28/02/2017	Nil Sightings							
1	01/03/2017	Nil Sightings							
3	02/03/2017	Nil Sightings							
1	03/03/2017	Nil Sightings							
2	03/03/2017	Nil Sightings							
2	04/03/2017	Nil Sightings							
1	19/03/2017	Nil Sightings							
3	19/03/2017	Nil Sightings							

Non-Breeding Season (Winter) 2016 Hen Harrier Sighting Notes									
VP Name	Date	Species	Sex	Time of sighting	Habitat	Duration (s)	Activity	Bird Notes	
2	20/03/2017	Nil Sightings							
1	20/03/2017	Nil Sightings							
2	21/03/2017	Nil Sightings							
5	30/03/2017	Nil Sightings							
4	30/03/2017	Nil Sightings							
4	31/03/2017	Nil Sightings							
5	01/04/2017	Nil Sightings							
3	02/04/2017	Nil Sightings							

A8.1.5 Hen Harrier Flight Lines as surveyed

Client: Ecopower

Project: UFW Related Works Appeal

Title:
Hen Harrier Flightlines March 2015

Legend:

Observations of Note:

- ▲ Hen Harrier (Female)
- ▲ Hen Harrier (Male)
- Related Works Construction Works Boundary
- Upperchurch Windfarm 2013 Study Area

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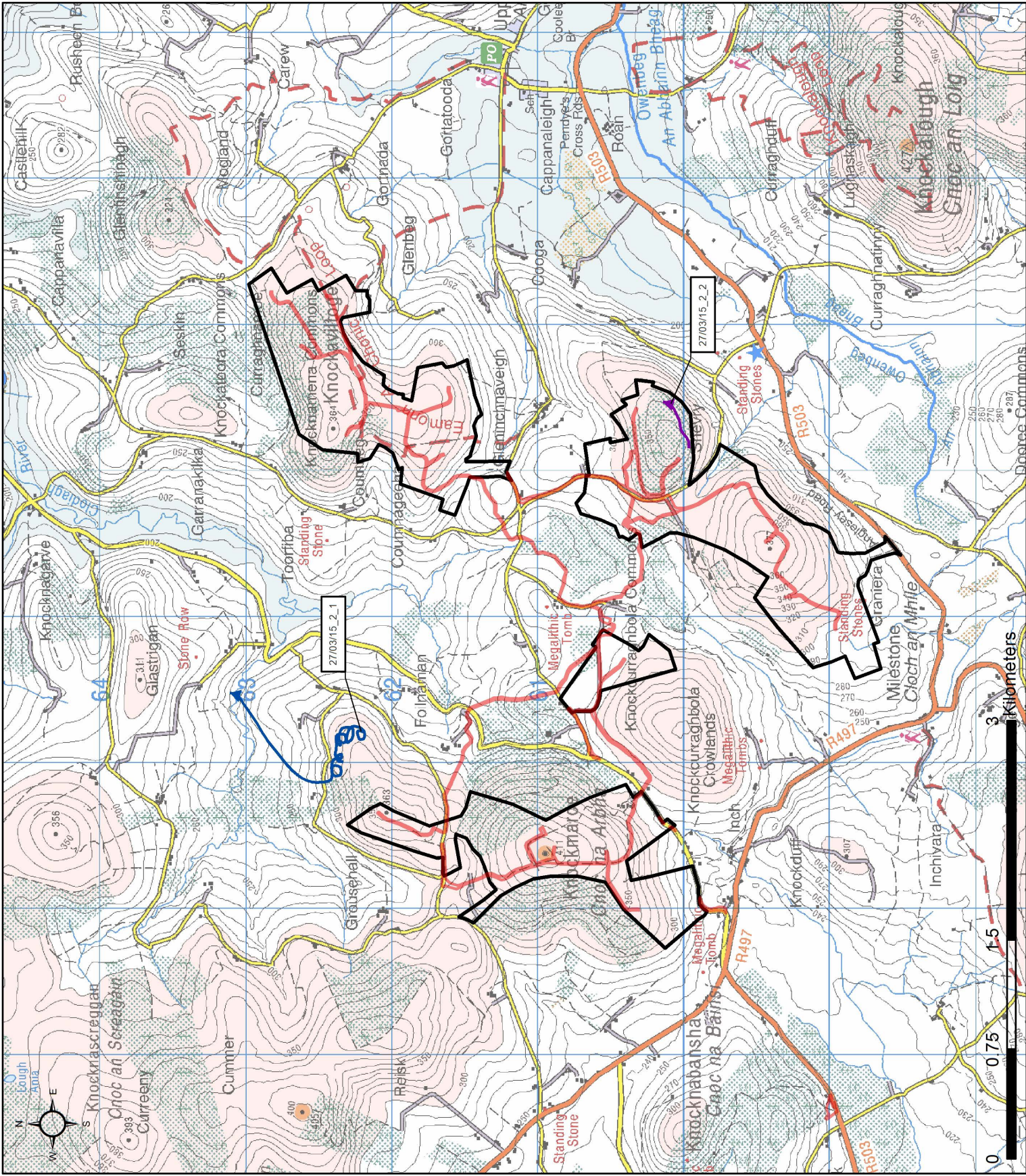
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Client: Ecopower

Project: UFW Related Works Appeal

Title:
Hen Harrier Flightlines April 2015

Legend:

Observations of Note:

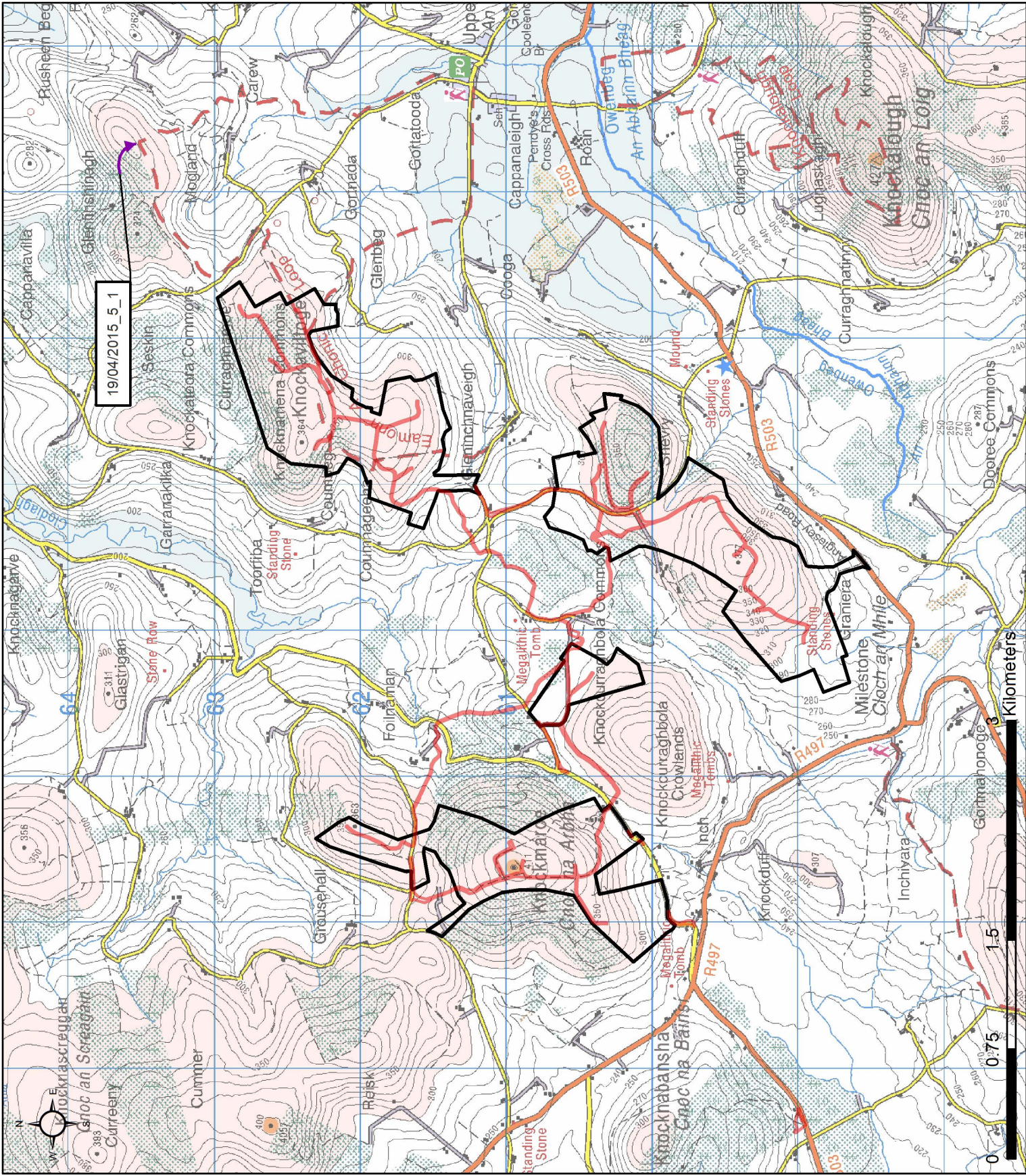
-  Hen Harrier (Female)
-  Related Works Construction Works
-  Boundary
-  Area

Upperchurch Windfarm 2013 Study

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Project: UFW Related Works Appeal

Title:
Hen Harrier Flightlines May 2015

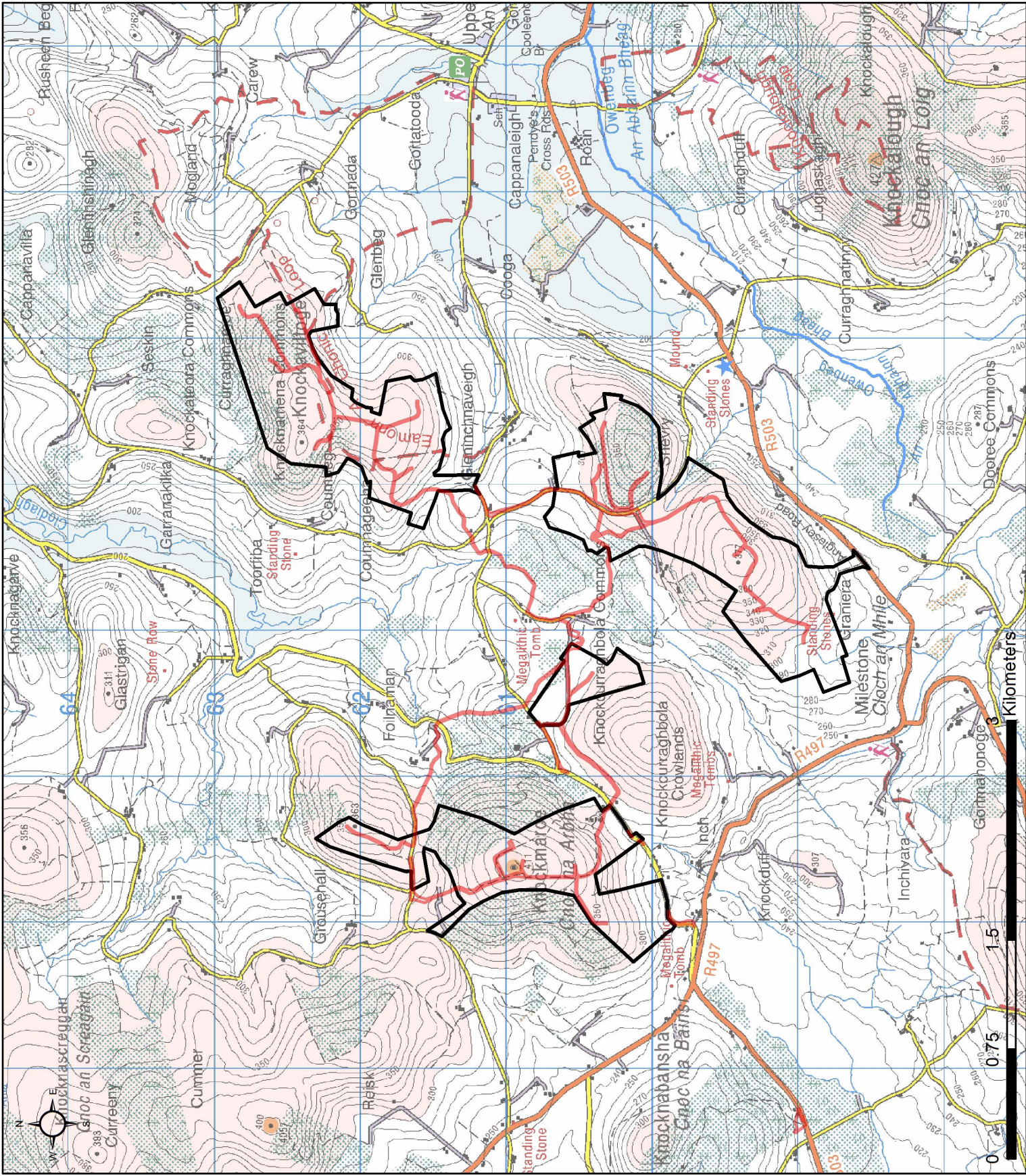
Legend:

- Nil Observations of Note
- Related Works Construction Works Boundary
- Upperchurch Windfarm 2013 Study Area

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Title:
Hen Harrier Flightlines June 2015

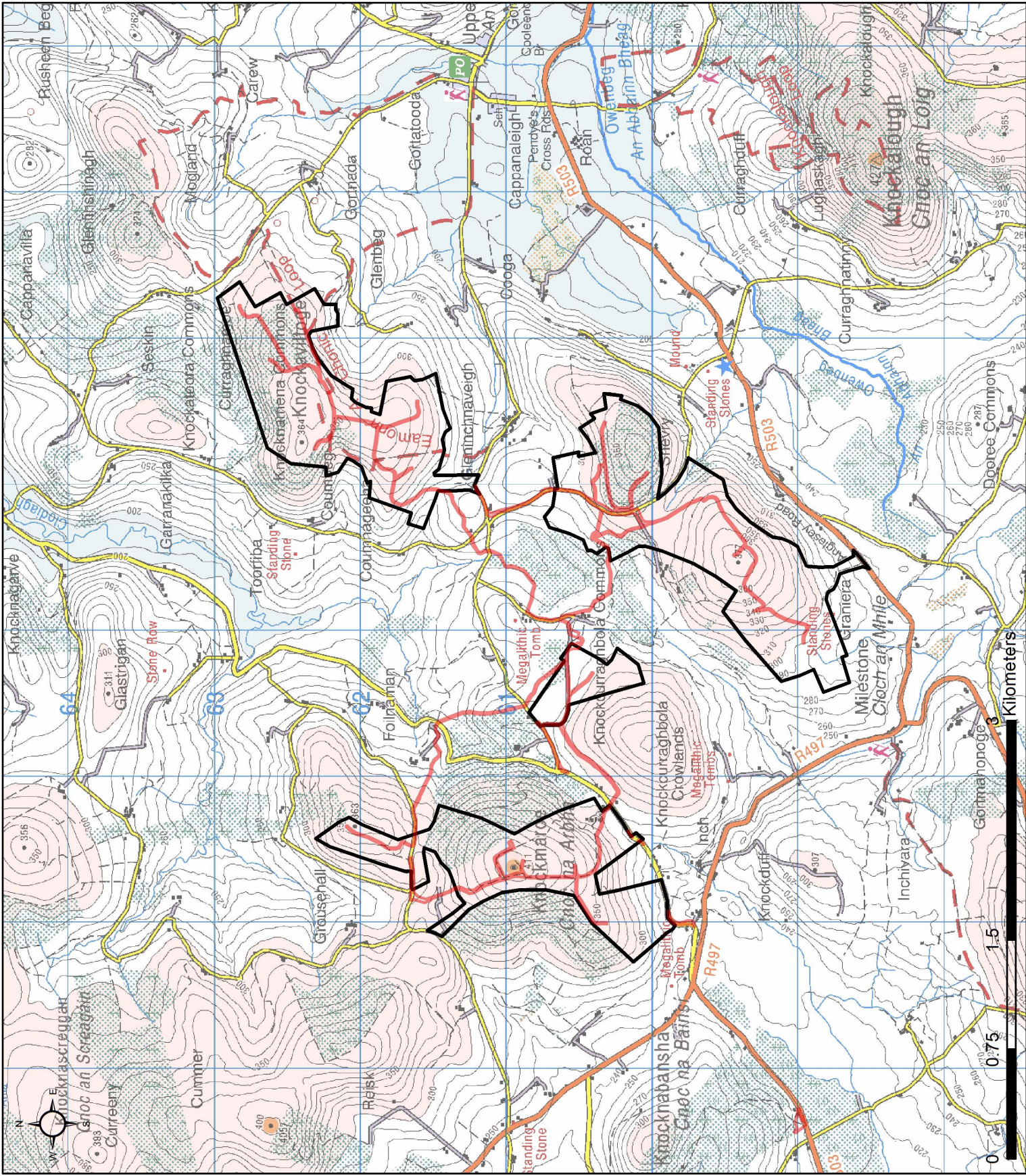
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- Boundary
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Hen Harrier Flightlines July 2015

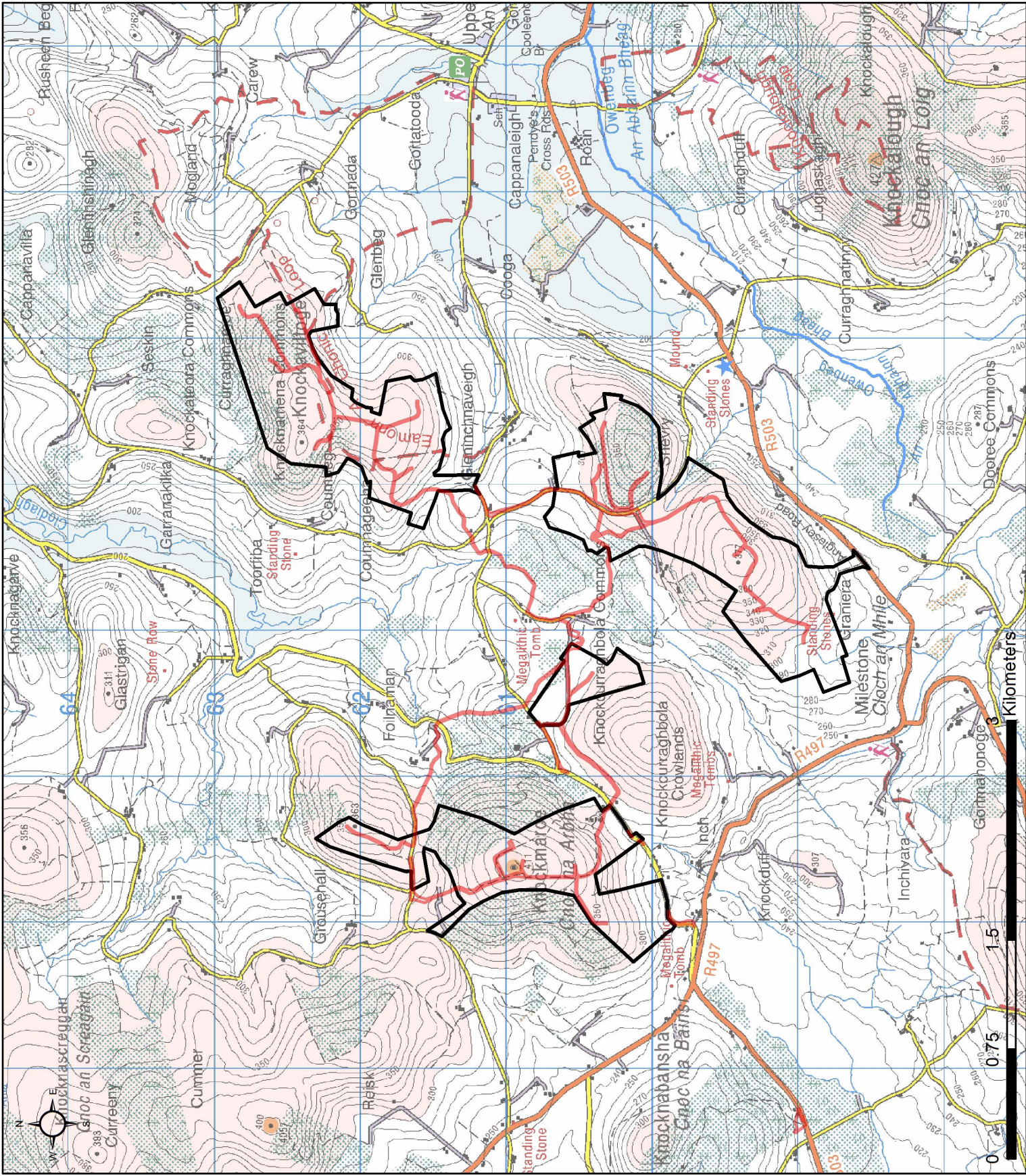
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- Boundary
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Title: Hen Harrier Flightlines August 2015

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Nil Observations of Note

Related Works Construction Works

Boundary

Upperchurch Windfarm 2013 Study Area

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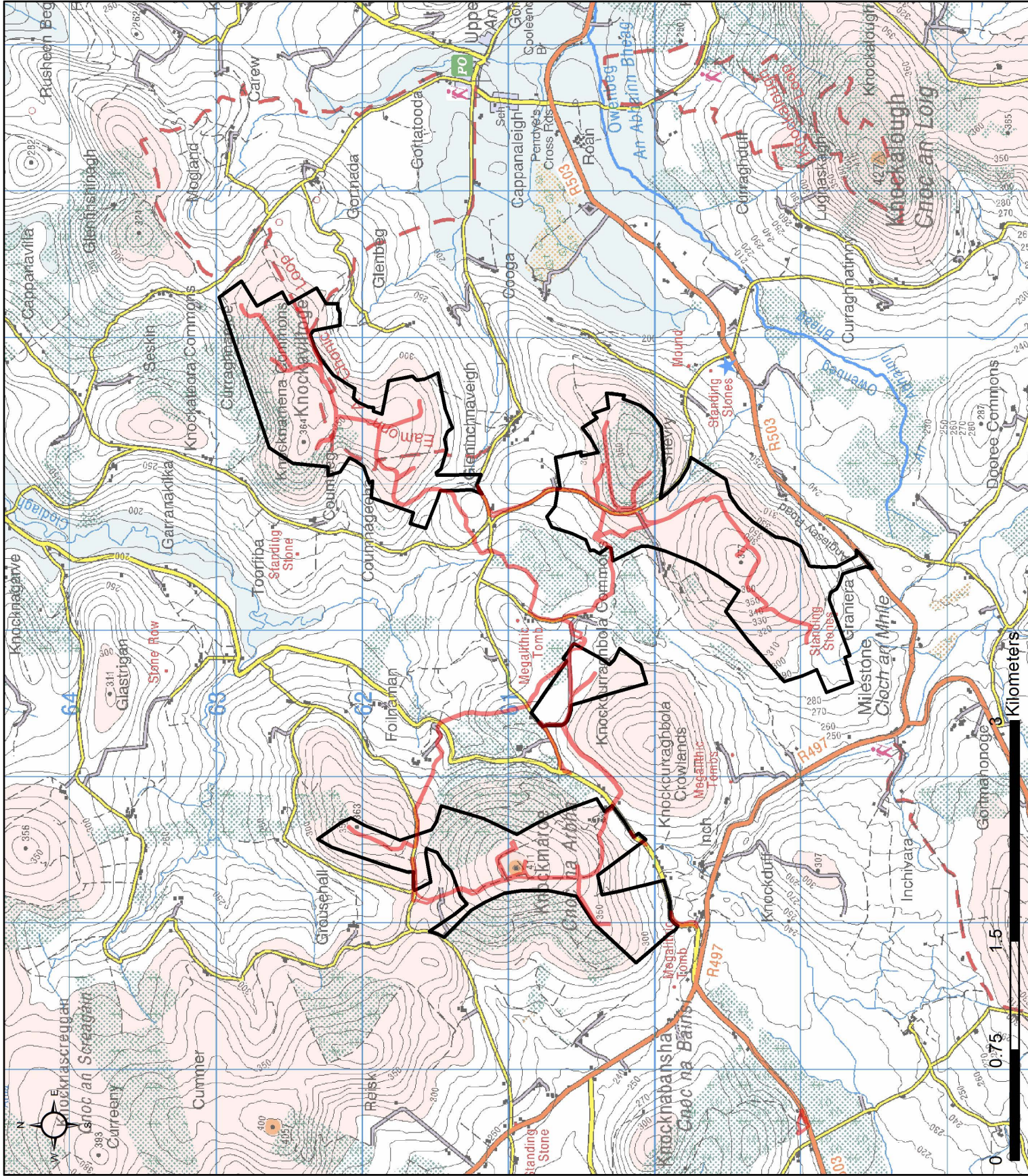
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Legend:

- Nil Observations of Note
- Related Works Construction Works
- Boundary
- Upperchurch Windfarm 2013 Study Area

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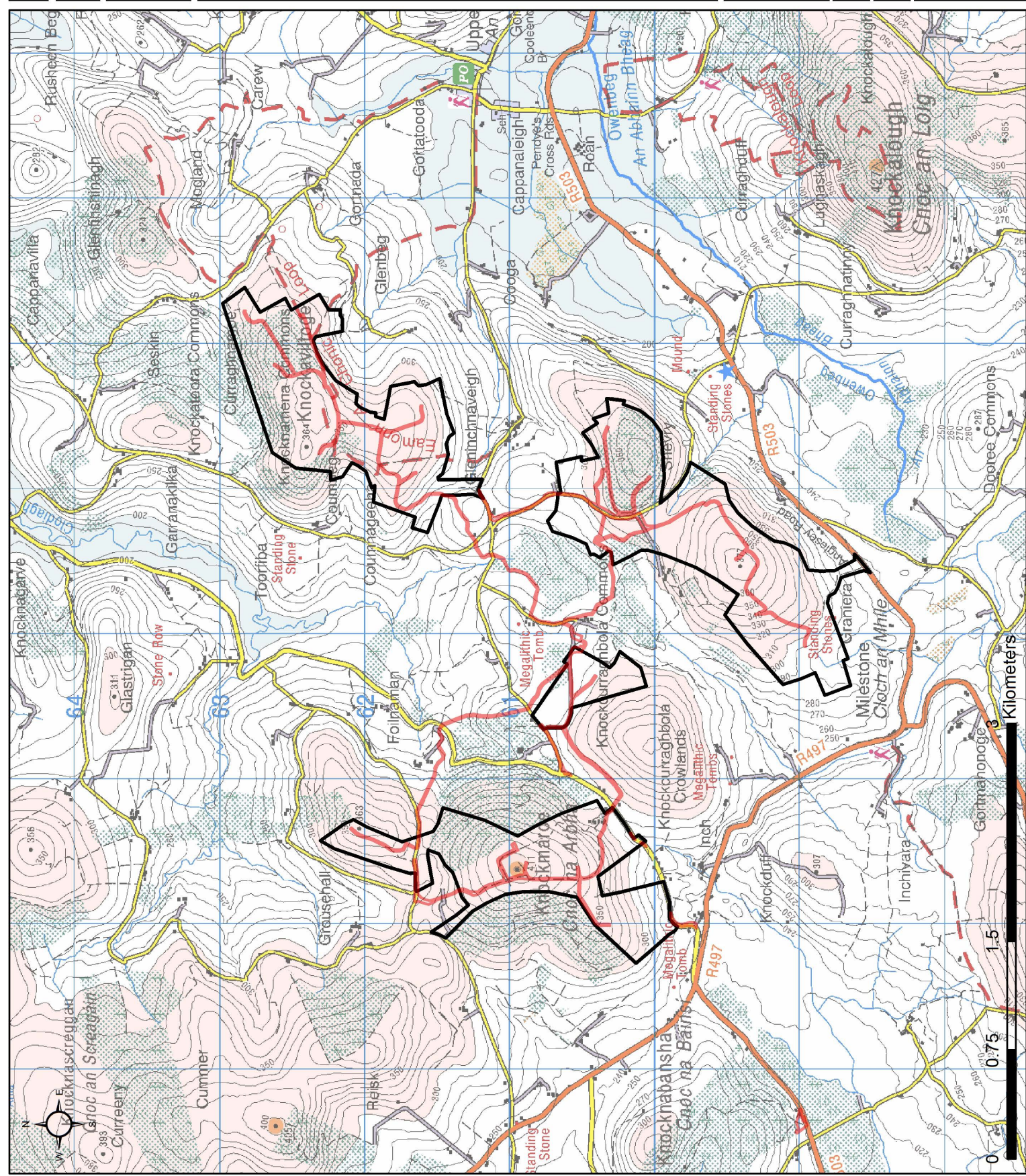
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Hen Harrier Flightlines October 2015

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- Nil Observations of Note
- Related Works Construction Works
- Boundary
- Upperchurch Windfarm 2013 Study Area

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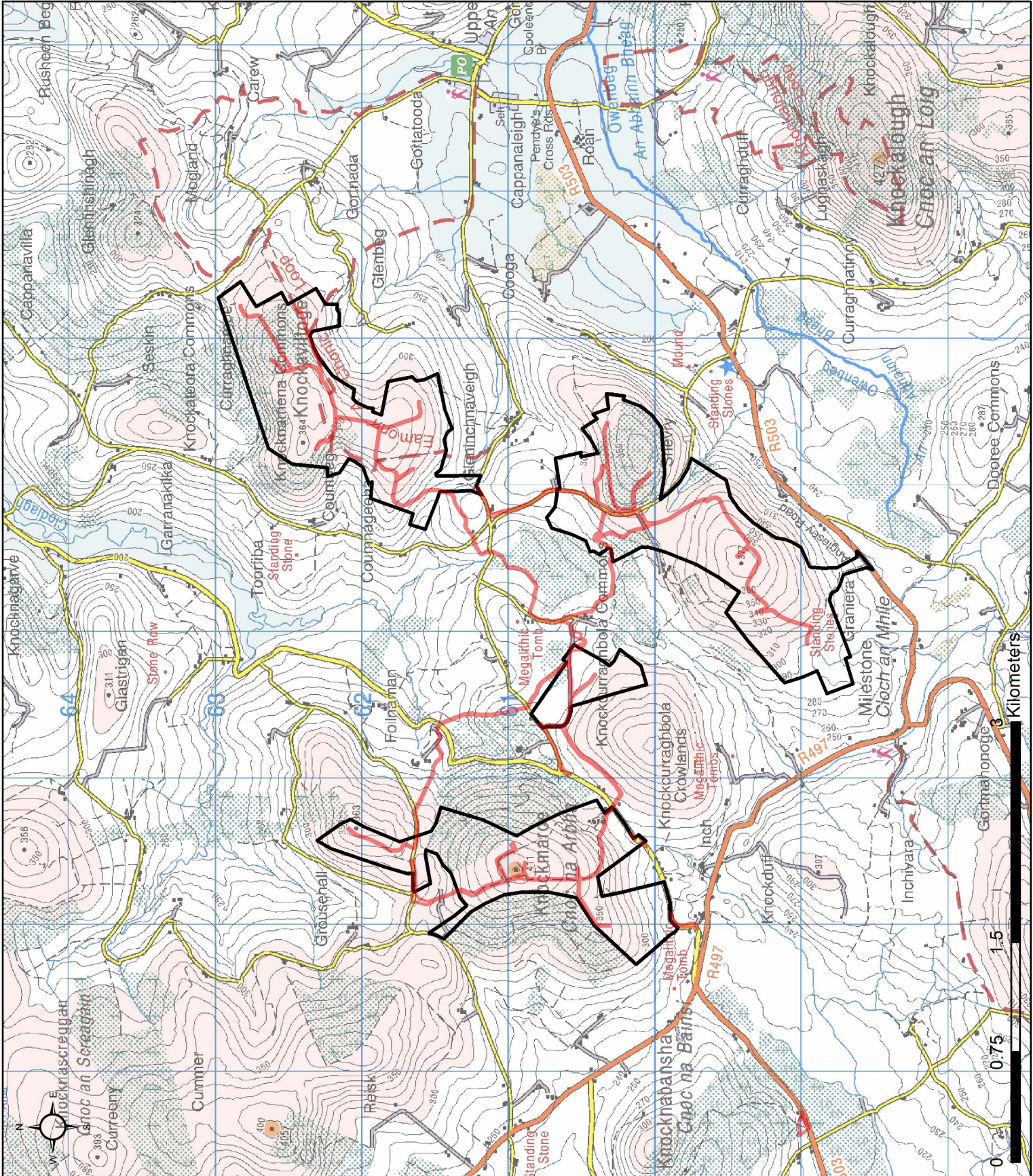
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Hen Harrier Flightlines November 2015

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- Boundary
- Upperchurch Windfarm 2013 Study Area

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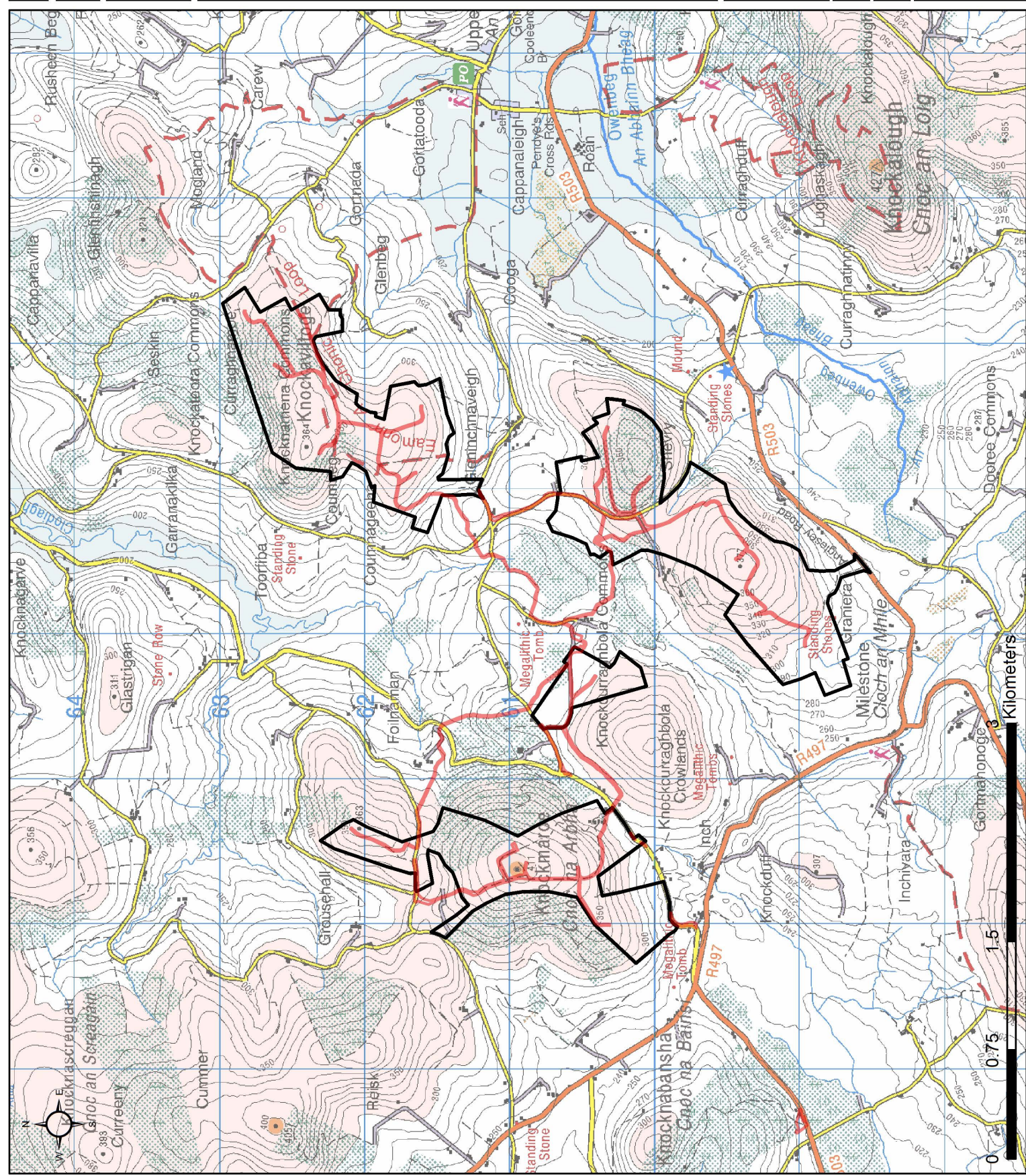
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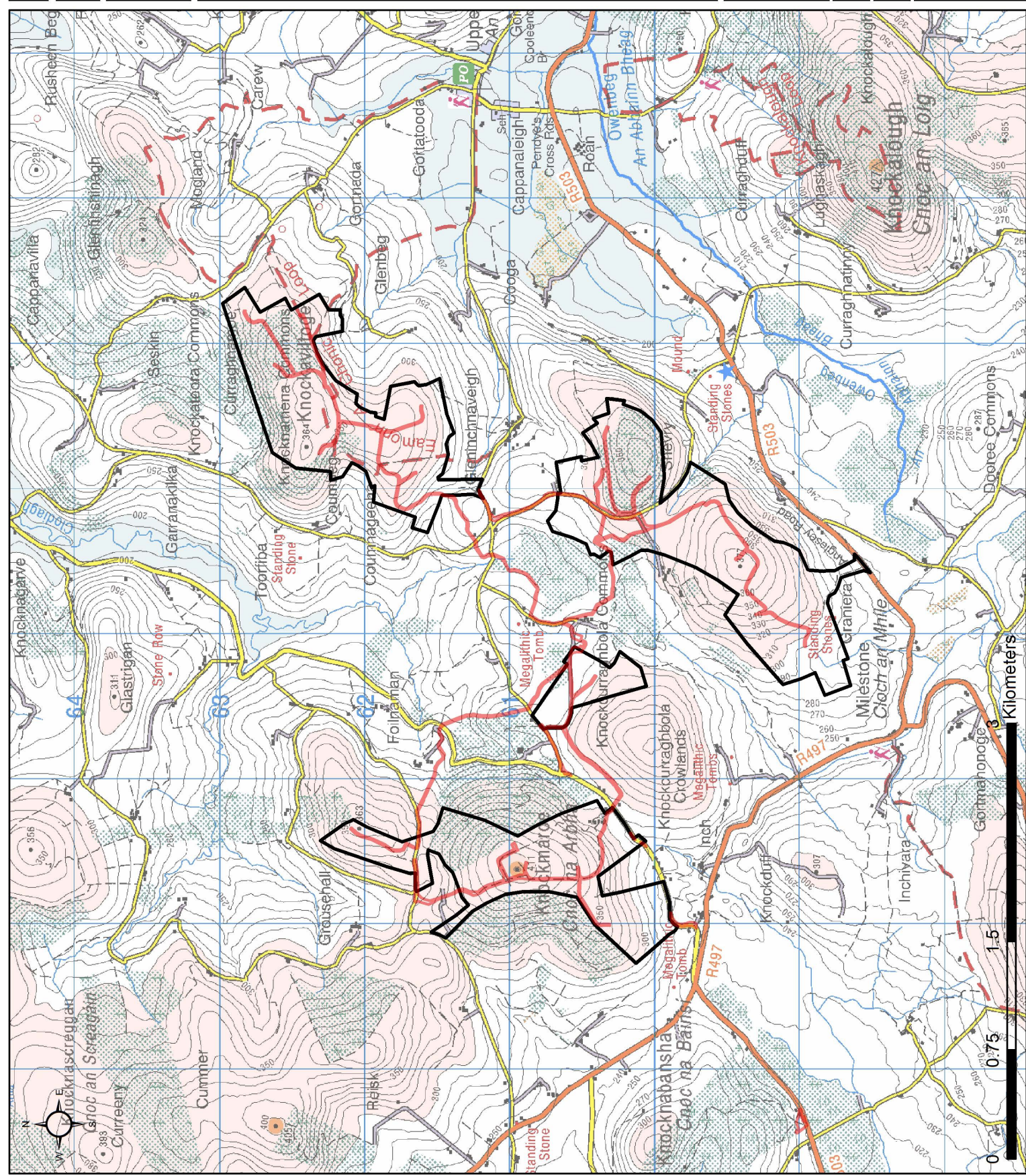
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Title: Hen Harrier Flightlines January 2016
Legend: Nil Observations of Note Upperchurch Windfarm 2013 Study Area Related Works Construction Works Boundary

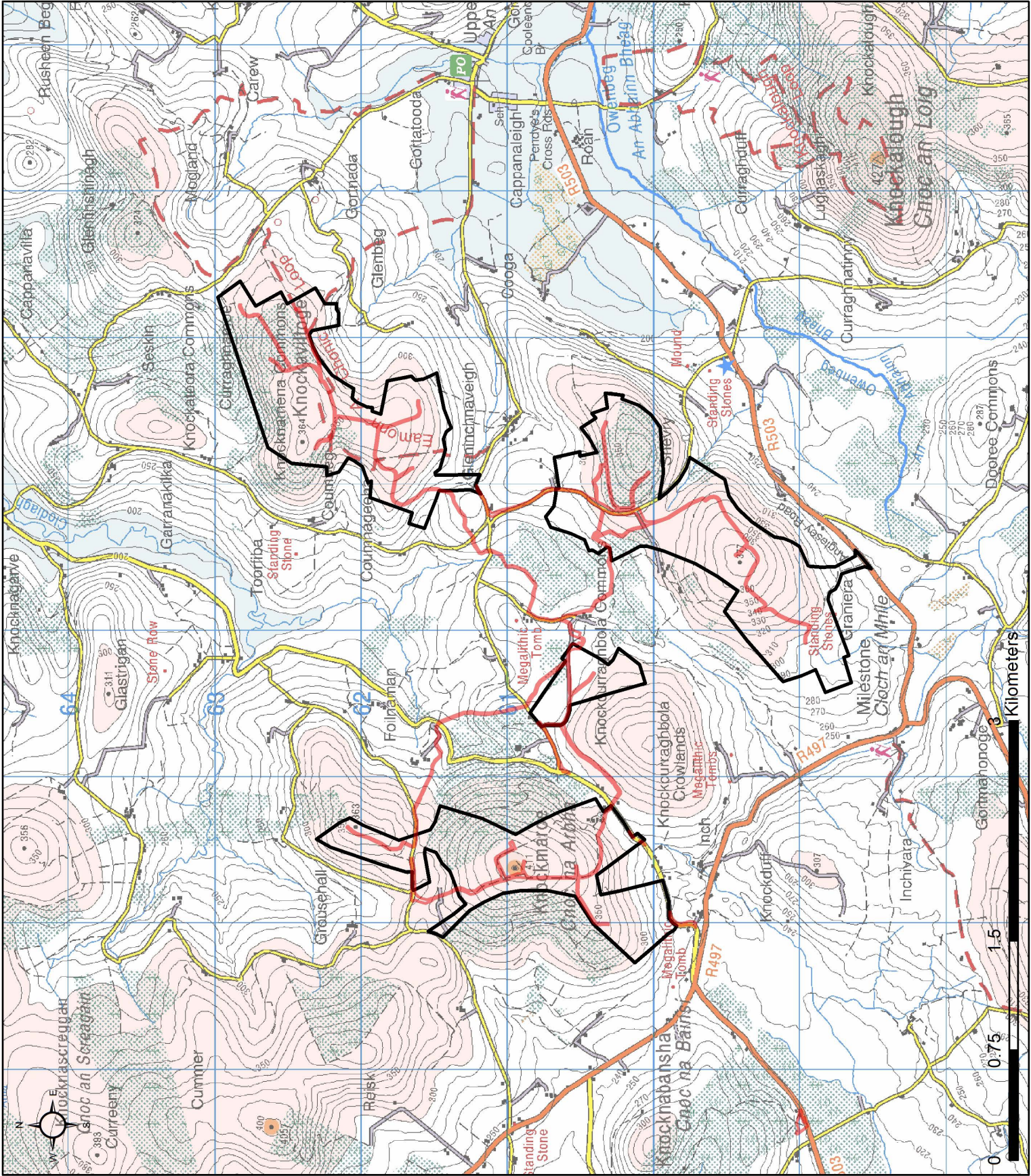
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Hen Harrier Flightlines February 2016

Legend:

Nil Observations of Note

Upperchurch Windfarm 2013 Study Area

Related Works Construction Works Boundary

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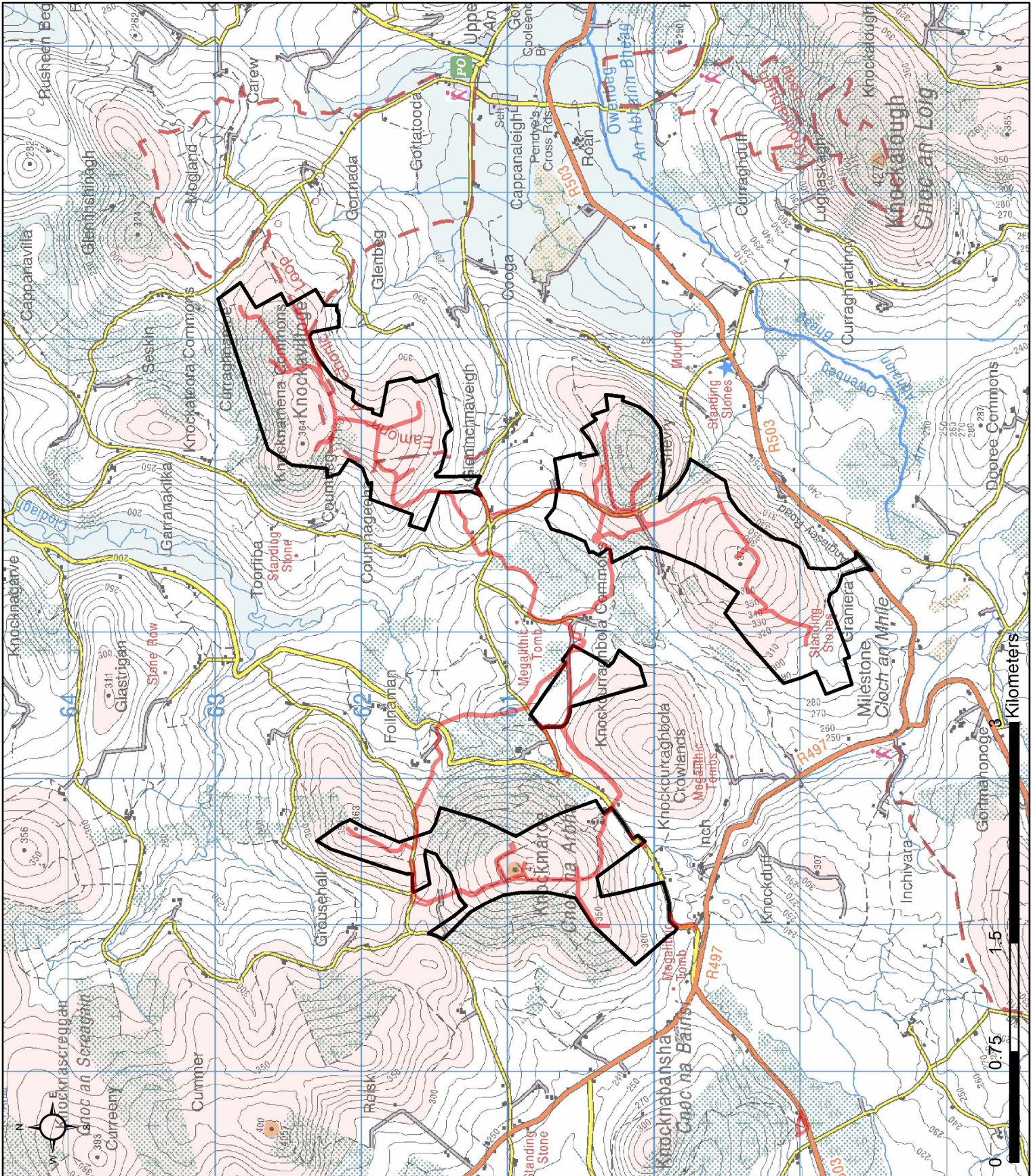
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Title:
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Legend:

Nil Observations of Note

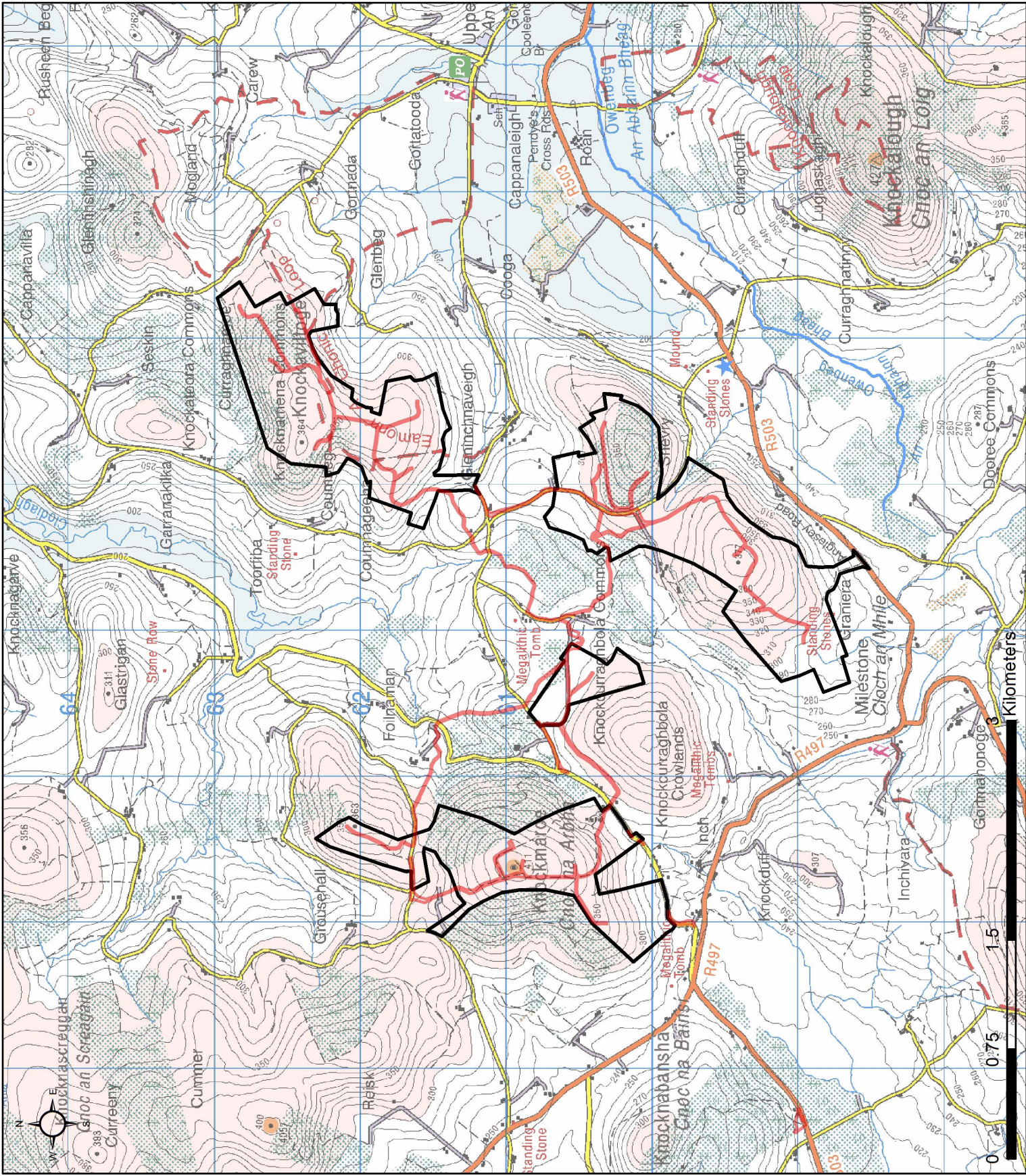
Upperchurch Windfarm 2013 Study Area

Related Works Construction Works Boundary

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Client: Ecopower

Project: UFW Related Works Appeal

Title:
Hen Harrier Flightlines April 2016

Legend:

- Nil Observations of Note
- Upperchurch Windfarm 2013 Study Area
- Related Works Construction Works Boundary

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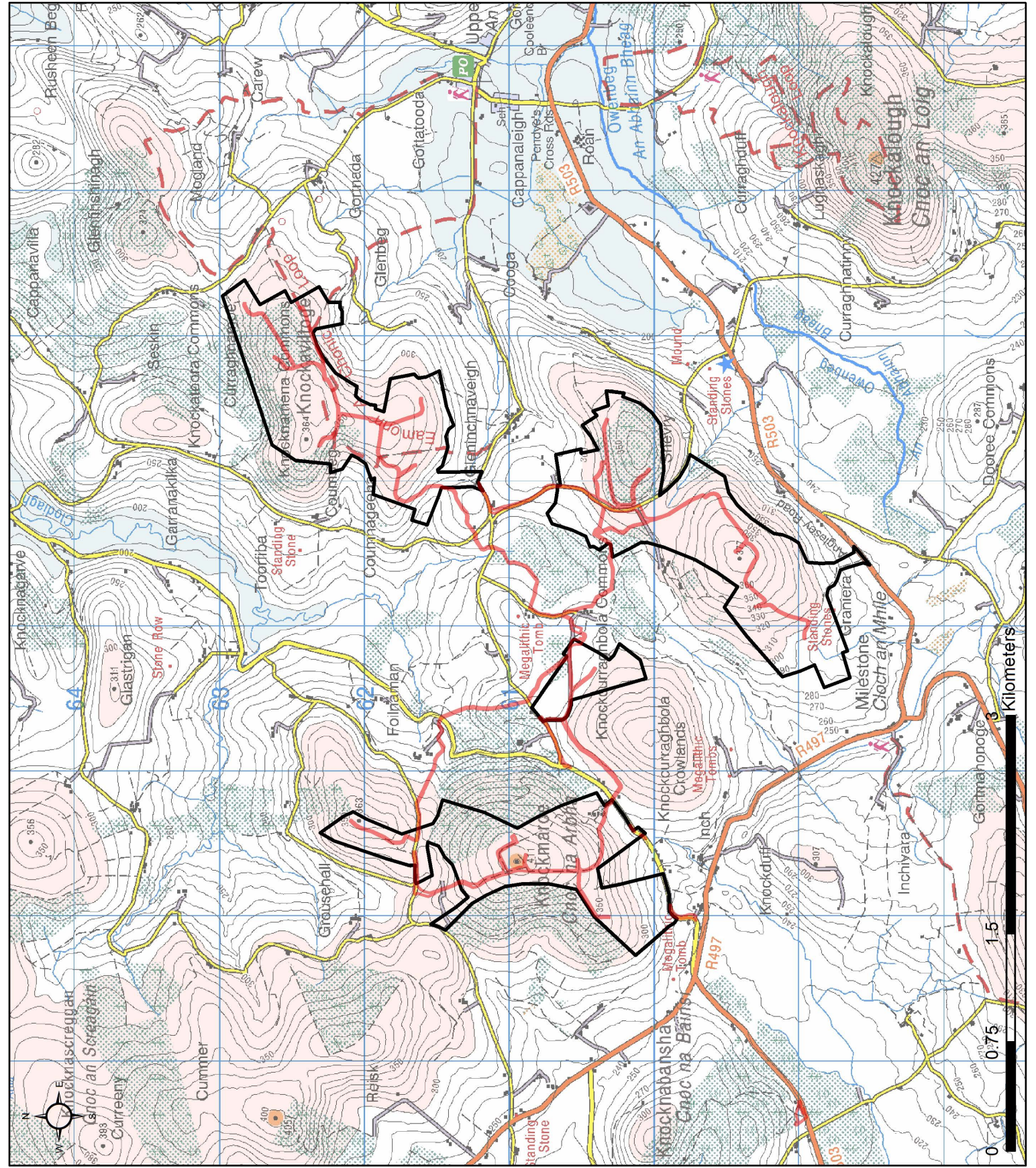
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Title:
Hen Harrier Flightlines July 2016

Legend:

- Nil Observations of Note
- Upperchurch Windfarm 2013 Study Area
- Related Works Construction Works
- Boundary

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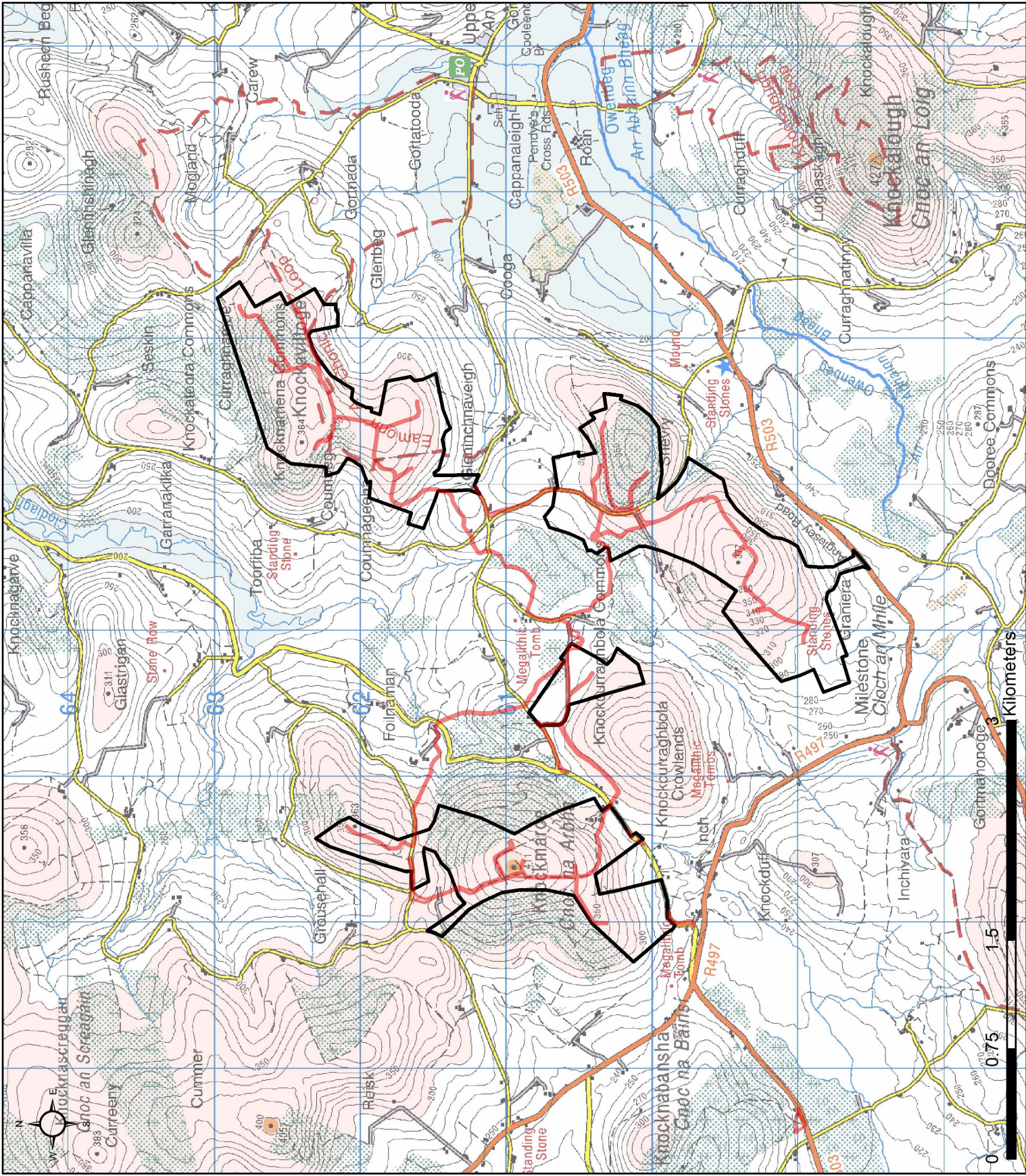
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Title:

Hen Harrier Flightlines May 2016

Legend:

Nil Observations of Note

Upperchurc Windfarm 2013 Study Area

Related Works Construction Works Boundary



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Date:

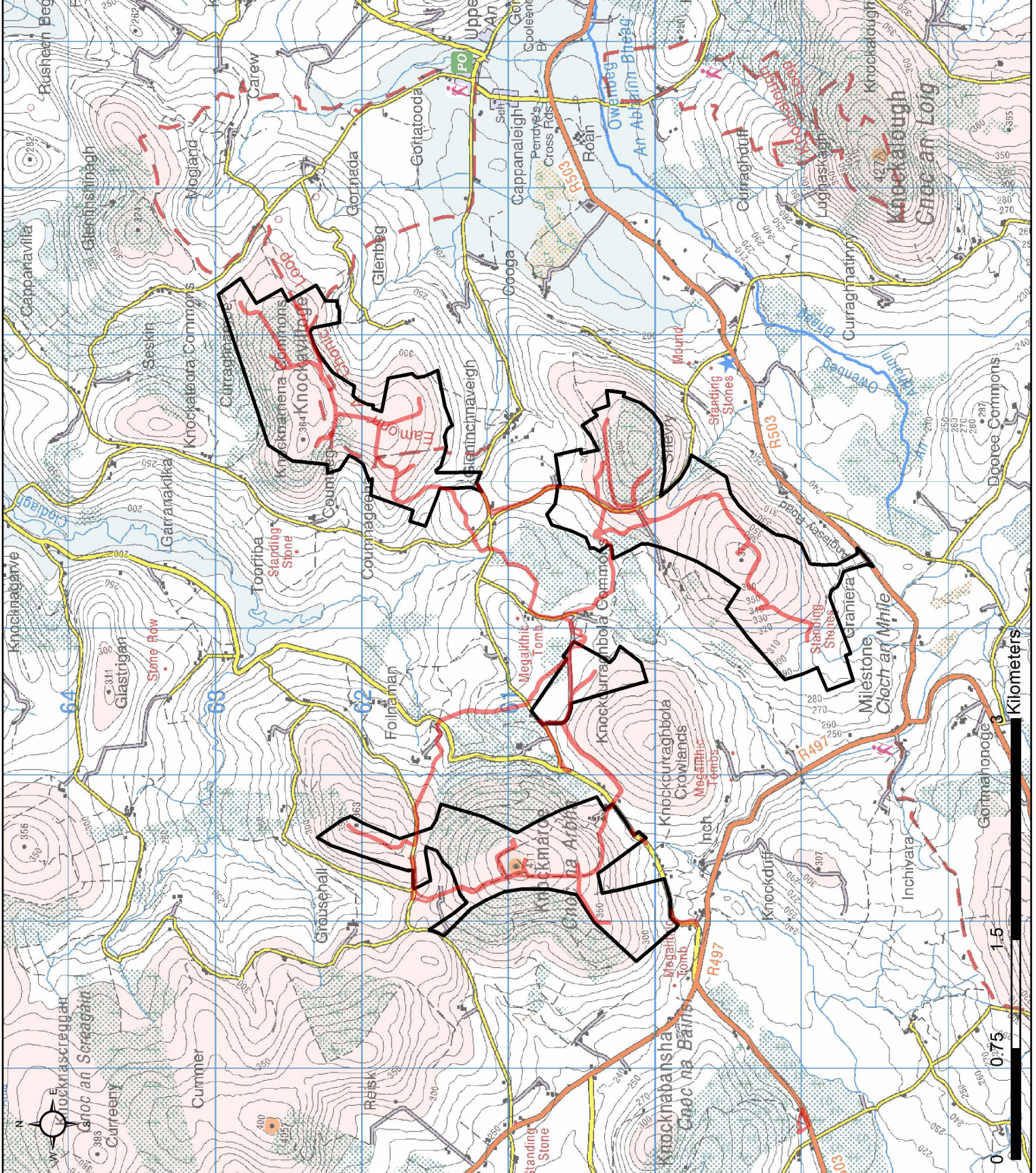
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Client: Ecopower

Project: UFW Related Works Appeal

Title:
Hen Harrier Flightlines July 2016

Legend:

- Nil Observations of Note
- Upperchurch Windfarm 2013 Study Area
- Related Works Construction Works
- Boundary

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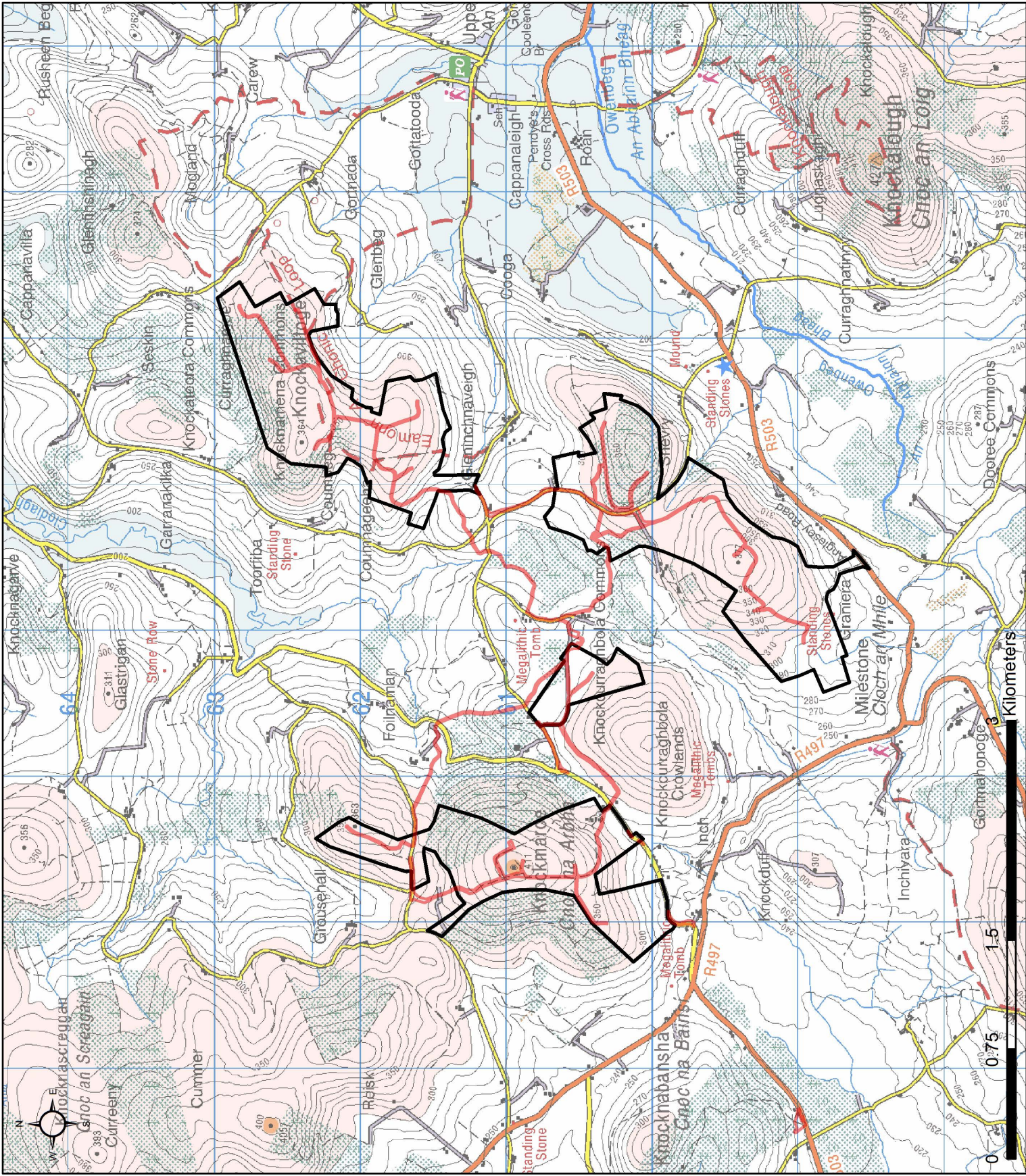
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Client: Ecopower

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Title:
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Legend:

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- Boundary

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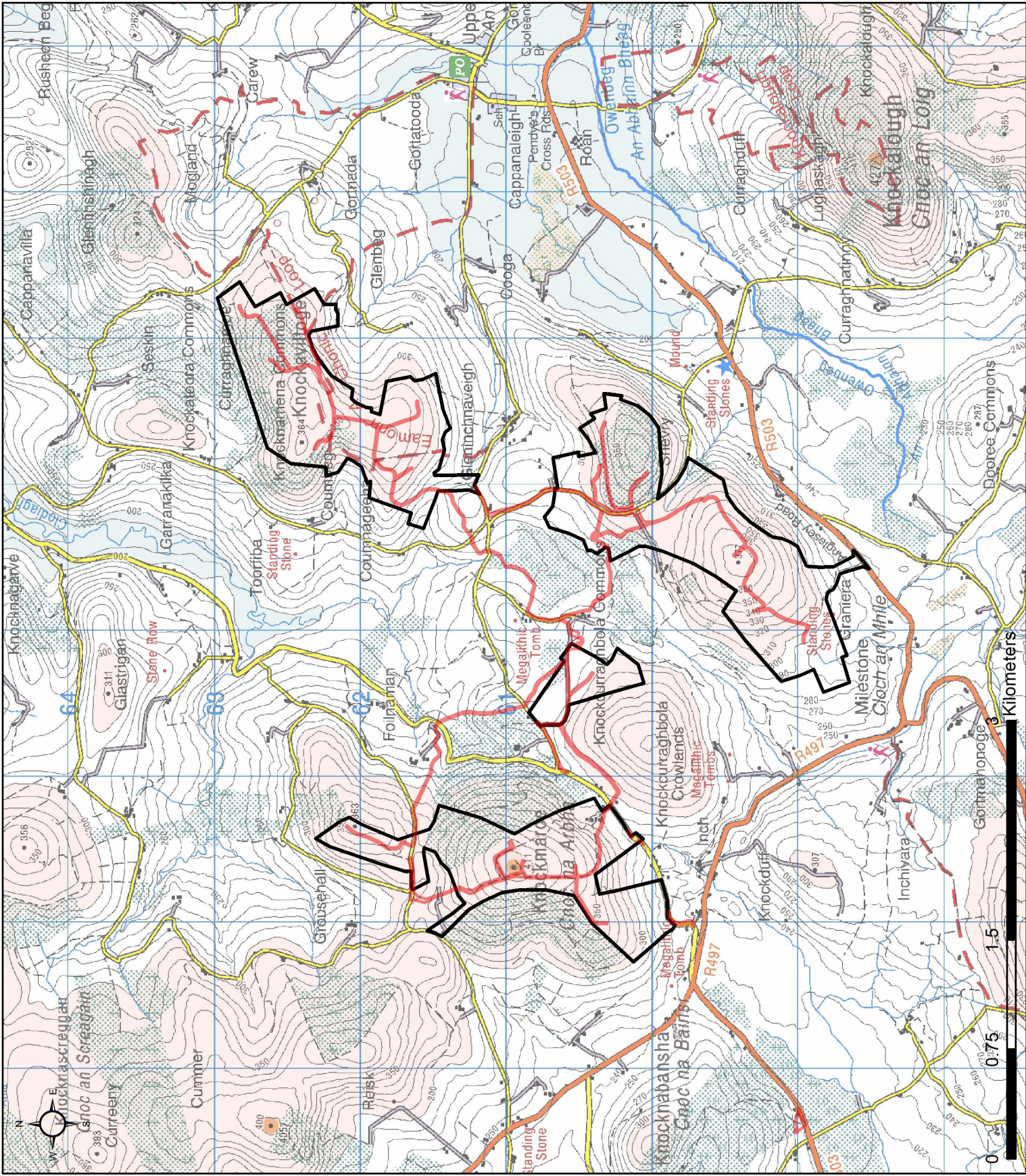
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Title:
Hen Harrier Flightlines September 2016

Legend:

- Nil Observations of Note
- Upperchurch Windfarm 2013 Study Area
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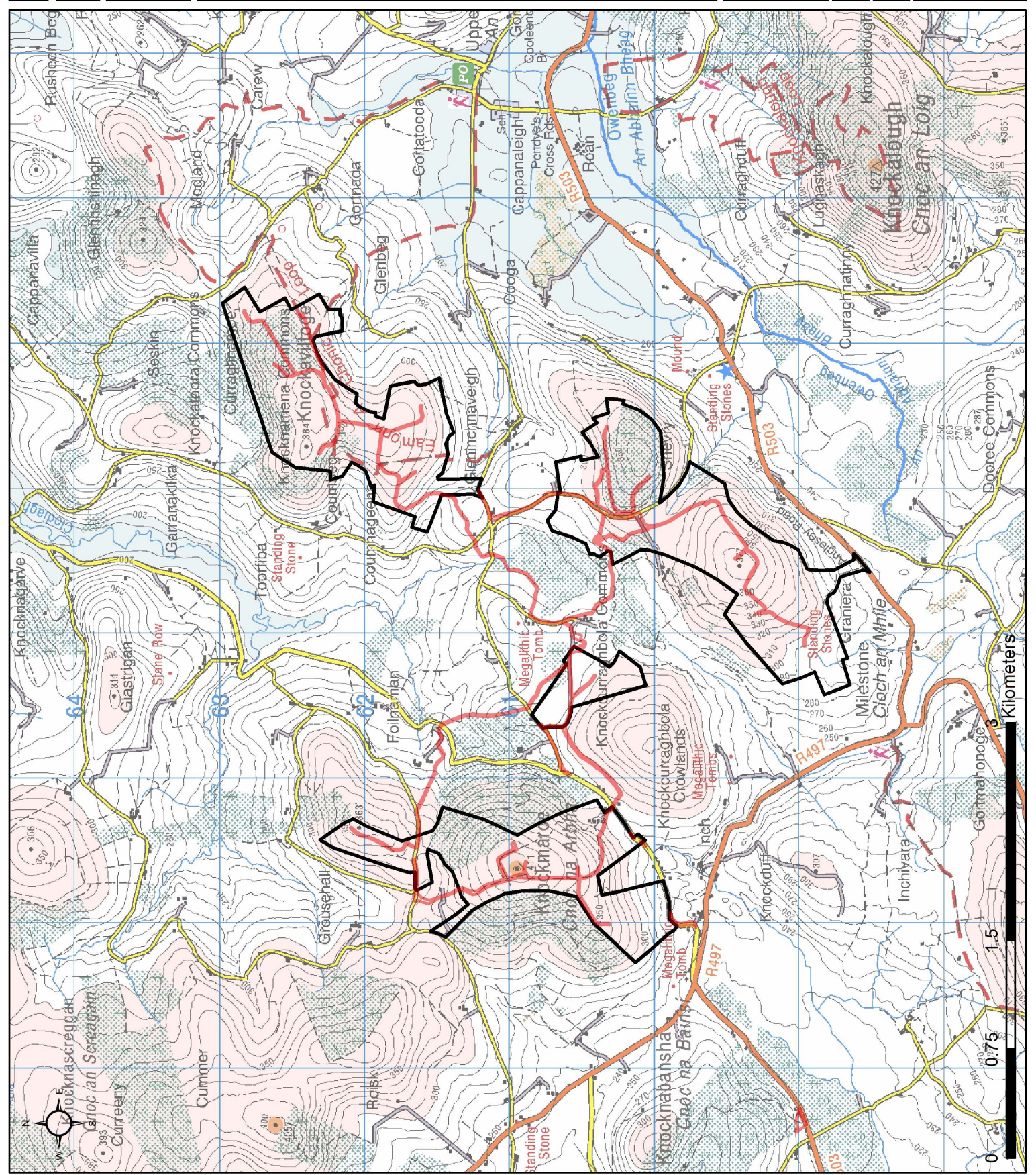
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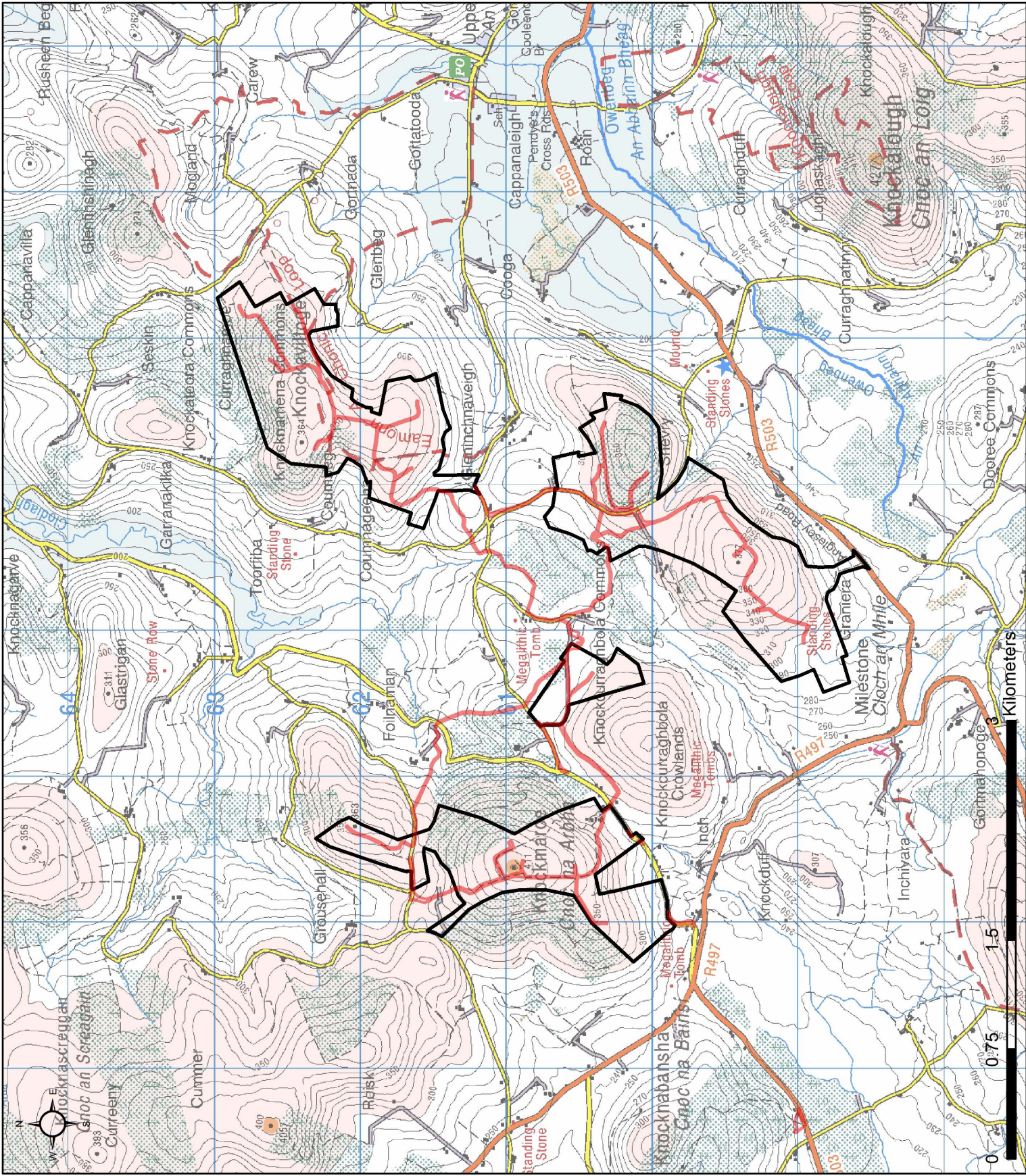
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- Related Works Construction Works Boundary

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Project: UFW Related Works Appeal

Title:
Hen Harrier Flightlines November 2016

Legend:

- Nil Observations of Note
- Upperchurch Windfarm 2013 Study Area
- Related Works Construction Works Boundary

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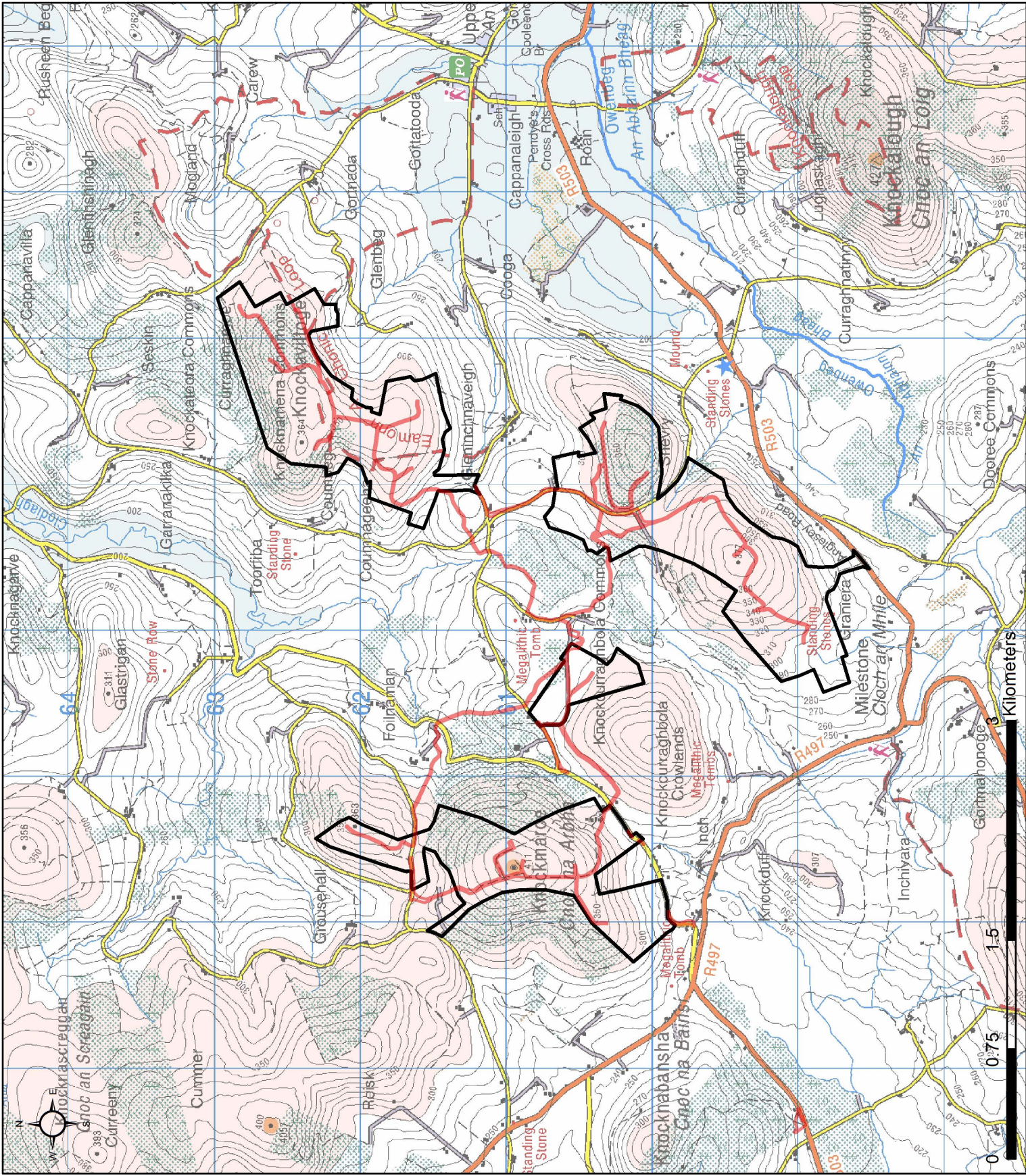
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Client: Ecopower

Project: UFW Related Works Appeal

Title:
Hen Harrier Flightlines December 2016

Legend:

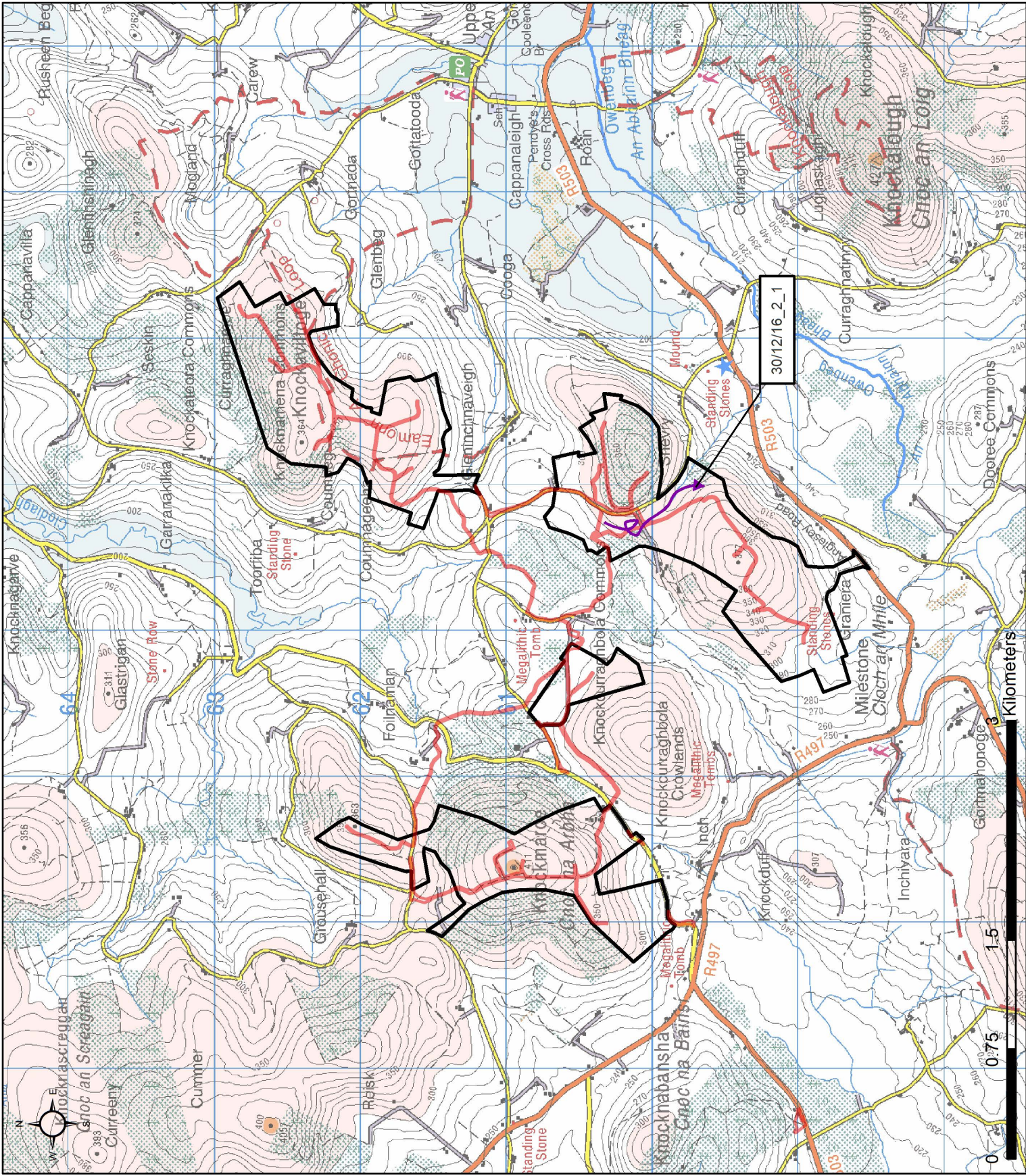
Observations of Note:

-  Hen Harrier (Female)
-  Upperchurch Windfarm 2013 Study Area
-  Related Works Construction Works Boundary

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Client: Ecopower

Project: UFW Related Works Appeal

Title:
Hen Harrier Flightlines January 2017

Legend:

Observations of Note:

-  Hen Harrier (Female)
-  Upperchurch Windfarm 2013 Study Area
-  Related Works Construction Works
-  Boundary

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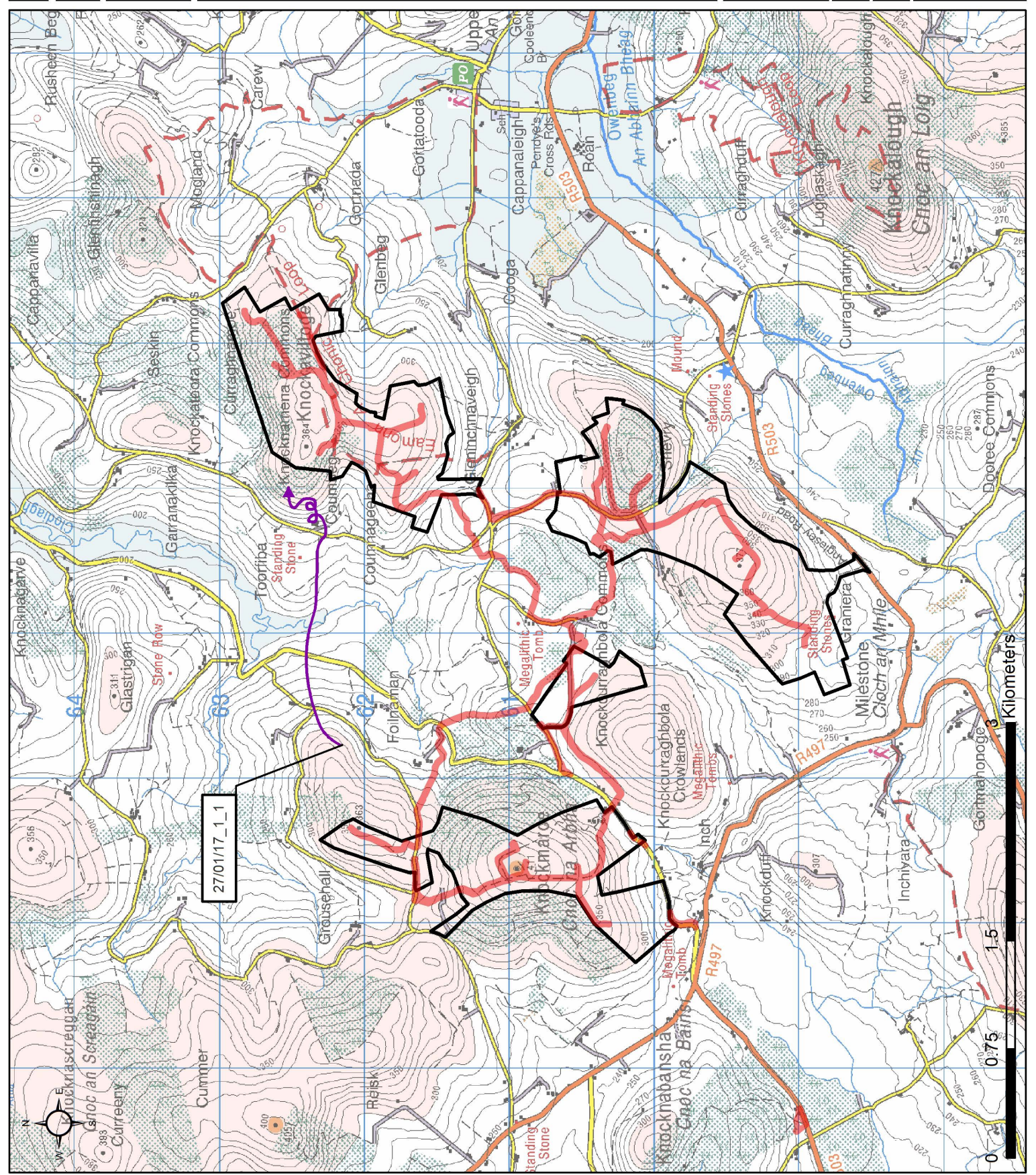
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Title:
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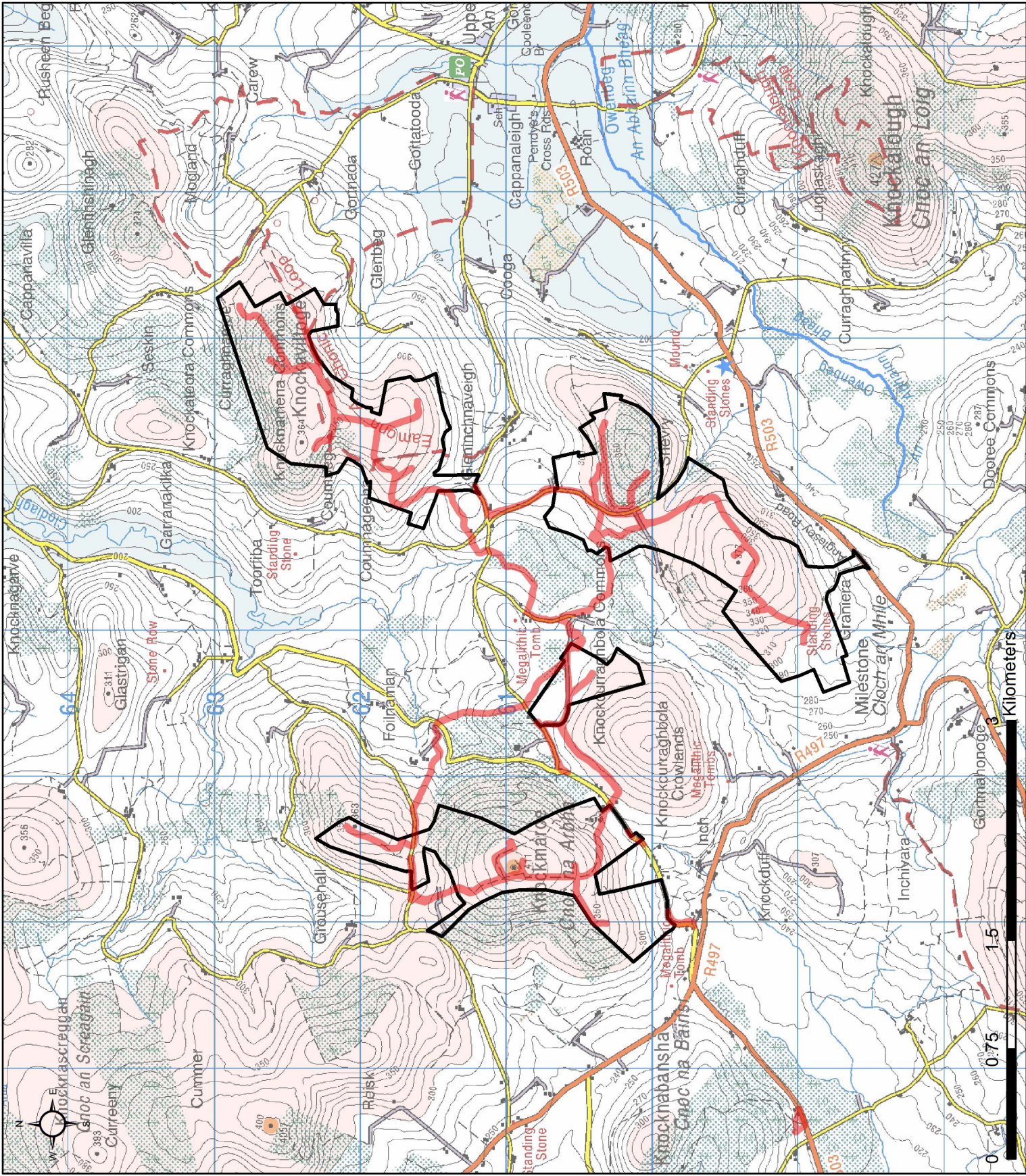
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Project: UFW Related Works Appeal

Title:
Hen Harrier Flightlines March 2017

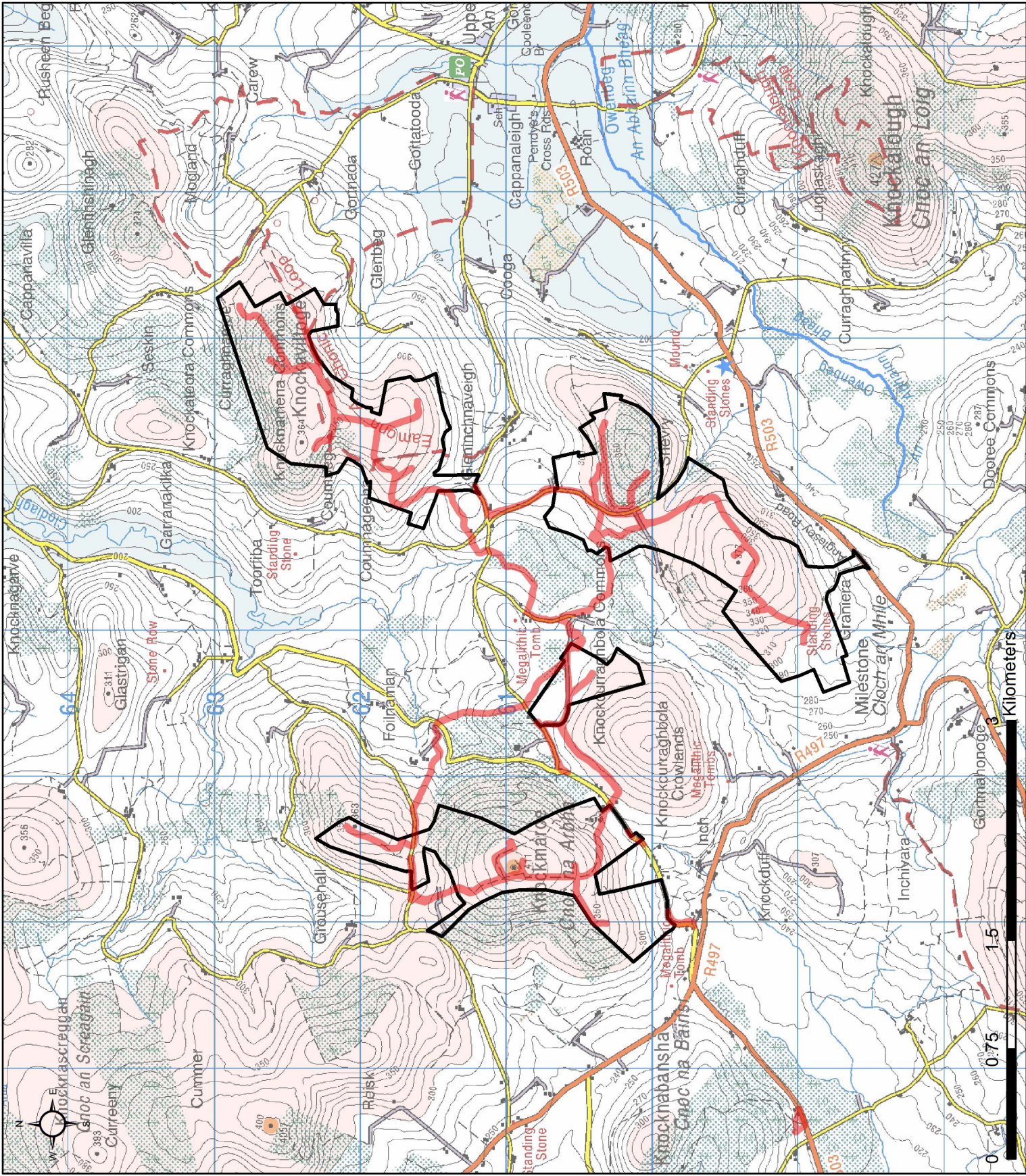
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A8.1.6 Milestone & Inchivara Windfarm Development Preconstruction Hen Harrier Surveys 2015

**MILESTONE & INCHIVARA
WIND FARM DEVELOPMENT**

**PRE-CONSTRUCTION HEN HARRIER SURVEY
2015**

DECEMBER 2015

Prepared for

ABO Wind Ltd.

by

**Biosphere Environmental Services
29 La Touche Park, Greystones, Co. Wicklow
Tel: 01-2875249 E-mail: maddenb@eircom.net**



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APPENDICES

Appendix 1. Hen Harrier survey : Classification of habitat types & Categories for activity and behaviour of observed birds.

Appendix 2. Hen Harrier Survey 2015: details of Vantage Point watches, April and May

1.0 INTRODUCTION

BioSphere Environmental Services (BES) was commissioned by ABO Wind Ireland Ltd. to carry out a Hen Harrier breeding survey in 2015 at the sites of the Milestone and Inchivara wind farm developments. The survey was focused on the area within a 500 m radius (approximately) of the construction works which will be carried out at these sites for wind farm development.

It is noted that BES had previously carried out bird surveys at the two sites in 2012, with a further survey at Inchivara in 2013.

1.1 General description of sites

Milestone

The majority of the Milestone site is improved grassland that is managed intensively for agriculture and is of little or no value for foraging hen harriers. Part of the grassland on the Knockcurraghbola Crowlands hill (north-west sector of site) has been reclaimed from heath relatively recently and has a wet character. However, this offers limited foraging potential for hen harriers as the sward is managed intensively through mowing and lacks a tussocky character.

Conifer plantation of two main ages occurs in the north-east sector of the site. Part of this is mature closed canopy forest (planted in 1993) and provides negligible foraging opportunities for harriers. The remainder was planted in 1998 and similarly offers low foraging potential. One small stand of young pre-thicket plantation (planted circa 2009), which provides potential foraging habitat for harriers, occurs in the central area of the site. A strip of immature deciduous woodland (WS2) in the central area of the site offers some foraging potential though is small in extent.

Further conifer plantations occur to the north and east of the site (all now beyond the canopy closure stage), with recent plantings on Shevry Hill.

Inchivara

The majority of the Inchivara site is improved grassland and is of little or no value for foraging hen harriers. The few areas of wet or rough grassland offer some potential for foraging. The plantation on site is now closed canopy and offers low potential for foraging.

The site is adjacent to areas of heath/bog, rough pasture and young plantation to the south and west (mostly within the SPA).

1.2 Slieve Felim to Silvermine Mountains SPA

The Milestone site is located approximately 1 kilometre east of the south-east boundary of the Slieve Felim to Silvermine Mountains SPA (code 04165), while the Inchivara site partially overlaps with the south-east boundary of the SPA.

The SPA is an extensive upland site, much of which is over 200 metres in altitude, rising to 694 m at Keeper Hill. Several important rivers rise within the site, including the Mulkear, Bilboa and Clare rivers.

The site consists of a variety of upland habitats, though approximately half is afforested. The coniferous forests include first and second rotation plantations, with both pre-thicket and

Milestone & Inchivara Wind Farms: Hen Harrier Survey 2015

post-thicket stands present. Substantial areas of clearfell are also present at any one time. Roughly one-quarter of the site is unplanted blanket bog and heath, with both wet and dry heath present. The remainder of the site is largely rough grassland that is used for hill farming.

This SPA is one of the strongholds for Hen Harriers in the country with a population of national importance. During the 2010 national survey, six confirmed pairs and one possible pair were recorded within the SPA (Ruddock et al. 2012). The mix of forestry and open areas provides optimum habitat conditions for this rare bird, which is listed in Annex I of the Birds Directive.

The SPA site is also a traditional breeding site for a pair of Peregrines. Merlin has been recorded within the site but further survey is required to determine its status. Both of these species are listed on Annex I of the EU Birds Directive. Red Grouse is found on some of the unplanted areas of bog and heath – this is a species that has declined in Ireland and is now Red-listed.

2.0 SURVEY METHODS

The survey is based on the methodology of Scottish Natural Heritage (2013). However, as the objective was merely to establish the presence of breeding birds on site (or strictly within 500 m of construction areas) there was no need for monthly surveys through the entire season (which is a requirement for collision risk modelling). Two rounds of surveying were carried out in the early part of the season, i.e. April to May. After early to mid June there is no real prospect of a breeding territory being established although a further short visit to the Milestone site was made in late June.

Surveys were carried out in the following periods:

28th to 29th April

13th to 14th May

23rd June

In previous surveys (as detailed in the relevant EIS reports), two vantage points had been used to provide complete coverage over the Milestone site and one for the Inchivara site. These were used again in 2015 and are described below:

Milestone

- **VP 1** (grid ref. 9583 6024) is located on the road at Shevry just east of the site. This gives commanding views over Knockcurraghbola Commons towards the peak of Knockmaroe, and also views of the north side of the 377 m hill to the south-west of Shevry.
- **VP 2** is located within the site on the mid-slope of Knockcurraghbola Crowlands (grid ref. 9444 5980). This give views of the internal valley and adjoining slopes extending west of the R497 and to the western slope of Shevry Hill.

Inchivara

- **VP 1** (grid ref. 9304 5754) is located on the mid-slope (350 m) of the hill to the south-southeast of the site. This gives a commanding view over the site, the rising ground to the north and east, and the lower land to the west (latter within SPA).

From the VPs, watches of approximately 6 hrs duration (broken into 3 hr sessions) were undertaken in each of the survey months (i.e. 12 hrs coverage from each VP). All surveys were carried out in suitable weather conditions. Observations were conducted between 07.30 and 18.00 hrs GMT. The following variables were recorded for sightings of hen harriers:

- Watch period
- Time of sighting
- Sex of bird
- Behaviour
- Habitat(s) below flight path
- Heights of flight (<10 m, 10-50 m, 50-100m, 100-150m, >150 m)

Where sightings of harriers were made, activity and behaviour of birds observed was identified and differentiated into various standard categories (see Appendix 1). Flight lines (if any) were plotted in the field on a 1:25,000 scale map, with direction of flight indicated.

The habitat or habitats over which the birds passed were classified using the standard categories recommended for hen harrier survey (see Appendix 1).

Other species of conservation importance

As well as Hen Harrier, any other bird species of conservation interest was recorded.

3.0 RESULTS AND DISCUSSION**3.1 Results of 2015 survey****Milestone**

One Hen Harrier was recorded from VP1 over the strip of conifer plantation to the northeast of WTG4 (within site) and then the adjoining forest to the east of site boundary (Knockcurraghbola Commons) on 13th May 2015. This was an adult female which was foraging over and through the conifers (NF4) at a height of less than 10 m for approximately 90 seconds. Less than 1 hour later it was seen over conifers to northeast of site and then rose steadily in a northwest direction towards Knockmaroe (eventually high in sky, c.200 m, and lost sight off) (see sighting 1, Figure 1).

Inchivara

There were no sightings within the site during the vantage point watches.

However, a male bird was seen briefly (c.30 sec) flying low (presumably hunting) over rough ground approximately 1 km west of the Inchivara site on 29th April 2015. (see sighting 2, Figure 1).

3.2 Discussion

From the 2015 survey, it can be concluded with full certainty that Hen Harriers did not attempt to nest within the Milestone or Inchivara sites (or within 500 m of the future construction work areas).

The female recorded foraging just outside the Milestone site was probably from one the territories in the hinterland though the nearest regular territory to Milestone is at a distance of almost 3 km. As the female would be expected to be sitting on the nest in mid May and only making short feeding forays from the nest location, this may suggest that the nesting attempt failed early in the season.

The male recorded in late April to the west of Inchivara (within the SPA) is not unexpected and this bird could be associated with any of the traditional territories (no. 3) within a 5 km radius of Inchivara.

The 2015 results concur with the findings of the 2012 and 2013 surveys, when several birds were recorded foraging within and around the Milestone site and in the vicinity of the Inchivara site but with local nesting not suspected

3.3 Other bird species recorded

There were no records from within the two wind farm sites of any other species of high conservation importance.

Kestrel (*Falco tinnunculus*), however, was recorded regularly (1-2 birds) within and around the Milestone site and on two occasions at Inchivara and probably breeds locally.

4.0 CONCLUSION AND RECOMMENDATION

The present survey provides conclusive proof that there were no nesting attempts by Hen Harriers within the Milestone and Inchivara wind farm sites in the 2015 season. This is in line with the previous surveys at these two sites and also reflects the absence of any historic records of nesting within or close to the sites.

While it is likely that the situation (i.e. no nesting within sites) will not change in the 2016 season, a similar survey focused on the early part of the breeding season would be required to confirm this. Should a survey in 2016 prove negative for nesting birds, it follows that there would be no restrictions on construction activities within the sites due to Hen Harriers during 2016.

The sightings of two hunting birds in the area during the April and May 2015 surveys indicates that nesting is still occurring at some of the traditional territories within the hinterland of the wind farm sites and foraging birds can be expected in the Milestone and Inchivara area.

5.0 REFERENCES

Barton, C., Pollack, C., Norriss, D.W., Nagle, T.A., Oliver, G.A. & Newton, S. (2006) The second national survey of breeding Hen Harriers *Circus cyaneus* in Ireland 2005. *Irish Birds* 8: 1-20

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Ruddock, M, Dunlop, B.J., O'Toole, L., Mee, A., & Nagle, T. (2012) *Republic of Ireland National Hen Harrier Survey 2010*. Irish Wildlife Manual No. 59. NPWS, Dublin.

Scottish Natural Heritage (May 2013). Survey Methods for Use in Assessing the Impacts of Onshore Wind Farms on Bird Communities

APPENDIX 1

Hen Harrier Survey

Classification of habitat types

NF 2	New forestry plantation, trees 20-30 cm high
NF 3	New forestry plantation, trees c 1m in height
NF 4	New forestry plantation, trees >2m in height, patchy thickets
2nd F 1 & 2	2nd rotation forestry plantation, trees 20-30 cm high
2nd F 3	New forestry plantation, trees c 1m in height
2nd F 4	New forestry plantation, trees >2m in height, patchy thickets
F	Post thicket plantation
G	Grazing
RG	Rough Grazing & rushy pasture
HB	Heath / Bog
DE	Deciduous woodland & scrub
GO	Gorse
CF	Clearfell
H	Hedgerow

Categories for activity and behaviour of observed birds

- c - circling
- d - displaying
- fl - flying
- fp - foodpass
- g - on ground
- gl - gliding
- h - hunting
- p - perching
- s - soaring
- wp - with prey
- fp - foodpass

APPENDIX 2

Hen Harrier Survey 2015: details of Vantage Point watches, April and May

MILESTONE

3-hour Vantage Point Watches

VP ID	Observer	Date	Watch Period	Details	Notes	Weather
1	BM	28 April	09:30-12:30	-	No HH sighted Cuckoo calling ; Male Kestrel hunting on & off site – seen several times;	Vis: good; Prec.: dry; Wind: SW F2-3
2	BM	28 April	14:00 - 17:00	-	Kestrel - 1 NW of wind farm	Vis: good; Prec.: dry; Wind: SW F3
1	BM	29 April	08.15-11.15	-	No HH sighted 2 Cuckoos Pair Kestrels	Vis: good; Prec.: dry; Wind: SW F2
2	BM	29 April	12.30-15.30	-	No HH sighted	Vis: good; Prec.: dry; Wind: SW F3
1	BM	13 May	09.45-12:45	Female Hen Harrier flew over conifers to NE of WTG4 & conifers to east at 10.50 hrs. Height <10 m; Duration 90 sec. At 11.35 hrs, same bird flew up from conifers and rose n a NW direction towards Knockmaroe, to a height of c.200 m & out of sight		Vis: good; Prec.: dry; Wind: W F2
2	BM	13 May	14:30-17:30	-	No HH sighted 1 Kestrel hunting in site	Vis: good; Prec.: dry; Wind: W F2+
1	BM	14 May	08.30-11.30	-	No HH sighted Buzzard drifted over north end of site	Vis: good; Prec.: mostly dry (a few showers); Wind: SW F3
2	BM	14 May	13.00-16.00	-	No HH sighted 4 Ravens in area	Vis: good; Prec.: dry; Wind: SW F3

INCHIVARA

3-hour Vantage Point Watches

VP ID	Observer	Date	Watch Period	Details	Notes	Weather
1	GP	28 April	09:00-12:00	-	No HH sighted Cuckoo pair; Kestrel to west	Vis: good; Prec.: dry; Wind: SW F2-3
1	GP	29 April	08:00 - 11:00	Male HH close to forest c.1km west of wind farm – foraging mode, c.10 m high. Seen for 30 sec	No HH sighted;	Vis: good; Prec.: dry; Wind: SW F2
1	GP	13 May	08.15-11.15	-	No HH sighted Kestrel off site	Vis: good; Prec.: dry; Wind: W F2

REFERENCE DOCUMENT

Milestone & Inchivara Wind Farms: Hen Harrier Survey 2015

VP ID	Observer	Date	Watch Period	Details	Notes	Weather
1	GP	13 May	14.30- 17.30	-	No HH sighted	Vis: good; Prec.: dry; Wind: W F2-3

**MILESTONE
WIND FARM DEVELOPMENT
PRE-CONSTRUCTION HEN HARRIER SURVEY,
2017**

FINAL REPORT

MAY 2017

Prepared for

ABO Wind Ireland Ltd.

by

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29 La Touche Park, Greystones, Co. Wicklow
Tel: 01-2875249 E-mail: maddenb@eircom.net**



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1.0 INTRODUCTION

BioSphere Environmental Services (BES) was commissioned by ABO Wind Ireland Ltd. to carry out a Hen Harrier breeding survey in 2017 at the site of the Milestone and Inchivara wind farm development. The survey was focused on the area within a 500 m radius (approximately) of the construction works which will be carried out at the site for wind farm development.

It is noted that BES had previously carried out bird surveys at the site in 2015, 2013 and 2012.

1.1 General description of site

Milestone component

The majority of the Milestone site is improved grassland that is managed intensively for agriculture and is of little or no value for foraging hen harriers. Part of the grassland on the Knockcurraghbola Crowlands hill (north-west sector of site) has been reclaimed from heath relatively recently and has a wet character. However, this offers limited foraging potential for hen harriers as the sward is managed intensively through mowing and lacks a tussocky character.

Conifer plantation of two main ages occurs in the north-east sector of the site. Part of this is mature closed canopy forest (planted in 1993) and is not of significant value to harriers for nesting or foraging purposes. The remainder was planted in 1998 and similarly offers low potential for nesting or foraging. One small stand of young pre-thicket plantation (planted circa 2009), which provides potential foraging habitat for harriers, occurs in the central area of the site. A strip of immature deciduous woodland (WS2) in the central area of the site offers some foraging potential though is small in extent.

Further conifer plantations occur to the north and east of the site, including Shevry Hill, though all of these are now at or beyond the canopy closure stage.

Inchivara component

The Inchivara component of the site is improved grassland and is of little or no value for foraging hen harriers. Locally there are a few areas of wet or rough grassland which offer marginal potential for foraging. A nearby conifer plantation is now closed canopy and offers negligible potential for foraging. The site is adjacent to areas of heath/bog, rough pasture and some young plantation to the south and west – these habitats provide useful foraging habitats for Hen Harriers and are mostly within the SPA. _

1.2 Slieve Felim to Silvermine Mountains SPA

The Milestone site is located approximately 1 kilometre east of the south-east boundary of the Slieve Felim to Silvermines Mountains SPA (code 04165), while the turbine location at

Inchivara is approximately 300 m from the SPA boundary.

The SPA is an extensive upland site, much of which is over 200 metres in altitude, rising to 694 m at Keeper Hill. Several important rivers rise within the site, including the Mulkear, Bilboa and Clare rivers.

The site consists of a variety of upland habitats, though approximately half is afforested. The coniferous forests include first and second rotation plantations, with both pre-thicket and post-thicket stands present. Substantial areas of clearfell are also present at any one time. Roughly one-quarter of the site is unplanted blanket bog and heath, with both wet and dry heath present. The remainder of the site is largely rough grassland that is used for hill farming.

The SPA is an important stronghold for Hen Harriers (Barton *et al.* 2006, Ruddock *et al.* 2012, Ruddock *et al.* 2016). Survey in the 2005 national survey recorded 5 pairs (4 confirmed, 1 possible). Numbers had increased to six confirmed pairs and one possible pair in the 2010 national survey, though this may have been due to increased survey coverage (Ruddock *et al.* 2012). Further increase to 10 breeding pairs (4 confirmed, 6 possible) was recorded in the 2015 national survey (Ruddock *et al.* 2016).

The SPA site is also a traditional breeding site for a pair of Peregrines. Merlin has been recorded within the site but further survey is required to determine its status. Both of these species are listed on Annex I of the EU Birds Directive. Red Grouse is found on some of the unplanted areas of bog and heath – this is a species that has declined in Ireland and is now Red-listed.

2.0 SURVEY METHODS

The survey is based on the methodology used in the Irish Hen Harrier Survey 2015 (Ruddock *et al.* 2016) to detect breeding territories (see ‘Survey and recording guidelines for contributors’). Two rounds of site visits are required between late-March and mid-May to establish territorial occupancy. Should these visits indicate that there is a territory present, further visits are required between late-May and July. However, if no birds are detected by mid-May, it can be assumed that the establishment of a new territory after that is highly unlikely.

The surveys were carried out on the following dates:

12th and 19th April

18th and 19th May

In previous surveys (as detailed in the relevant EIS reports), two vantage points had been used to provide complete coverage over the Milestone site and one for the Inchivara site. These were used again in 2017 and are described below:

Milestone

- **VP 1** (grid ref. 9583 6024) is located on the road at Shevry just east of the site. This gives commanding views over Knockcurraghbola Commons towards the peak of

Knockmaroe, and also views of the north side of the 377 m hill to the south-west of Shevry.

- **VP 2** is located within the site on the mid-slope of Knockcurraghbola Crowlands (grid ref. 9444 5980). This give views of the internal valley and adjoining slopes extending west of the R497 and to the western slope of Shevry Hill.

Inchivara

- **VP 1** (grid ref. 9304 5754) is located on the mid-slope (350 m) of the hill to the south-southeast of the site. This gives a commanding view over the site, the rising ground to the north and east, and the lower land to the west (latter within SPA).

From the VPs, watches of approximately 6 hrs duration (broken into 3 hr sessions) were undertaken in each of the survey sessions (i.e. 12 hrs coverage from each VP). All surveys were carried out in suitable weather conditions (winds <F4). Observations were conducted between 07.00 and 19.00 hrs GMT. The following variables were recorded for sightings (if any) of hen harriers:

- Watch period
- Time of sighting
- Sex of bird
- Behaviour
- Habitat(s) below flight path
- Heights of flight (<10 m, 10-50 m, 50-100m, 100-150m, >150 m)

Where sightings of harriers were made, activity and behaviour of birds observed was identified and differentiated into various standard categories (see Appendix 1). Flight lines (if any) were plotted in the field on a 1:25,000 scale map, with direction of flight indicated. The habitat or habitats over which the birds passed were classified using the standard categories recommended for hen harrier survey (see Appendix 1).

Other species of conservation importance

As well as Hen Harrier, any other bird species of conservation interest was recorded.

3.0 RESULTS AND DISCUSSION

Results of the 2017 survey

Information on the vantage point watches is presented in Appendix 2.

There were no sightings of Hen Harriers within the wind farm site during the vantage point surveys in April and May 2017.

On 19th May, a male bird was seen off-site, approximately 2 km northwest of the Inchivara component – this bird was passing west over forestry and bog on the southern slope of Knocknabansha (approx. location R 914593) and within the area of the SPA.

The results confirm that there was no attempt by a Hen Harrier pair to establish a breeding territory within the wind farm study area. The single sighting of a male bird to the northwest could have been from any one of several traditional territories to the north and west of Milestone (male harriers can travel up to 5 km from the nest site when foraging).

The absence of sightings is not surprising as habitats on site are of low value for Hen Harriers (both for nesting and foraging purposes). The plantation forestry that is present is now within the closed canopy stage which is not of significant value for Hen Harriers (see Plates 1 & 2). It is noted that the sightings of Hen Harriers in previous surveys were at a time when open canopy plantation existed which provided suitable foraging habitat.

Other bird species recorded

There were two records of Kestrel on site in April and one just north of site in May. The April records were both male birds and probably referred to the same individual (sex of May bird not determined). It is likely that Kestrel nests locally (but not on site).

There was one record of Sparrowhawk on site in April and this species is expected to breed locally.

Raven nested off-site in a small quarry to the east of Shevry Hill.

4.0 CONCLUSION

The 2017 survey did not record any sighting of Hen Harrier within or around the wind farm site (the only sighting during the study was of a single bird off-site at a distance of c.2 km from the development area). This conclusively demonstrates that Hen Harrier did not attempt to nest within the site or in the surrounding areas.

Taking into account that there are no records of harriers nesting in this area in the past, and considering the low potential the habitats on site presently have for supporting Hen Harriers, the absence of birds in the study area is not surprising.

5.0 REFERENCES

Barton, C., Pollack, C., Norriss, D.W., Nagle, T.A., Oliver, G.A. & Newton, S. (2006) The second national survey of breeding Hen Harriers *Circus cyaneus* in Ireland 2005. *Irish Birds* 8: 1-20

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Scottish Natural Heritage (May 2014). Survey Methods for Use in Assessing the Impacts of Onshore Wind Farms on Bird Communities



Plate 1. View of Milestone Wind Farm from Vantage Point A, looking westwards across site towards Knockcurraghbola Hill. Note closed canopy conifer plantations.



Plate 2. View of Milestone Wind Farm from Vantage Point B, looking eastwards across site towards Shevry Hill (centre of photo). Note improved pasture grassland and closed canopy conifer plantations.

APPENDIX 1

Hen Harrier Survey

Classification of habitat types

NF 2	New forestry plantation, trees 20-30 cm high
NF 3	New forestry plantation, trees c 1m in height
NF 4	New forestry plantation, trees >2m in height, patchy thickets
2nd F 1 & 2	2nd rotation forestry plantation, trees 20-30 cm high
2nd F 3	New forestry plantation, trees c 1m in height
2nd F 4	New forestry plantation, trees >2m in height, patchy thickets
F	Post thicket plantation
G	Grazing
RG	Rough Grazing & rushy pasture
HB	Heath / Bog
DE	Deciduous woodland & scrub
GO	Gorse
CF	Clearfell
H	Hedgerow

Categories for activity and behaviour of observed birds

c - circling
 d - displaying
 fl - flying
 fp - foodpass
 g - on ground
 gl - gliding
 h - hunting
 p - perching
 s - soaring
 wp - with prey
 fp - foodpass

APPENDIX 2

Hen Harrier Survey 2017: details of Vantage Point watches, April and May

MILESTONE 3 hour Vantage Point Watches

VP ID	Date	Watch Period	Observation Details	Weather
1	12 April	08.30-11.30	No HHs Kestrel at Shevry (off-site); Ravens active in area	Dry Wind: SW F2 Visibility: good
2	12 April	12.15-15:15	No HHs	Showers Wind: SW F2-3 Visibility: mod-good
1	19 April	07.45-10.45	No HHs Male kestrel flew through site	Dry Wind: W F2 Visibility: good
2	19 April	12.00-15.00	No HHs Sparrowhawk hunting along edge of conifer plantation Swallows (20+)	Dry Wind: W F2 Visibility: good
2	18 May	10.30-13:30	No HHs Cuckoo calling; Kestrel hunting just north of site	Dry Wind: S F2 Visibility: good
1	18 May	14.30-17:70	No HHs	Dry Wind: S F2 Visibility: good
2	19 May	07.00-10.00	No HHs Ravens (2) overhead	Dry Wind: SW F2 Visibility: good
1	19 May	11.00-14.00	No HHs 2 cuckoos	Occ. showers Wind: SW F2 Visibility: good

INCHIVARA 3 hour Vantage Point Watches

VP ID	Date	Watch Period	Observation Details	Weather
1	12 April	16.00-19.00	No HHs	Dry Wind: SW F2 Visibility: good
1	19 April	15.45-18.45	No HHs	Dry Wind: W F2 Visibility: good
1	18 May	07.00-10:00	No HHs Cuckoo calling;	Dry Wind: S F2 Visibility: good
1	19 May	15.00-18.00	Hen Harrier – male c. 2km NW of site – hunting on slope of Knocknabansha	Dry Wind: SW F2 Visibility: good

A8.1.7 Confidential Annex

The Confidential Annex contains highly sensitive information on protected species that are vulnerable to persecution. It may be reviewed by the planning officers of the Competent Authorities and by the Statutory Consultees (e.g. the National Parks and Wildlife Service), but should not be published on any online system or made available in any other public format.

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UWF Related Works

Revised Appropriate Assessment Report For UWF Related Works

January 2019

Appendix A13: Biodiversity Information Appendix 8.1.7 Confidential Annex



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CONFIDENTIAL ANNEXAPPENDIX 8.1
to EIA Chapter 8:*Biodiversity*

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*APPENDIX 8.1
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Biodiversity

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